

NSTA AREA CONFERENCE ON SCIENCE EDUCATION

# SALT LAKE CITY, UT

OCTOBER 24-26, 2019



This Is the Place for Monumental Science

[www.nsta.org/saltlakecity](http://www.nsta.org/saltlakecity)

#NSTA19



National  
Science  
Teaching  
Association



# TODAY'S LABS CREATE TOMORROW'S LEADERS

Nearly all of the  
30 fastest-growing  
occupations in the  
next decade will  
require at least some  
background in STEM.<sup>1</sup>

<sup>1</sup> BUSINESS CENTER FOR A COLLEGE-  
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Vernier Software & Technology helps teachers instill curiosity and hone problem-solving skills through innovative technology and engaging investigations. With our technology, teachers can prepare students for careers in an ever-evolving, STEM-focused world.

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**National  
Science  
Teaching  
Association**

Salt Lake City, UT Area Conference

**OCTOBER 24–26, 2019**



**NSTA 2019 Area Conference on Science Education**  
*This Is the Place for Monumental Science*  
 Salt Lake City, Utah • October 24–26, 2019

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**Presenters, key information,  
and complete session descriptions  
on Conference App:**

**Visit: [www.nsta.org/conferenceapp](http://www.nsta.org/conferenceapp)**

**National Science Teaching Association**

1840 Wilson Blvd.  
 Arlington, VA 22201-3000  
 703-243-7100  
 E-mail: [conferences@nsta.org](mailto:conferences@nsta.org)  
[www.nsta.org](http://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)
- WIDA

# Thank You!

We at NSTA wish to express our heartfelt thanks to the members of UtSTA (Utah Science Teachers Association) for the many hours of time they volunteered in planning this conference.



## Contributors

American Chemical Society  
American Society for Engineering Education

## Salt Lake City Conference Committee

---

### *Program Representatives*

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**Conference Advisory Board Liaison**  
David Crowther  
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### *Strand Leader*

**Navigating Phenomenal Landscapes:  
Using Phenomena as a Way to Guide  
Science Instruction**  
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### *Strand Leader*

**Forming Natural Bridges: Integrating  
Science Across Content Areas**  
**Richard (Ricky) Scott**  
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### *Strand Leader*

**Hook 'em for Life: Sustaining  
Science Teaching and Learning**  
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### *Guides Manager*

**Laura Cotter**  
Senior Manager, Education  
Discovery Gateway Children's Museum  
Salt Lake City, UT

## President's Welcome: Making Science Learning Lifelong, Life-wide, and Life-deep



Welcome to the NSTA Area Conference in Salt Lake City. The planning committee has done an outstanding job of embracing my Presidential Theme: *Making Science Learning Lifelong, Life-wide, and Life-deep*.

- *Lifelong*: Making science learning something people engage in throughout their lives.
- *Life-wide*: Making science learning something people experience in a variety of situations throughout the day/year (e.g., school, home, afterschool, museums, and summer camps).
- *Life-deep*: Encouraging people to engage in science learning at a level that is right for them (e.g., enjoying following science in the media; participating in a citizen science project; becoming an amateur astronomer; becoming a science-based professional).

You will see that the conference uses the grand scenery of the region to think about how science is pervasive throughout life, especially in the strand *Hook 'em for Life: Sustaining Science Teaching and Learning*. Sessions related to this strand explore how rich science environments can support and encourage the love of science to “hook” learners’ interest in science and engage their curiosity as lifelong learners and advocates of scientific literacy. The other two strands also build on the region’s geography and geology: *Forming Natural Bridges: Integrating Science Across Content Areas* shows how learning is a habit of mind that a student builds, beginning with bridging simple connections and ideas that progress toward synthesizing and transferring learning to new and complex situations. *Navigating Phenomenal Landscapes: Using Phenomena as a Way to Guide Science Instruction* shows how science makes sense of observable natural phenomena and can be used to predict future occurrences. Phenomena help students navigate their learning and operate much like landmarks on a map, helping students understand the world around them and make sense of future sights they might see.

My thanks to the conference planning committee for developing an outstanding program with more than 200 sessions, exhibit hall displays, and ways for you to network with science educators across the region. May you have an outstanding experience during your time at the conference.

Dennis Schatz  
2019–2020 NSTA President

## Welcome to Salt Lake City—This Is the Place for Monumental Science



John R. Taylor



Josh Stowers



Dawn Monson

Welcome to Salt Lake City! We are proud to welcome science teachers from across the nation to Utah’s high-elevation capital bordered by the buoyant waters of the Great Salt Lake and the snow-capped peaks of the Wasatch Range. Not only are we the “Crossroads of the West” but we are the “Crossroads of Science Instruction.”

“This is the Place” for Monumental Science! Join us in exploring our three strands filled with featured speakers, relevant materials, ideas, and strategies. There will be short courses, hands-on workshops, and, for the first time, 90-minute sessions to meet your science needs.

- *Navigating Phenomenal Science* in 90-minute sessions using phenomena to guide science instruction and assist students in navigating their learning.
- *Forming Natural Bridges* by integrating science across content areas. Find ways to synthesize and transfer learning to new situations.
- *Hook 'em for Life* by sustaining your students in science and learning as they engage their curiosity as lifelong learners and advocates of science.

The conference is located in the heart of the city at the beautiful Salt Palace. You will be within walking distance of the historic Temple Square and Family History Library, Clark Planetarium, Discovery Gateway Children’s Museum, and a bus or Uber ride away from This Is the Place Heritage Park. There are amazing shops, restaurants, and an opportunity to shop for Jazz gear.

We are delighted to welcome you here. Enjoy yourself as you experience Monumental Science Moments!

2019 NSTA Salt Lake City Area Conference Committee Leaders  
John Taylor, Josh Stowers, and Dawn Monson

### Conference Chair

#### John R. Taylor

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### Local Arrangements Coordinator

#### Dawn Monson

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Provo, UT 84601  
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# Registration, Travel, and Hotels

## Meeting Location and Times

The conference headquarters hotel is Hilton Salt Lake City Center. Conference registration, Express Check-in, the exhibits, all sessions, and the NSTA Store will be located at Salt Palace Convention Center.

The conference will begin with concurrent sessions on Thursday, October 24, at 8:00 AM and end on Saturday, October 26, at 12 Noon.

## New Badge Reprint Fee

If you misplace or forget your badge, there will be a reprint fee of \$20 for a replacement badge. To have a replacement badge printed, please proceed to Attendee Services and present your personal ID to be issued a replacement. *Note:* Only ONE replacement badge will be issued.

## Express Check-In

Registration is required for participation in all conference activities and the exhibits. Express Check-In, Attendee Services, and the NSTA Store are located in Hall B. Proceed to Express Check-In to print your official badge and secure conference materials. Express Check-In and Attendee Services will be open the following hours:

Wed., Oct. 23	5:00–7:00 PM
Thu., Oct. 24	7:00 AM–5:00 PM
Fri., Oct. 25	7:00 AM–4:00 PM
Sat., Oct. 26	7:30 AM–12 Noon

## Purchasing Ticketed Events

The Salt Lake City short courses require a separate fee and ticket. You may purchase tickets, space permitting, at NSTA Attendee Services. See page 15 for short course details.

## Getting Around Town

Downtown Salt Lake City is a vortex of entertainment, with many restaurants, bars, and clubs; NBA games; and more. Hop aboard TRAX trains for a ride around downtown. For bus routes and specific transportation questions, visit [www.rideuta.com](http://www.rideuta.com).

# Download the Conference App!

## Connect. Share. Engage.

By downloading the conference app, you'll be able to easily manage your schedule and maximize your conference experience. Start mapping out your journey today!

With the app, you'll be able to:

- Search sessions, exhibitors, and speakers to build a schedule of your favorites
- Filter the sessions you're interested in by strand and type to customize an agenda that is just right for you
- Access maps of the Exhibit Hall, Convention Center, and hotels while you are on the move
- Pull up the all-important Wi-Fi information
- Learn more about the exhibitors and sponsors
- Find out where NSTA events are happening
- Tweet while you are in sessions or attending events
- Receive important updates and notifications

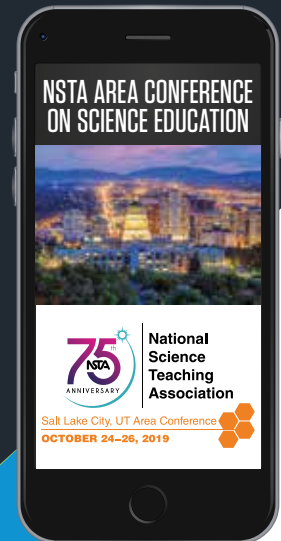
Available for download on



iPhone + iPad



Android



National Science Teaching Association

Download now at  
[www.nsta.org/conferenceapp](http://www.nsta.org/conferenceapp)



## Housing Questions or Concerns?

If you have questions or concerns regarding your housing, contact Orchid.Events (during business hours) Monday through Friday, 7:00 AM–6:00 PM (MT) at 877-352-6710 (toll-free) or 801-505-4611. After hours and on Saturday, call 801-505-4105.



- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Hilton Salt Lake City Center<br/>(Headquarters Hotel)<br/>255 S W Temple</li> <li>2. Holiday Inn Express Salt Lake City<br/>Downtown<br/>206 S W Temple</li> <li>3. Salt Lake Marriott Downtown at<br/>City Creek<br/>75 S W Temple</li> </ol> | <ol style="list-style-type: none"> <li>4. Radisson Hotel Salt Lake City<br/>Downtown<br/>215 W S Temple</li> <li>5. Salt Lake Plaza Hotel Temple<br/>Square<br/>122 S W Temple</li> </ol> |
|--|---|

Shuttle service will not be provided as all hotels are within walking distance of Salt Palace Convention Center.

