



DENVER

AREA CONFERENCE *on* SCIENCE EDUCATION

DECEMBER 12-14, 2013

#NSTA13



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Teachers
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| Thursday | 7:00 AM–5:00 PM |
| Friday | 7:00 AM–5:00 PM |
| Saturday | 7:30 AM–12 Noon |

- Fun NSTA-branded gear—unique hats, shirts, mugs, collectible pins, and more
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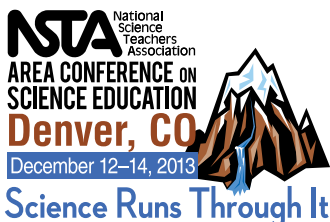
| | |
|-----------------|---|
| 8:00am-9:15am | PASCO's SPARKscience for High School Students - Free starter kits for 20 attendees! |
| 10:00am-11:15am | PASCO's SPARKscience for K-8 Students - Free starter kits for 20 attendees! |
| 12:00am-1:15am | PASCO's SPARKscience for High School Students - Free starter kits for 20 attendees! |



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NSTA National
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Association



NSTA 2013 Area Conference on Science Education

Denver, Colorado • December 12–14, 2013

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NSTA Affiliates

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

National Science Teachers Association

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#6. **Network** and contribute to the NSTA Blog, an easy-to-use platform.

10

REASONS TO BECOME AN NSTA MEMBER

For more information or to become a member,
www.nsta.org/membership or call 1.800.722.6782

NSTA National
Science
Teachers
Association

Welcome to Denver



Bev DeVore-Wedding



Larisa Merrell



Karen Hays

Welcome to the NSTA Denver Area Conference! The importance of science education is even more vital now with the release of the *Next Generation Science Standards*. The theme for this conference—“Science Runs Through It”—emphasizes how everything is science, is related to science, or incorporates science.

The Denver Conference Committee has engineered a wide variety of professional learning opportunities and experiences for a diverse audience of elementary through post-secondary educators, coordinators, and administrators. From field trips, short courses, and workshops to general and specific presentations, you are sure to find just what you need to

enhance your own learning as well as your students’ learning. In addition, the networking opportunities are boundless and sure to complement your current PLC. Just as “Science Runs Through It,” you will find friendships and mentorships running throughout this conference and your future.

The conference is organized around these three strands:

- PreK–8 Science: A Playground for Literacy and Mathematics
- Engineering the Engineering: Connecting the Why to the How
- Exploring STEM: Inside and Out.

These strands offer content sessions developed for all levels and include a featured presentation by a leading researcher. Our program also includes an extra featured presentation by Scott Sampson from the Denver Museum of Nature & Science and an outstanding keynote speaker, Geoffrey Ling, recently retired from the U.S. Army and an authority on Traumatic Brain Injury. His work has been featured twice on *60 Minutes*.

We look forward to meeting with you at this premier event planned around the love of learning and the thrill of showcasing science.

2013 Denver Area Conference Committee Leaders
Bev DeVore-Wedding, Larisa Merrell, and Karen Hays

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

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Denver Conference Committee

Program Committee

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Commerce City, CO

Strand Leader: Engineering the Engineering: Connecting the Why to the How
Teresa Coons
The John McConnell Math & Science Center of Western Colorado
Grand Junction, CO

Strand Leader: Exploring STEM: Inside and Out
Jon Pedersen
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Mesa Public Schools
Mesa, AZ

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Denver, CO

Guides Manager

Sean Vair
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Aurora, CO

Manager of Services for People with Disabilities

Christine Leahy
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Denver, CO

Volunteers Manager

Theresa Hemming
Douglas County High School
Castle Rock, CO



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▶ HOW TO USE WITH YOUR STUDENTS

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- **Educational opportunities are everywhere!**

Hidden in a big city, students will discover hidden objects and learn amazing facts about the history of innovation, science, technology and the environment.

- **Incorporate this hands-on, inquiry-based program in your classroom!**

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- **For Classroom Game:** http://eyespybytoshiba.com/exploravision_2014

ABOUT TOSHIBA/NSTA EXPLORAVISION:

The Toshiba/NSTA ExploraVision STEM competition inspires K-12 students to envision the technologies of the future. ExploraVision lets your students engage in hands-on learning, problem solving, critical thinking, and collaboration. Learn more at: www.exploravision.org/regionalconference



TOSHIBA | NSTA

ExploraVision

President's Welcome

Building and Sustaining Teacher Leadership in Science, Standards, and Literacy



Welcome to NSTA's 2013 Denver Area Conference on Science Education in beautiful Denver. This "Mile High City" provides the backdrop for you to engage in professional development to strengthen your understanding of science standards and literacy.