## Conference Resources

### 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 education.

Go to **Express Check-In** to print your official badge. This badge is your "ticket of admission" to the Exhibit Hall and all non-ticketed conference activities. A map display of the Exhibit Hall is accessible via our Conference app. A complete list of exhibitors is on page 41.

**Exhibit Hall Hours.** Located in Exhibit Hall A of the Convention Center, exhibits will be open for viewing during the following hours:

Thu., Oct. 24	11:00 AM–5:00 PM
Fri., Oct. 25	9:00 AM–4:00 PM
Sat., Oct. 26	9:00 AM–12 Noon

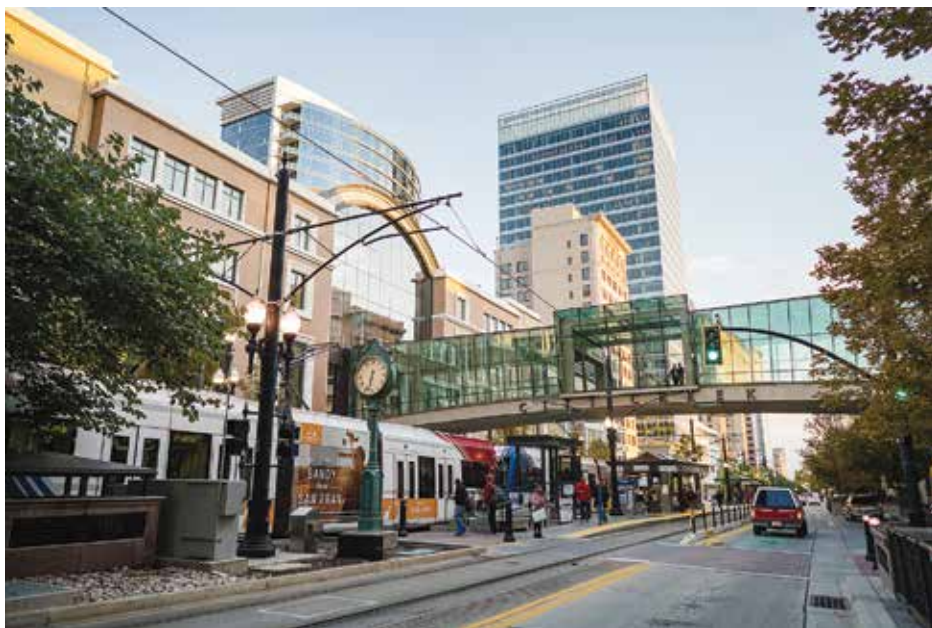
**Exhibitor Workshops.** Exhibitor-sponsored workshops for science teachers are offered throughout the conference. These workshops give you an opportunity to use a variety of commercial instructional materials. Attendance is on a first-come, first-served basis.

### Presenters and Presiders Check-In

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

### Wi-Fi at Convention Center

Wireless internet is available in all lobby areas and meeting rooms, excluding the exhibit halls. No password is required; to access, connect to "SP Guest" and choose the complimentary option. *Note:* Accounts are good for only one hour. You can sign up for another account, if needed, once the first one expires.



—Photo courtesy of Austen Diamond Photography, Visit Salt Lake

### NSTA Community Hub

Be sure to stop by the NSTA Community Hub, located at Booth #100 in the Exhibit Hall. While you're there, ask us about our #reachforthestars initiative and redeem your coupon to spin our 75th Anniversary Prize wheel! Find out more about the benefits of becoming an NSTA member, our professional learning opportunities, and NSTA Press books. The NSTA Community Hub will be open during exhibit hall hours.

### NSTA Conference App

The NSTA Conference app provides all the tools necessary for a successful experience. Search sessions, exhibitors, and speakers to build a schedule of your favorites. Features include the ability to view session and workshop listings by time and presenter, as well as maps of the Convention Center and the Exhibit Hall. Plus, you're able to find key information on conference resources, such as First Aid, AV rooms, and Business Services. Available for iPhone and Android devices, download from the respective app stores or visit [www.nsta.org/conferenceapp](http://www.nsta.org/conferenceapp) for information.

### NSTA Store

Visit us at the NSTA Store to explore a wide selection of resources and gear you'll love! You'll find hundreds of books that uniquely blend accurate science content with sound teaching strategies for science educators of all grade ranges and disciplines.

### Graduate-Level Credit Opportunity

Salt Lake City Area Conference attendees can earn one (1) graduate-level credit in professional development through **Southern Utah University** course #EDPD 5010-400. To obtain credit, you must be registered for the Salt Lake City area conference, complete the required assignments, and pay a fee of \$25 for one credit. An NSTA transcript is also required. Visit [bit.ly/2LU2oHW](http://bit.ly/2LU2oHW) for complete details.

Register for graduate-level credit by stopping by the Utah Science Teachers Association booth located in Hall B of the Convention Center or by going to [utsta.org](http://utsta.org). Submit the required assignments by Sunday, December 1, 2019.



### 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 completing session evaluations online **October 24–November 5, 2019**, while the session is fresh in your mind! During the conference, session evaluations can be completed on the computers at the Presenters/Presiders booth in the Attendee Services Area. **And this year, we're giving away an Apple iPad mini 5 Wi-Fi tablet to a lucky attendee who completes a session evaluation!** Remember, the more sessions you attend and evaluate, the more chances you have to win!

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

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

On or before **November 6, 2019**, attendees will be e-mailed instructions for accessing their respective transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.





GREAT MINDS

Great Minds®, the nonprofit behind *Eureka Math*®/EngageNY Math, now offers *PhD Science*™ to support three-dimensional science teaching and learning.

- ✓ Aligned to NGSS
- ✓ Approved for adoption
- ✓ Available to pilot

**Join us at Booth #402 for a hands-on workshop**

[greatminds.org/science](http://greatminds.org/science)

# PhD SCIENCE™

SEE US AT BOOTH #402

**Inspiring** students to wonder about the world and **empowering** them to make sense of it.

**Harnessing the Wind: Energy Transfer and Transformation**

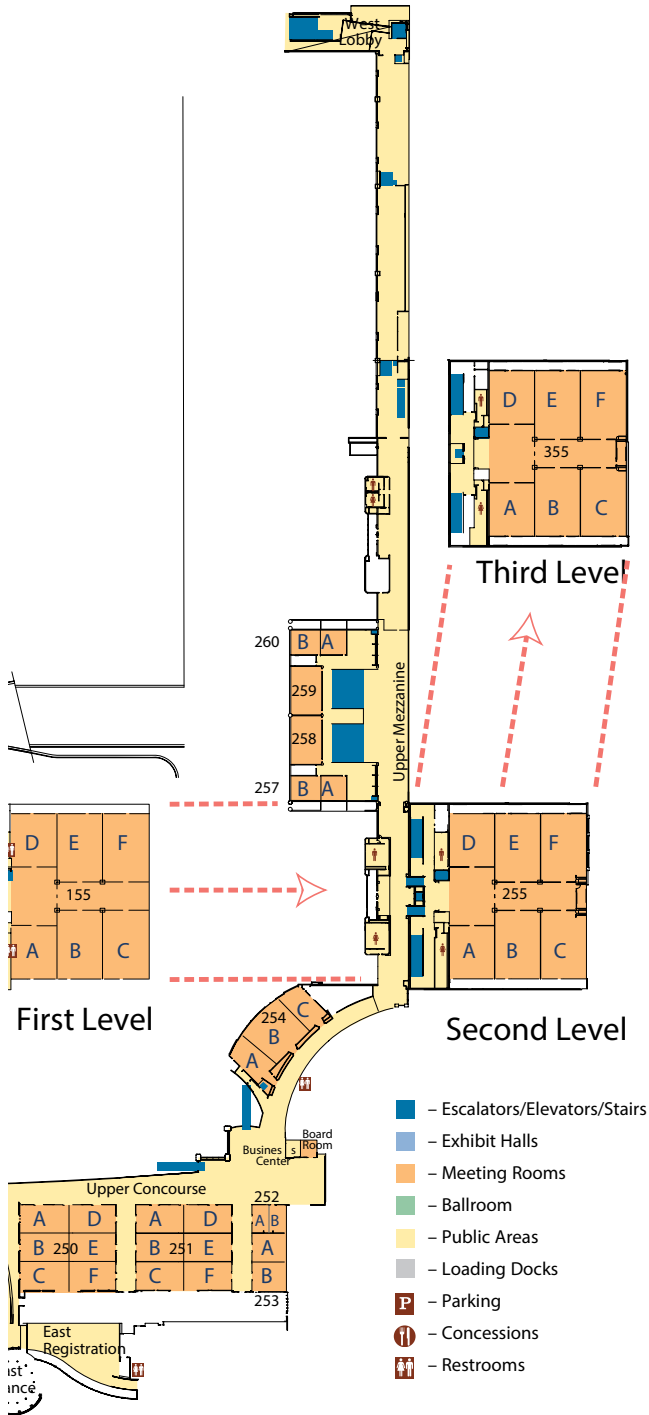
Oct. 25 | 9:30–10:30 AM | Salt Palace Convention Center, 151 A-C

In this hands-on workshop, you'll build a windmill and observe energy transfer (CC.5), create an anchor model (SEP.2) to record how windmills work (PS3.B), then develop a driving question board (SEP.1) to guide learning.

# Salt Palace Convention Center



# Salt Palace Convention Center



*All cities are subject to change pending final negotiation.*

### National Conferences on Science Education

Boston, Massachusetts  
April 2–5, 2020

Chicago, Illinois  
April 8–11, 2021

Houston, Texas  
March 31–April 3, 2022

### 9th Annual STEM Forum & Expo, hosted by NSTA

Louisville, Kentucky—July 22–24, 2020

### 10th Annual STEM Forum & Expo, hosted by NSTA

Detroit, Michigan—July 28–30, 2021

### Area Conferences on Science Education

#### 2019 Area Conferences

Cincinnati, Ohio—November 14–16  
Seattle, Washington—December 12–14

#### 2020 Area Conferences

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

#### 2021 Area Conferences

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

# Share Your Ideas!

## NSTA's Conferences on Science Education

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



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

**Proposal Deadline:  
12/03/2019**



**2020 Area Conferences**  
Pittsburgh, PA  
October 29–31  
New Orleans, LA  
November 19–21  
Phoenix, AZ  
December 10–12

**Proposal Deadline:  
1/15/2020**



**2021  
National Conference**  
Chicago, IL  
April 8–11

**Proposal Deadline:  
4/15/2020**

To submit a proposal, visit [www.nsta.org/conferenceproposals](http://www.nsta.org/conferenceproposals)



# Visit the NSTA STORE

FREE  
Shipping  
for on-site Book  
Purchases!



## STORE HOURS

Wednesday, October 23	4:30–7:00 PM
Thursday, October 24	7:30 AM–5:30 PM
Friday, October 25	7:30 AM–4:30 PM
Saturday, October 26	8:00 AM–12 Noon

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

- Fun NSTA-branded gear—unique hats, shirts, mugs, and more
- Meet your favorite NSTA Press authors
- Ask about our NSTA gift cards—great gift ideas!

Download the conference app or follow #NSTA19 for special giveaways, contests, and more throughout the conference!

Visit [www.nsta.org/store](http://www.nsta.org/store) to make a purchase today, or call 800-277-5300.



National  
Science  
Teaching  
Association

Presenters,  
key information,  
and complete session  
descriptions on  
Conference App:

Visit: [www.nsta.org/  
conferenceapp](http://www.nsta.org/conferenceapp)

**Thursday, October 24**

8:00–9:00 AM	First-Timer Conference Attendees’ Orientation . . . . .	12, 19
	(Is This Your First NSTA Conference?)	
9:15–10:30 AM	Keynote Presentation: Mireya Mayor . . . . .	13
	<i>Sponsored by National Geographic Learning   Cengage</i>	
11:00 AM–5:00 PM	Exhibits . . . . .	18
	<i>(Exclusive exhibit / exhibitor workshop hours: 11:00 AM–12:30 PM)</i>	
2:00–3:00 PM	Featured Presentation: AnnMarie Thomas. . . . .	13

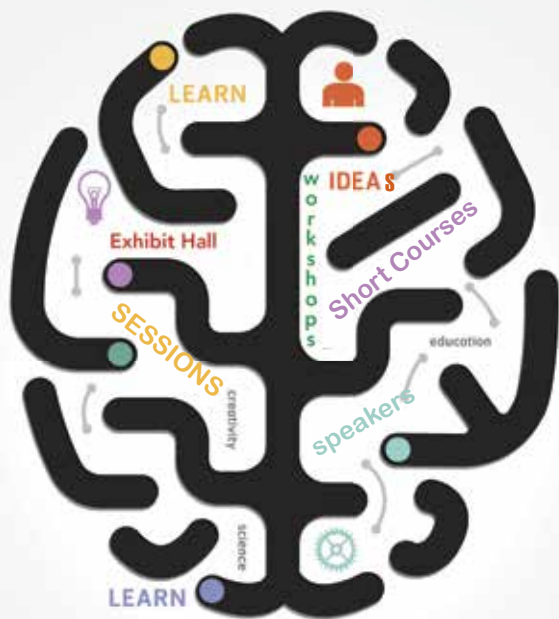
**Friday, October 25**

8:00 AM–1:30 PM	High School Chemistry Day . . . . .	30, 34
8:00 AM–1:30 PM	Middle School Chemistry Day . . . . .	30, 34
8:00 AM–1:30 PM	Engineering Day . . . . .	31, 35
9:00 AM–4:00 PM	Exhibits . . . . .	27
	<i>(Exclusive exhibit / exhibitor workshop hours: 3:00–4:00 PM)</i>	
9:30–11:00 AM	Featured Presentation: Brett Moulding . . . . .	13
2:00–3:00 PM	Featured Presentation: Sonia Galaviz . . . . .	13
2:45–3:30 PM	Meet the Presidents and Board/Council . . . . .	35

**Saturday, October 26**

9:00 AM–12 Noon	Exhibits . . . . .	37
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# 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 24, 8:00–9:00 AM  
155F, Salt Palace Convention Center



### **Keynote Presentation: Mireya Mayor, Primatologist and National Geographic Explorer**

*(Sponsored by National Geographic Learning | Cengage)*

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

**Thursday, Oct. 24**

**9:15– 10:30 AM**

*Ballroom B, Convention Center  
(page 18)*

## Featured Presentations

**Thursday, Oct. 24**

2:00–3:00 PM • 155E  
Convention Center



**AnnMarie Thomas**  
Professor, School of Engineering  
The Opus College of Business  
University of St. Thomas  
Saint Paul, MN  
*(page 23)*

*Strand: Forming Natural Bridges:  
Integrating Science Across Content  
Areas*

**Friday, Oct. 25**

9:30–11:00 AM • 155E  
Convention Center



**Brett Moulding**  
Director  
Partnership for Effective Science  
Teaching and Learning  
Ogden, UT  
*(page 28)*

*Strand: Navigating Phenomenal  
Landscapes: Using Phenomena as a  
Way to Guide Science Instruction*

**Friday, Oct. 25**

2:00–3:00 PM • 155E  
Convention Center



**Sonia Galaviz**  
Teacher and STEM Coordinator  
Boise School District  
Boise, ID  
*(page 33)*

*Strand: Hook 'em for Life: Sustaining  
Science Teaching and Learning*

## Conference Program • Conference Strands

The Salt Lake City Conference Committee has planned the conference around these three strands, enabling you to focus on a specific area of interest or need.

### **Navigating Phenomenal Landscapes: Using Phenomena as a Way to Guide Science Instruction**

Science helps us make sense of observable natural phenomena and to predict future occurrences. Phenomena should be used to help students navigate their learning. Phenomena are best used in classrooms to engage students in science and engineering practices as they develop their understanding of disciplinary core ideas through the lens of crosscutting concepts. These phenomena can operate much like landmarks on a map, helping students understand the world around them and to make sense of future sights they might see.

### **Forming Natural Bridges: Integrating Science Across Content Areas**

Integrative learning is a habit of mind that a student builds, beginning with bridging simple connections and ideas that progress toward synthesizing and transferring learning to new and complex situations. Sessions with grade-appropriate examples of this continuum will illustrate how students can effectively connect, transfer, reflect, and communicate their experiences.

### **Hook 'em for Life: Sustaining Science Teaching and Learning**

Humans are curious, wondering creatures. Understanding how to create rich science environments that support and encourage all students' love of science is key to "hooking" their interest in science and engaging their curiosity as lifelong learners and advocates of scientific literacy. Sessions will exemplify how science learning is inspired in the classroom and extends far beyond.

## Help us with your feedback...and get a chance for a free Apple iPad mini 5

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

When you evaluate a session, you get entered into a drawing for a chance to win an Apple iPad mini 5 Wi-Fi tablet *courtesy of the NSTA Conference Department.*

To evaluate a session using our online conference browser, click on **Attendee Info** tab and navigate to **Attendee Service Center Login** then log in with your e-mail address and password. Once logged in, select the **Session Evaluations** tab. Find the session that you have attended, then click the **Start** button. Follow the step-by-step process.

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

- **WE'RE GIVING AWAY an APPLE IPAD MINI 5 WI-FI TABLET**



## • CONFERENCE APP



[www.nsta.org/conferenceapp](http://www.nsta.org/conferenceapp)



*Admission to NSTA short courses is by ticket only. Tickets, if still available, can be purchased at the NSTA Attendee Services. See Conference App or Salt Lake City session browser ([www.nsta.org/saltlakecitybrowser](http://www.nsta.org/saltlakecitybrowser)) for complete descriptions.*

### **Coasting with Newton's Laws (SC-1)**

Level: K–5

Science Area: Physical Science

Date/Time: Thursday, Oct. 24, 8:00–11:00 AM

Location: 259, Convention Center

Ticket Price: \$20

In order to interact and apply Newton's laws of motion via potential and kinetic energy, participants in this short course will design a model roller coaster using foam tubes and marbles that works reliably and safely. After teams design their roller coaster, they will evaluate the efficiency of their coaster and write a report of their findings as a student would. Lastly, participants will discuss how the workshop applies directly to the 5Es Learning Cycle and NSTA's Matrices (science and engineering practices, disciplinary core ideas, crosscutting concepts). Other aspects and theories of the lesson will be discussed through Kagan Cooperative Learning structures.

### **Three-Dimensional Teaching and Learning Powered by STEM (SC-2)**

Level: Grades K–12

General Science Education

Date/Time: Thursday, October 24, 2:00–5:00 PM

Location: 259, Convention Center

Ticket Price: \$52

In which ways are the *Framework* vision and STEM initiatives in harmony with each other? We will explore the *Framework* vision for a scientifically literate society and discuss how this vision is mutually supportive of STEM education. In this short course, we will focus on aspects of the designed world through the application of science and engineering practices. The goal of this short course is to empower educators to better integrate both STEM and three-dimensional standards for teaching and learning.

*Note:* Attendees should bring a notepad and pencil or tablet/laptop.

### **Bodies in Motion and Forces at Play: Modeling Science and Arts Integration Through Movement (SC-3)**

Level: Grades PreK–College

Science Area: General Science Education

Strand: Forming Natural Bridges: Integrating Science Across Content Areas

Date/Time: Friday, Oct. 25, 8:00–11:00 AM

Location: 259, Convention Center

Ticket Price: \$17

In this short course, participants will discover ways to use physics and dance in parallel to help students understand science and engineering practices and crosscutting concepts that apply to choreography as well as to engineering, and to science as well as to artistic performance. Although physics and dance or science and the arts each have important distinctions and different purposes, many practices such as investigating, modeling, and communicating; and crosscutting concepts like patterns, cause and effect, stability and change, etc. can be leveraged to engender significant student inquiry. In this workshop, we'll demonstrate some activities, provide resources, and promote discussion for classroom application and future work that incorporates these integrated practices. All abilities and backgrounds welcome.



—Photo courtesy of Nathan Bennion

*Use physics and dance in parallel to help students understand science and engineering practices and crosscutting concepts (SC-3).*

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

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

## Disciplinary Core Ideas

Disciplinary Core Ideas in Physical Science	Disciplinary Core Ideas in Life Science	Disciplinary Core Ideas in Earth and Space Science	Disciplinary Core Ideas in Engineering, Technology, and the Application of Science
<p><b>PS1: Matter and Its Interactions</b>                      PS1.A: Structure and Properties of Matter                      PS1.B: Chemical Reactions                      PS1.C: Nuclear Processes</p> <p><b>PS2: Motion and Stability: Forces and Interactions</b>                      PS2.A: Forces and Motion                      PS2.B: Types of Interactions                      PS2.C: Stability and Instability in Physical Systems</p> <p><b>PS3: Energy</b>                      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</p> <p><b>PS4: Waves and Their Applications in Technologies for Information Transfer</b>                      PS4.A: Wave Properties                      PS4.B: Electromagnetic Radiation                      PS4.C: Information Technologies and Instrumentation</p>	<p><b>LS1: From Molecules to Organisms: Structures and Processes</b>                      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</p> <p><b>LS2: Ecosystems: Interactions, Energy, and Dynamics</b>                      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</p> <p><b>LS3: Heredity: Inheritance and Variation of Traits</b>                      LS3.A: Inheritance of Traits                      LS3.B: Variation of Traits</p> <p><b>LS4: Biological Evolution: Unity and Diversity</b>                      LS4.A: Evidence of Common Ancestry and Diversity                      LS4.B: Natural Selection                      LS4.C: Adaptation                      LS4.D: Biodiversity and Humans</p>	<p><b>ESS1: Earth’s Place in the Universe</b>                      ESS1.A: The Universe and Its Stars                      ESS1.B: Earth and the Solar System                      ESS1.C: The History of Planet Earth</p> <p><b>ESS2: Earth’s Systems</b>                      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</p> <p><b>ESS3: Earth and Human Activity</b>                      ESS3.A: Natural Resources                      ESS3.B: Natural Hazards                      ESS3.C: Human Impacts on Earth Systems                      ESS3.D: Global Climate Change</p>	<p><b>ETS1: Engineering Design</b>                      ETS1.A: Defining and Delimiting an Engineering Problem                      ETS1.B: Developing Possible Solutions                      ETS1.C: Optimizing the Design Solution</p> <p><b>ETS2: Links Among Engineering, Technology, Science, and Society</b>                      ETS2.A: Interdependence of Science, Engineering, and Technology                      ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World</p>

# NSTA Partnership School Program



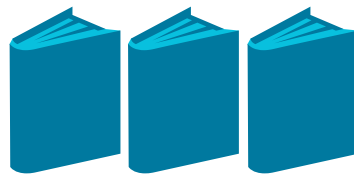
## Each Partner School receives these benefits:

- ✓ **NSTA membership** for all teachers in the school building
- ✓ **One free conference registration** for a teacher/administrator to a STEM Forum or an NSTA Conference
- ✓ **Recognition** as an NSTA Partner School
- ✓ **One print journal** for the school building and e-journals for every teacher/member in the school
- ✓ **One hard copy of NSTA Reports** (newspaper) with e-Reports for every teacher/member in the school
- ✓ **Access to Learning Center Forums**, including collections of NGSS and STEM resources differentiated by grades
- ✓ **An initial one-on-one conversation** with NSTA to determine which products and services can best support school-wide professional learning goals
- ✓ **Participation in three virtual conferences** per year, exploring critical topics for STEM and NGSS integration
- ✓ **Access** to a national NGSS and STEM listserv and 16 other listservs

## In addition, each teacher gets discounts on



NSTA conferences and workshops



NSTA Press books



Enhanced e-books



National  
Science  
Teaching  
Association

LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
150 D–F Convention Center	<b>Exhibitor Workshop</b> Introducing Your Students to Gene Editing with CRISPR <i>(Sponsor: Edvotek Inc.)</i>	<b>Exhibitor Workshop</b> Left at the Scene of the Crime! <i>(Sponsor: Edvotek Inc.)</i>	<b>Exhibitor Workshop</b> Transform Your Class into a Neuroscience Laboratory <i>(Sponsor: Edvotek Inc.)</i>
150G Convention Center		<b>Exhibitor Workshop</b> Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher <i>(Sponsor: Carolina Biological Supply Co.)</i>	<b>Exhibitor Workshop</b> Come to Your Senses: Physiology in Action <i>(Sponsor: Carolina Biological Supply Co.)</i>
151 A–C Convention Center		<b>Exhibitor Workshop</b> Teaching Earth and Space Science with Authentic Data for Elementary Grades <i>(Sponsor: WGBH Education)</i>	
151 D–F Convention Center	<b>Exhibitor Workshop</b> Using Water Models to Uncover Misconceptions in Chemistry <i>(Sponsor: 3D Molecular Designs)</i>	<b>Exhibitor Workshop</b> Dynamic DNA—One Model to Teach It All <i>(Sponsor: 3D Molecular Designs)</i>	
151G Convention Center		<b>Exhibitor Workshop</b> Using Maggots, Flies, and Flesh to Solve a Mystery! <i>(Sponsor: Texas Instruments)</i>	
155A Convention Center	<b>Mysteries as Motivators:</b> Storylines, Discrepant Events, and Imagineering Make Science Wonderful!		
155B Convention Center	<b>NSTA Press Session:</b> Argument-Driven Inquiry in the Life, Physical, and Earth-Space Sciences: Lab Investigations for Grades 6–8		
Ballroom B Convention Center		<b>Keynote Presentation</b> <b>9:15–10:30 AM</b> WILD ABOUT SCIENCE: My Journey from NFL Cheerleader to National Geographic Explorer <b>Speaker: Mireya Mayor</b> <i>Sponsor: National Geographic Learning   Cengage</i>	
Exhibit Hall A Convention Center			<b>NSTA Exhibits!</b> <b>11:00 AM–5:00 PM</b>

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
155E Convention Center			
155F Convention Center	Is This Your First NSTA Conference? First-Timer Conference Attendees' Orientation		
250A/B Convention Center	<b>Exhibitor Workshop</b> pH Scale <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> Distilling Aromatic Hydrocarbons <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> Chemical Formula and Amino Acids <i>(Sponsor: Lab-Aids, Inc.)</i>
250C Convention Center		<b>Exhibitor Workshop</b> Beyond CER Labels: Supporting Authentic Scientific Argumentation in the Classroom <i>(Sponsor: Amplify)</i>	<b>Exhibitor Workshop</b> Lead with Phenomena and the Three Dimensions Will Follow <i>(Sponsor: Amplify)</i>
250D Convention Center	NARST-Sponsored Session: I Didn't Know What Real Science Was! Citizen Science, STEM Education, and Career Interest		
250E Convention Center	NSELA-Sponsored Session: Developing Science Practices with Citizen Science		
251D Convention Center			<b>Exhibitor Workshop</b> Modern Biology Is Revolutionizing Human Lives! Are Your Students Prepared? <i>(Sponsor: Bio-Rad Laboratories)</i>
253A/B Convention Center		<b>Exhibitor Workshop</b> Space Science for the Modern, Interactive Classroom <i>(Sponsor: Simulation Curriculum Corp.)</i>	
254A Convention Center	NMLSTA-Sponsored Session: Engaging Students with Authentic Data		

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
254B Convention Center	SCST-Sponsored Session: Summer Science Camps Reimagined: A New Way to Promote Early Teacher Training and Community Outreach		
254C Convention Center	ASTE-Sponsored Session: Think About It!		
255A Convention Center	CESI-Sponsored Session: Integrating Science for Young Children with an Outdoor Focus		
255B Convention Center			
255C Convention Center	Where Have All The Bees Gone? Supporting All Students Through Problem-Based Enhanced Language Learning (PBELL) <b>(HOOK 'EM strand)</b>		
255D Convention Center	NSTA-WIDA Session: Equitable 3-D Science Education for Multilingual Learners: New Resources from the NSTA-WIDA Affiliation		
255E Convention Center	Inquiry in Action: Investigating Matter K–5		
255F Convention Center	Technologies Help Us Grow		
257A/B Convention Center	Teaching Science Content Literacy Strategies		

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>259 Convention Center</b>	Coasting with Newton’s Laws (SC-1) By Ticket Only; \$20 8:00–11:00 AM		
<b>260A Convention Center</b>	Heterogeneous Classrooms: The Beauty and Challenges of Integrating Science Students		
<b>260B Convention Center</b>	Culturally Relevant Pedagogy in the Indigenous Secondary Science Classroom: Enhancing Learning by Getting to Know Your Students Better ----- Implementing Collaboration Techniques in the Classroom		
<b>355A Convention Center</b>	Enriching Science and Literacy by Teaching Them Simultaneously		
<b>355B Convention Center</b>	Does Black English Stand Between Black Students and Success in Science?		
<b>355C Convention Center</b>	NESTA Session: Addressing the NGSS Through Topographic Maps and Profiles		
<b>355D Convention Center</b>	CSSS-Sponsored Session: Literacy for Science in GRC Science Instruction		
<b>355E Convention Center</b>	NGSS Practices: Analyzing and Interpreting Data to Construct Explanations		

LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
150 D–F Convention Center	<b>Exhibitor Workshop</b> Exploring STEAM with Transformation <i>(Sponsor: Edvotek Inc.)</i>	<b>Exhibitor Workshop</b> Cancer Investigators: Medical Diagnostics in Your Classroom <i>(Sponsor: Edvotek Inc.)</i>	<b>Exhibitor Workshop</b> Sweet Science: Exploring Complex Mixtures with Biotechnology <i>(Sponsor: Edvotek Inc.)</i>
150G Convention Center	<b>Exhibitor Workshop</b> Criteria and Constraints: Raising the Bar for Rigor Grades 3–5 <i>(Sponsor: Carolina Biological Supply Co.)</i>	<b>Exhibitor Workshop</b> Next Generation Dissection <i>(Sponsor: Carolina Biological Supply Co.)</i>	<b>Exhibitor Workshop</b> Phenomenal Classroom Critters <i>(Sponsor: Carolina Biological Supply Co.)</i>
151 A–C Convention Center		<b>Exhibitor Workshop</b> Teaching Weather and Climate with Digital Media, Grades 6–12 <i>(Sponsor: WGBH Education)</i>	
151 D–F Convention Center	<b>Exhibitor Workshop</b> Get a Move On! Modeling Molecular Transport Across the Cell Membrane <i>(Sponsor: MSOE Center for BioMolecular Modeling)</i>		<b>Exhibitor Workshop</b> Connecting CRISPR Biotechnology to What You Already Teach <i>(Sponsor: MSOE Center for BioMolecular Modeling)</i>
151G Convention Center		<b>Exhibitor Workshop</b> Zombie Apocalypse! <i>(Sponsor: Texas Instruments)</i>	
155A Convention Center	Harry Potter Episodes as Stimulators for Motivation, Creative Thinking, and Science Concept Development	Do You Need a New Science Lab? Win a Shell Science Lab Makeover (\$20,000 Value) for Your School	The Best STEM Books for Kids: What Are They, How Are They Selected, How to Use Them! <b>3:30–4:00 PM</b>
155B Convention Center	NSTA Press Session: One Teacher’s Influence on a Natural Phenomenon	NSTA Press Session: Argument-Driven Inquiry in Grades 3–5: Three-Dimensional Investigations That Integrate Literacy and Mathematics	NSTA Press Session: <i>Solar Science</i> Provides Three-Dimensional Learning Experiences About the Sun, Earth, and Moon
155C Convention Center		Before the Phenomena: An Interdisciplinary Foundation to Prepare Learners to Interact with Phenomena <b>(PHENOMENA strand)</b> <b>2:00–3:30 PM</b>	
155D Convention Center	NGSS@NSTA Forum Session: <i>The NSTA Atlas of the Three Dimensions</i>	Increasing Women’s Pursuit of STEM Degrees: Possible Role of Selective Specialized Public High Schools ----- It’s All Matter with Matter Tag	Birding Is Elementary

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
155E Convention Center		<b>Featured Presentation</b> The Playful Side of Science Speaker: AnnMarie Thomas (INTEGRATING SCIENCE strand)	
155F Convention Center			
250A/B Convention Center	<b>Exhibitor Workshop</b> NGSS—Ecology: Introduction of a New Species (Sponsor: Lab-Aids, Inc.)	<b>Exhibitor Workshop</b> NGSS—Energy: Are These Bulbs Heating Up Our Energy Bill? (Sponsor: Lab-Aids, Inc.)	<b>Exhibitor Workshop</b> NGSS—Weather and Climate: Atmosphere, Climate, and Global Warming (Sponsor: Lab-Aids, Inc.)
250C Convention Center	<b>Exhibitor Workshop</b> Snails, Robots, and Biomimicry: Phenomena and 3-D Instruction for Grades K–5 (Sponsor: Amplify)		
250D Convention Center			
250E Convention Center	Setting the Table to Support Three-Dimensional Professional Learning	Model Stellar Evolution and Supernovas Using NASA Images, Data, and STEM Analysis Tools	Freshwater Stewardship: Equip Your Student-Scientists with Cutting-Edge Resources from NOAA
251D Convention Center		<b>Exhibitor Workshop</b> Learn to Infuse NGSS Science and Engineering Practices with an Engaging Activity (Sponsor: Bio-Rad Laboratories)	<b>Exhibitor Workshop</b> Think Like an Engineer in Your Biology Class (Sponsor: Bio-Rad Laboratories)
253A/B Convention Center		<b>Exhibitor Workshop</b> STEM Challenge: Keeping Students Engaged with Problem Solving (Sponsor: AEOP)	
254A Convention Center	Making Waves: Seismic Waves Activities and Demonstrations	Creating Classrooms Where Science Inquiry Thrives	

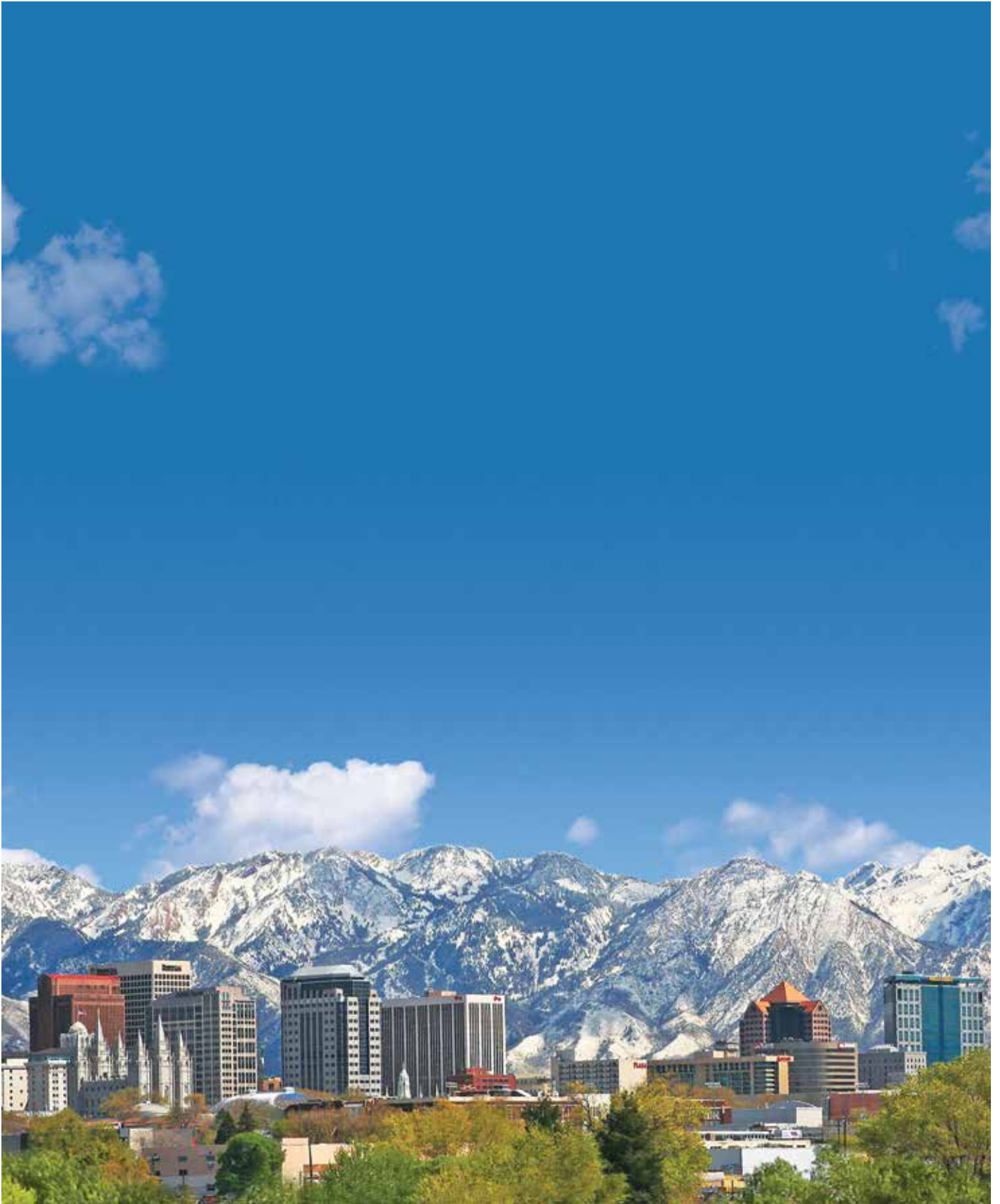
Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
254B Convention Center	Analyzing Hazards and Risks in High School Chemistry Labs		
254C Convention Center		Win the Grant Writing Game: Grant Writing Strategies for You and Your Chemistry Students	A Data-Centered Approach to Science Teaching
255A Convention Center			
255B Convention Center		Diverse Learners Tackle Plastic Pollution (Supporting Diverse Learners Through Problem-Based Enhanced Language Learning) <b>(INTEGRATING SCIENCE strand)</b>	Fostering Interdisciplinary Climate Change Activities <b>(INTEGRATING SCIENCE strand)</b>
255C Convention Center	Tales from the Trail: Exploring Strategies for Setting Students on a Science Path and Sustaining Them on Their Science Journeys <b>(HOOK 'EM strand)</b>	Learning Scientific Inquiry and Reading Strategies Through Storytelling <b>(HOOK 'EM strand)</b>	Energy, Energy Everywhere—An Investigation for Young Children Using Toys <b>(HOOK 'EM strand)</b>
255D Convention Center	Model Me This: 3D Modeling (and Printing!) in the Classroom		Earthquake Shaking: Building Contest
255E Convention Center		NGSS@NSTA Forum Session: Designing and Using Equitable Three-Dimensional Formative Assessments to Support Meaningful NGSS Investigations	NGSS@NSTA Forum Session: What Does It Look Like? Assessing 3-D Learning in the Classroom: How to Navigate Opportunities and Pitfalls
255F Convention Center	The Other Side of English Language Learner Strategies	Utah's First Platinum-Designated STEM Elementary School Shares Resources	
257A/B Convention Center	Why Is Teacher-Led Epistemic Inquiry so Effective?	Incorporating Video Lab Conclusions into Student Digital Lab Reports Promoting and Retaining Preservice and Inservice STEM Teachers	The Process of Creating a Three-Dimensional Science Unit: Exploring the Tragedy of the Aral Sea

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
259 Convention Center		Three-Dimensional Teaching and Learning Powered by STEM (SC-2) By Ticket Only; \$52 2:00–5:00 PM	
260A Convention Center	Using Pop Culture and Polymers to Create Inquisitive Minds	Mining for Information: Should We Open a Copper Mine? 2:30–3:00 PM	Using Socioscientific Issues to Enhance Middle School Students' Understanding of the Effects of Deregulations on Environmental Health
260B Convention Center	Polymers: Teaching "Hard" Concepts with Gooey Labs	How to Get Published in an NSTA Journal	
355A Convention Center	Opioids and the Science of Addiction	Say What? Getting Students to Learn and Use Scientific Vocabulary Words	Forensics: Science in the Real World
355B Convention Center	STEM-Selected Tradebooks Enrich Minds	Innovative Life Science Activities for Preservice and Inservice Elementary Teachers	Bringing Play Back to the Classroom
355C Convention Center			
355D Convention Center	Using Current Examples of Natural Selection in Your Classroom	Entropy Happens	
355E Convention Center	BIO-CS BRIDGE: Integrating Biology and Computational Thinking in High School Curricula to Meet <i>Next Generation Science Standards</i>	Exploring Genetics Through Genetic Disorders	Engineering in a Biological World

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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—Photo courtesy of Steve Greenwood, Visit Salt Lake

LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
150 A–C Convention Center	<b>Exhibitor Workshop</b> What Color Is That Candy? Gather Evidence to Find Out (Sponsor: MiniOne Systems)	<b>Exhibitor Workshop</b> Use Pedigrees and Gel Electrophoresis to Determine PTC Genotype (Sponsor: MiniOne Systems) 9:30–11:00 AM	
150 D–F Convention Center	<b>Exhibitor Workshop</b> Quick and Easy Experiments Using the Latest Technology (Sponsor: Vernier Software & Technology)	<b>Exhibitor Workshop</b> Common Biology Experiments Using the Latest Technology (Sponsor: Vernier Software & Technology)	<b>Exhibitor Workshop</b> Common Middle School Experiments Using the Latest Technology (Sponsor: Vernier Software & Technology)
150G Convention Center	<b>Exhibitor Workshop</b> Talking Allowed! Using Science Discourse for Equity in Grades 6–8 (Sponsor: Carolina Biological Supply Co.)	<b>Exhibitor Workshop</b> Engineer Physical Science Excitement with a Carolina STEM Challenge® (Sponsor: Carolina Biological Supply Co.)	<b>Exhibitor Workshop</b> Increasing the Sophistication of Student Thinking: Need for K–5 Learning Progressions (Sponsor: Carolina Biological Supply Co.)
151 A–C Convention Center		<b>Exhibitor Workshop</b> Harnessing the Wind: Energy Transfer and Transformation (Sponsor: Great Minds)	<b>Exhibitor Workshop</b> Teaching About Earth and Space with Authentic Data for Middle and High School (Sponsor: WGBH Education)
151 D–F Convention Center	<b>Exhibitor Workshop</b> Attract Students to Water Concepts with Magnetic Water Molecule Models (Sponsor: 3D Molecular Designs)	<b>Exhibitor Workshop</b> “Going with the Flow” of Genetic Information (Sponsor: MSOE Center for BioMolecular Modeling)	
151G Convention Center	<b>Exhibitor Workshop</b> How to Use Phenomena to Make Gains in Student Inquiry (Sponsor: STEMscopes)	<b>Exhibitor Workshop</b> Let’s DIVE-in to Engineering and the Engineering Design Process (Sponsor: STEMscopes)	<b>Exhibitor Workshop</b> Claim-Evidence-Reasoning: Scientific Explanations to Increase Student Voice (Sponsor: STEMscopes)
155B Convention Center	NSTA Press Session: Eureka! K–2 and Grades 3–5 Science Activities and Stories	NSTA Press Session: Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12	Making Science Learning Lifelong, Life-wide, and Life-deep: Incorporating Out-of-School (Informal) STEM Learning Experiences in the Classroom
Ballroom H/J Convention Center		NESTA Earth System Science Share-a-Thon	
Exhibit Hall A Convention Center		<b>NSTA Exhibits!</b> 9:00 AM–4:00 PM	

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>155C Convention Center</b>	Bringing Earth and Space Phenomena into Your Classroom with Digital Media, Grades 6–12 <b>(PHENOMENA strand)</b> 7:30–9:00 AM	Worth Your Salt: Student Investigations with Great Salt Lake <b>(PHENOMENA strand)</b> 9:30–11:00 AM	The Great Planetary Divide: Making Sense of the Frost Line as a Model for Student-Driven Phenomenon-Focused Instruction <b>(PHENOMENA strand)</b> 11:30 AM–1:00 PM
<b>155D Convention Center</b>	Phenomenal Phenomena	Creating the Need to Read in Science Classrooms	Hit the Ground Running with Speed and Measurement
<b>155E Convention Center</b>		<b>Featured Presentation</b> Teaching Science Is Phenomenal! Speaker: Brett Moulding <b>(PHENOMENA strand)</b> 9:30–11:00 AM	
<b>155F Convention Center</b>	Modeling Cardiac Physiology	Spark Students’ Curiosity with Chemistry!	PolyWhat? Application of STEM Using Polymers
<b>250A/B Convention Center</b>	<b>Exhibitor Workshop</b> NGSS—Evolution: Embryo-OH! <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> NGSS—Chemical Reactions: Developing a Prototype <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> NGSS—Land, Water, and Human Interactions: Cutting Canyons and Building Deltas <i>(Sponsor: Lab-Aids, Inc.)</i>
<b>250C Convention Center</b>		<b>Exhibitor Workshop</b> Access and Rigor: Three-Dimensional Science for English Language Learners <i>(Sponsor: Amplify)</i>	<b>Exhibitor Workshop</b> Embedded and Immersive Engineering <i>(Sponsor: Amplify)</i>
<b>250D Convention Center</b>	NARST-Sponsored Session: How Does a Research-Based Instructional Framework Support Teachers’ Customization of Web-Based Curriculum?		
<b>250E Convention Center</b>	NSELA-Sponsored Session: Supporting Diverse Students Through Problem-Based Enhanced Language Learning (PBELL)		
<b>251A/B Convention Center</b>	<b>Exhibitor Workshop</b> Engaging Students in Citizen Science Through WildCam Gorongosa <i>(Sponsor: HHMI BioInteractive)</i>	<b>Exhibitor Workshop</b> Use Phenomena, Data, and Engineering Design with HHMI BioInteractive <i>(Sponsor: HHMI BioInteractive)</i>	<b>Exhibitor Workshop</b> Difficult Conversations with HHMI’s The Biology of Skin Color <i>(Sponsor: HHMI BioInteractive)</i>

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>251C Convention Center</b>	<b>Managing and Storing Chemicals Safely in Science Classrooms</b>	<b>Mistake Making: A Path to Discovery and Deeper Learning</b>	<b>Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry!</b>
<b>251D Convention Center</b>	<b>Exhibitor Workshop</b> Investigate Photosynthesis and Cellular Respiration with Algae Beads for Gen Bio <i>(Sponsor: Bio-Rad Laboratories)</i>	<b>Exhibitor Workshop</b> Are Increased Incidences of Infection the Result of Climate Change? <i>(Sponsor: Bio-Rad Laboratories)</i>	<b>Exhibitor Workshop</b> The Opioid Epidemic: Exploring the Genetic Associations of Opioid Abuse <i>(Sponsor: Bio-Rad Laboratories)</i>
<b>251E Convention Center</b>	<b>Exhibitor Workshop</b> Photosynthesis and Respiration: Light and Dark Reactions Quantified with Technology <i>(Sponsor: PASCO)</i>	<b>Exhibitor Workshop</b> Investigating Enzyme Activity: Finding the Optimal Conditions <i>(Sponsor: PASCO)</i>	<b>Exhibitor Workshop</b> Speed and Velocity: Lessons with Motion Graphs <i>(Sponsor: PASCO)</i>
<b>251F Convention Center</b>	<b>Exhibitor Workshop</b> Genes in Space: Genetics on the International Space Station, Free Loaner Equipment, Curricula, and More! <i>(Sponsor: miniPCR bio)</i>	<b>Exhibitor Workshop</b> P51 Glow Labs: Investigate DNA, Enzymes, and Other Molecules Through Fluorescence <i>(Sponsor: miniPCR bio)</i>	<b>Exhibitor Workshop</b> Are You a Night Owl? A Morning Lark? The Answer May Be in Your Genes <i>(Sponsor: miniPCR bio)</i>
<b>253A/B Convention Center</b>	<b>Exhibitor Workshop</b> Solving Crimes with Science: Forensics for Your Classroom <i>(Sponsor: AEOP)</i>	<b>Exhibitor Workshop</b> Earth Science for the Modern, Interactive Classroom <i>(Sponsor: Simulation Curriculum Corp.)</i>	<b>Exhibitor Workshop</b> Brod Bagert the Science Poet! Using Performance Literature to ROCK YOUR WORLD! <i>(Sponsor: Southern Science Supply)</i>
<b>254A Convention Center</b>	<b>STEM Rooted in Culture</b> ----- <b>Newton's Laws on Gym Scooters</b>	<b>Solar Sails in STEM</b> ----- <b>Global PBL Project Connecting Environmental Literacy and Robotics in Computer Science</b>	<b>Rethinking the Way Technology-Based Projects Are Implemented in the Classroom</b> <b>11:30 AM–12 Noon</b>
<b>254B Convention Center</b>	<b>SCST-Sponsored Session:</b> Is Vitamin D Deficiency Contributing to the Autism Epidemic?	<b>NGSS Practices: Engaging in Argument from Evidence</b>	<b>Epidemic Crisis and Public Behavior</b>
<b>254C Convention Center</b>	<b>ASTE-Sponsored Session:</b> The World in Which We Live: Blending Place-Based Education and NGSS for Greater Student Engagement	<b>Developing a Course-Based Undergraduate Research Experience</b> -----	<b>LEVEL UP! Differentiated Instruction and Assessment for NGSS</b>
		<b>Getting Beyond the "Hook"—Moving from Engagers to Phenomena</b>	
<b>255A Convention Center</b>	<b>CESI-Sponsored Session:</b> Active Formative Assessment		<b>3-D Natural Selection</b>

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
255B Convention Center		Bridging Science, Social Studies, and ELA Through STEM <b>(INTEGRATING SCIENCE strand)</b>	A Unique Ice Core Investigation That Integrates the Three Dimensions of NGSS and STEM <b>(INTEGRATING SCIENCE strand)</b>
255C Convention Center	Slingshot Physics <b>(HOOK 'EM strand)</b>	Student Engagement Strategies, Activities, and Resources That Reduce the Achievement Gap <b>(HOOK 'EM strand)</b>	Mastering Models in Elementary Science <b>(HOOK 'EM strand)</b>
255D Convention Center			
255E Convention Center	ACS Middle Level Session: Particles of a Liquid and Changes of State	ACS Middle Level Session: The Water Molecule and Dissolving	ACS Middle Level Session: Chemical Reactions—Breaking and Making Bonds
255F Convention Center	ACS High School Session One: Relating Structure and Properties: Exploring the Nature and Properties of Ionic and Covalent Compounds—Composition, State, and Conductivity	ACS High School Session Two: Relating Structure and Properties: Constructing Science Ideas About Ionic Bond Strength—Solubility and Melting Point	ACS High School Session Three: Interparticle Forces in Covalent Compounds—Melting Point, Viscosity, and Vapor Pressure
257A/B Convention Center		Delivering Three-Dimensional Science in Informal Education Settings	
258 Convention Center	NSTA/ASTE Present 2020 Standards for Science Teacher Preparation	Electrifying Human Migration: Bridging Social Studies and Science Content 9:30–10:00 AM	Using NSTA as Your Online Textbook—for Professors!
259 Convention Center	Bodies in Motion and Forces at Play: Modeling Science and Arts Integration Through Movement (SC-3) By Ticket Only; \$17 <b>(INTEGRATING SCIENCE strand)</b> 8:00–11:00 AM		
260A/B Convention Center	Gross! There Are Chemicals in That!		Engineerize It!

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>355A Convention Center</b>	ASEE Session: Buoyance Force of Floating Objects	ASEE Session: Engineering and Community Partnerships	ASEE Session: Literacy-Infused Engineering for Middle School and Elementary Students
<b>355B Convention Center</b>	You Can Never Talk Too Much... the Productive Science Classroom	How to Implement STEM and NGSS into Your Classroom Through the Use of NSTA Competitions	Taking on Big Science Challenges Across Districts: How a District Science Network Can Build Capacity and Advance Equity
<b>355D Convention Center</b>	CSSS-Sponsored Session: Science Professional Learning Standards: A Tool for Designing, Supporting, and Evaluating Professional Learning	Minerals, Trading, and Songs...Oh My!	Middle School Magic: Choice, Song, and Play

LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
150 A–C Convention Center	<b>Exhibitor Workshop</b> Who Is Baby Whale’s Father? DNA Fingerprinting Solves the Mystery! <i>(Sponsor: MiniOne Systems)</i>	<b>Exhibitor Workshop</b> DNA Forensics Solves the Murder Mystery of Dr. Ward <i>(Sponsor: MiniOne Systems)</i>	<b>Exhibitor Workshop</b> Use Pedigrees and Gel Electrophoresis to Determine PTC Genotype <i>(Sponsor: MiniOne Systems)</i> <b>3:30–5:00 PM</b>
150 D–F Convention Center	<b>Exhibitor Workshop</b> Common Physics Experiments Using the Latest Technology <i>(Sponsor: Vernier Software &amp; Technology)</i>	<b>Exhibitor Workshop</b> Robots, Coding, and Science: A Complete STEM Experience <i>(Sponsor: Vernier Software &amp; Technology)</i>	<b>Exhibitor Workshop</b> Common Chemistry Experiments Using the Latest Technology <i>(Sponsor: Vernier Software &amp; Technology)</i>
150G Convention Center	<b>Exhibitor Workshop</b> Introduction to Wisconsin Fast Plants® <i>(Sponsor: Carolina Biological Supply Co.)</i>	<b>Exhibitor Workshop</b> Autopsy: Forensic Dissection Featuring Carolina’s Perfect Solution® Pigs <i>(Sponsor: Carolina Biological Supply Co.)</i>	
151 A–C Convention Center		<b>Exhibitor Workshop</b> Are You Moody? <i>(Sponsor: Texas Instruments)</i>	<b>Exhibitor Workshop</b> STEMulating the Heart with Code! <i>(Sponsor: Texas Instruments)</i>
151 D–F Convention Center	<b>Exhibitor Workshop</b> Touch a Nerve with Hands-On Modeling of Neuronal Communication <i>(Sponsor: 3D Molecular Designs)</i>		<b>Exhibitor Workshop</b> 5 E’sy Ways to Investigate Proteins and Enzyme Action <i>(Sponsor: 3D Molecular Designs)</i>
151G Convention Center	<b>Exhibitor Workshop</b> Let’s Improve Student Achievement Through STEM Teacher Actions and STEM Certification <i>(Sponsor: National Institute for STEM Education)</i>		
155B Convention Center	<b>NSTA Press Session: Second Edition Curriculum Topic Study (CTS), a Systematic Process for Informing Curricular and Instructional Decisions</b>		
155C Convention Center	<b>Bringing Earth and Space Phenomena into Your Classroom with Digital Media, Grades K–5</b> <b>(PHENOMENA strand)</b> <b>1:30–3:00 PM</b>		
155D Convention Center	<b>Interactive Science Notebooks</b>	<b>Love Acronyms? Then RSVP to This Session ASAP!</b>	

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
155E Convention Center		<b>Featured Presentation</b> Engaging the Whole Family in STEM... Speaker: Sonia Galaviz <b>(HOOK 'EM strand)</b>	
155F Convention Center	Schoolyard Scientists: Exploring Life Sciences Using iNaturalist	Let's Get Wet—Wind, Water, and Weather for Grades PreK–3	
250A/B Convention Center	<b>Exhibitor Workshop</b> What Is a Species? <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> Cell Differentiation and Gene Expression <i>(Sponsor: Lab-Aids, Inc.)</i>	<b>Exhibitor Workshop</b> Photosynthesis and Respiration Shuffle <i>(Sponsor: Lab-Aids, Inc.)</i>
250C Convention Center	<b>Exhibitor Workshop</b> Light Waves and Skin Cancer: Phenomena and 3-D Instruction for Grades 6–8 <i>(Sponsor: Amplify)</i>		
250D Convention Center		Partnering with NSTA to Personalize Professional Learning for Your School or District	
251A/B Convention Center	<b>Exhibitor Workshop</b> Using Data to Explain Phenomenal Images with BioInteractive <i>(Sponsor: HHMI BioInteractive)</i>	<b>Exhibitor Workshop</b> Scientists at Work: Engaging in Argument from Evidence <i>(Sponsor: HHMI BioInteractive)</i>	
251D Convention Center		<b>Exhibitor Workshop</b> It's in Their DNA! Teach Personalized Medicine with Students' Own DNA <i>(Sponsor: Bio-Rad Laboratories)</i>	<b>Exhibitor Workshop</b> Mushroom Ecology and Why It Matters for Biofuel Production <i>(Sponsor: Bio-Rad Laboratories)</i>
251E Convention Center	<b>Exhibitor Workshop</b> Crash Barrier: How to Design a STEM Engineering Challenge <i>(Sponsor: PASCO)</i>	<b>Exhibitor Workshop</b> Stoichiometry Made Easy: A Mole Story <i>(Sponsor: PASCO)</i>	<b>Exhibitor Workshop</b> Easy Titration: Breaking the Equivalence Curve <i>(Sponsor: PASCO)</i>
254A Convention Center	Using Seminars as a Form of Alternative Assessment ----- Effects of Contextualized Instruction on Preservice Teachers' Critical Thinking in Integrated Science		

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
254B Convention Center	Data Collection, Analysis, and Reporting in a Digital Laboratory	Equilibrium: The Key to Student Success	
254C Convention Center	Climate Literacy → Climate Solutions	Data in the Classroom: Use NOAA Resources to Bring Scientific Data to Your Classroom	
255A Convention Center	Using Air-Quality Challenges to Engage Students in Science and Engineering	NSTA-WIDA Session: Seamless Integration of 3-D Science and Language Using Phenomena to Drive Instruction and Facilitate Science Discourse	
255B Convention Center	Connecting Literacy Practices to Authentic Science Communication <b>(INTEGRATING SCIENCE strand)</b>		
255C Convention Center	Inviting Play into the Classroom <b>(HOOK 'EM strand)</b>	Teaching Science Through Everyday Challenges <b>(HOOK 'EM strand)</b>	
255D Convention Center	Using Storylines to Support Student Sensemaking	NWASTE Research Sharing Meeting	
255E Convention Center	ACS Middle Level Session: Chemical Reactions—Ocean Acidification		
255F Convention Center	ACS High School Session Four: Relating Structure and Properties: Demonstrating Understanding of Bond Strength and Interparticle Attractions	Project- / Problem-Based Learning: Let's Bring It to Life	
257A/B Convention Center	STEM, Creativity, and Innovation—Proven Pathway to a Well-Rounded Education	"Teacher, We've Done This Before."	

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	12:30–1:30 PM	2:00–3:00 PM	3:30–4:30 PM
<b>258 Convention Center</b>	NSTA's Online Resources and Communities	Anchoring and Investigative Phenomena	
<b>260A/B Convention Center</b>	STEAM It UP: Are You Learning to Read or Reading to Learn Using Literacy with Science?	Experience Integration	
<b>355A Convention Center</b>	ASEE Session: Early Childhood Engineering Encounters		
<b>355B Convention Center</b>	Building Literacies: From STEM Books to the Beautiful Outdoors	STEM-ify Your Middle School Science Classroom	
<b>355D Convention Center</b>		Henrietta Lacks and Altruistic Science 2:00–2:30 PM	
<b>Exhibit Hall Entrance Convention Center</b>		Special Session Meet the Presidents and Board/Council 2:45–3:30 PM	



—Photo courtesy of Salt Palace Convention Center

LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>Exhibit Hall A Convention Center</b>		<p style="text-align: center;"><b>NSTA Exhibits!</b> 9:00 AM–12 Noon</p>	
<b>151 D–F Convention Center</b>	<p><b>Exhibitor Workshop</b> A Microscopic to Molecular Perspective in Modeling Chromosomes <i>(Sponsor: MSOE Center for BioMolecular Modeling)</i></p>		
<b>155A Convention Center</b>	<p><i>Eureka!</i> Science Trade Books: Good as Gold! ----- Full STEAM Ahead</p>		<p>K–3 Discovery and Exploration at the Intersection of Literacy and Science <b>11:00–11:30 AM</b></p>
<b>155B Convention Center</b>	<p>NSTA Press Session: Uncovering K–12 Ideas About Matter and Energy Using Everyday Phenomena</p>	<p>NSTA Press Session: Need Money? Write a Grant!</p>	<p>NSTA Press Session: Developing and Using 3-D Formative Assessment Probes</p>
<b>155C Convention Center</b>	<p>Choosing the Right Phenomenon to Sustain Inquiry in the Elementary Classroom (K–5) <b>(PHENOMENA strand)</b> <b>8:00–9:30 AM</b></p>	<p>Patterns and Trends: Observe and Explore Bird Populations with Citizen Science <b>(PHENOMENA strand)</b> <b>10:00–11:30 AM</b></p>	
<b>155D Convention Center</b>	<p>Materials Matter! Looking at Materials Science to Help Teach Chemistry</p>	<p>Injecting Viruses into the Curriculum</p>	<p>Chemistry Can Be Fun with the ACS ChemClub Program</p>
<b>155F Convention Center</b>	<p>NGSS Practices: Developing and Using Models to Teach Science</p>	<p>Engineering Design to Study Physics</p>	<p>Building a Periodic Table Unit Plan Using American Association of Chemistry Teachers Resources</p>
<b>250A/B Convention Center</b>	<p><b>Exhibitor Workshop</b> Using Climate Proxies to Learn About Earth’s Climate History <i>(Sponsor: Lab-Aids, Inc.)</i></p>	<p><b>Exhibitor Workshop</b> Prospecting for Mineral Ore <i>(Sponsor: Lab-Aids, Inc.)</i></p>	<p><b>Exhibitor Workshop</b> Calling All Carbons <i>(Sponsor: Lab-Aids, Inc.)</i></p>
<b>250D Convention Center</b>	<p>You Are What Your Grandparents Ate: What You Need to Know About Nutrition, Experience, Epigenetics, and the Origins of Chronic Disease <b>8:00–8:30 AM</b></p>	<p>Making the Leap to a Digital Course ----- Using Case Studies in the High School Science Classroom</p>	<p>Advancing Science Literacy with Lesson Plans That Meet the CCSS and NGSS</p>

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>250E Convention Center</b>		<b>Meteorology 101: Weather for Teachers</b>	NESTA Shares: Looking for an Earth Science Spark? Come Get Energized via the American Meteorological Society ----- Earth and Space Digital Media Resources with Accessibility Supports
<b>250F Convention Center</b>	<b>Stoichiome-Treats: Teaching Amounts Through No-Bake Cooking</b>	<b>Phenomenal Temperature Inversions</b>	<b>Cars: Basic Science Concepts That Can Be Covered Using the Automobile</b>
<b>251C Convention Center</b>	<b>Using National Science Olympiad STEM Classroom Materials to Address NGSS Crosscutting Concepts and Content</b>	<b>Avalanche Science and Safety: A Dynamic Curriculum to Educate Students, Involve the Community, and Save Lives</b> <b>10:00–10:30 AM</b>	
<b>254A Convention Center</b>	Rallying Student Interest Through Maker Science Education ----- Integrating Literacy and a Love of Reading into Science Classrooms and Curricula		<b>Taking STEM Outside</b> ----- <b>WILD PICS: Wildlife Photographic Investigations for Communities and Schools</b>
<b>254C Convention Center</b>		<b>Green Jobs in Green Spaces</b> <b>9:30–10:00 AM</b>	
<b>255A Convention Center</b>	<b>Using Meaningful 3-D Design When Creating a STEM Unit</b>	<b>Animal Architects: Using Nature’s Builders to Teach STEAM in Early Childhood</b>	<b>A Teacher’s Toolbox for Lab Safety</b>
<b>255C Convention Center</b>	<b>DIGing into Scientific Literacy with Phenomena</b> <b>HOOK ‘EM strand)</b>	<b>Beyond Disbelief and Controversy: Teaching Climate Change with Student Dialogue Engagement</b>	
<b>257A/B Convention Center</b>	<b>All Systems Go! Using a Systems Approach in Science Teaching and Learning</b>	<b>Using Models to Teach High School Chemistry Topics</b>	<b>Solarize Your Science Classroom</b>
<b>260B Convention Center</b>	Increasing Student Understanding by Integrating Video Lectures into Your Science Course ----- Improving Learning Through Student Self-Assessment	<b>Modeling Magnetism: Tools to Support Revision of Scientific Models</b>	<b>Polar Science: It Will Heat Up the Excitement in Your Classroom!</b> <b>(HOOK ‘EM strand)</b>

Earth & Space Science	Engineering & Tech	Life Science	Physical Science	Informal Science	General Science
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LOCATION	8:00–9:00 AM	9:30–10:30 AM	11:00 AM–12 Noon
<b>355A Convention Center</b>	Sweating Alcohol in 3-D!	Phenomenon-Based Learning Using Digitized Museum Objects	Constructing a Mentorship Pipeline to Empower STEM Career Pathways in Low-Socioeconomic Communities
<b>355C Convention Center</b>		AMSE-Sponsored Session: George W. Carver Conversation Series on Diversity and Equity 9:30–11:30 AM	

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3D Molecular Designs	#410	Montana State University	#314
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Bio Corp.	#506	National Inventors Hall of Fame / Camp Invention	#510
Bio-Rad Laboratories	#317	National Institute for STEM Education	#400
BIOZONE	#219	NOAA Office of Education	#516
Brigham Young University	#215	NSTA Community Hub	#100
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Girls Who Code	#203	TeacherGeek, Inc.	#511
Great Minds	#402	Texas Instruments	#316
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Joint Science and Technology Institute	#204	Utah State University	#501
K12IRC.org	#207	Vernier Software & Technology	#301
Lab-Aids, Inc.	#311	Water Environment Federation	#420
LaMotte Co.	#217	Westminster College	#500
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<b>Time</b>	<b>Room 150 D-F</b>
8:00-9:00am	Quick and Easy Experiments Using the Latest Technology
9:30-10:30am	Common Biology Experiments Using the Latest Technology
11:00-12:00pm	Common Middle School Experiments Using the Latest Technology
12:30-1:30pm	Common Physics Experiments Using the Latest Technology
2:00-3:00pm	Robots, Coding, and Science: A Complete STEM Experience
3:30-4:30pm	Common Chemistry Experiments Using the Latest Technology



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