With the release of the NRC *Framework*, the *Next Generation Science Standards*, and the *Common Core State Standards*, in

English language arts and mathematics, the Denver Conference Committee has organized a comprehensive program incorporating these areas around the theme "Science Runs Through It." The major conference strands include:

- PreK–8 Science: A Playground for Literacy and Mathematics
- Engineering the Engineering: Connecting the Why to the How
- Exploring STEM: Inside and Out

These strands will allow you to leave the conference with a deeper understanding of the NGSS, (including the focus on engineering practice), the principles behind their development, and how they may be implemented. The strands will focus on important issues in STEM education and address the connection between science, literacy, and the *Common Core State Standards* and how to capitalize on that connection. Supporting students' abilities to read, write, and discuss in the context of science is critical to student achievement in both science and literacy.

I encourage you to take full advantage of this opportunity to attend dynamic teacher workshops and presentations, see outstanding speakers, explore the exhibit hall, sign up for special ticketed events, and network with colleagues.

I look forward to meeting you in Denver. I guarantee that you will leave here inspired to create new opportunities for your students and colleagues!

Bill Badders
2013–2014 NSTA President

Sponsors and Contributors to the Denver Conference

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

Sponsors

Appleseed Expeditions
Colorado Association of Science Teachers
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Texas Instruments, Inc.

Contributors

American Chemical Society
American Society for Engineering Education
Colorado–Wyoming Section of the American Association of Physics Teachers
National Association of Biology Teachers



Your Passion. Our Technology. Student Success.™



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. Brief conference previews allow us to be more focused in our conference content, since each preview is specific to a particular conference. As an added bonus, they are more environmentally friendly, as they dramatically reduce 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

All conference pre-registrants are sent an electronic version (PDF) of the final conference program by e-mail approximately two weeks 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 now printed on recycled paper. In addition, Walsworth Print Group, the printer for our conference materials, is in strict compliance with all environmental laws and exceeds these standards in many areas. Wherever possible, Walsworth Print Group works to reduce and recycle waste, use reduced or low-VOC chemicals, increase the recycled content of raw materials, and use soy- and/or vegetable-based inks. Walsworth Print Group has also obtained chain-of-custody certification for paper products to ensure they 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.

Colorado Convention Center's Green Efforts

In December 2012, the Colorado Convention Center became the first event and conference venue in the world to be certified to the international sustainability standard introduced earlier that year to promote responsible environmental and social practices in the event industry. E2774-11 is one of nine formal, voluntary standards developed by the meetings, conventions, exhibitions, and events industry to provide event planners and suppliers with specifications for producing events in a more sustainable manner. The standard specifies specific performance criteria for staff management, communications, waste management, energy, air quality, water, procurement, and community partners. The Colorado Convention Center was also voted Colorado's Best Green Meeting Facility in 2009 and 2011 by readers of *Colorado Meeting and Events Magazine*. The following are some of their innovative eco-friendly practices:

- Reduced emissions of CO₂ by 1,962,674 lbs. with its rooftop Solar Array, which has generated 1.6 million kWh of energy to date
- Converted 2,448 meeting room, street level, and lobby lights to LED.
- Has single stream recycling throughout the facility and a back of house compost collection program to help minimize the amount of materials hauled to landfills.
- In 2012, donated 308,000 lbs. of leftover conference materials for reuse or repurposing.
- Has three free parking spaces dedicated to hybrid vehicles in its parking garage.
- In 2010, adopted eight acres of land along the Platte River in downtown Denver. As part of this commitment, Convention Center staff maintain the area a minimum of three times per year.
- Replaced the grass along 14th Street with native and drought-resistant plants. As a result, 75% less water is used to maintain these areas.

"Go Green" at the Denver 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.



Free Hands-On Workshops

USING VERNIER DATA-COLLECTION TECHNOLOGY

| FRIDAY, DECEMBER 13 th – ROOM 401 | |
|--|--|
| 8:00 – 9:30 am | Chemistry and Biology with Vernier |
| 10:00 – 11:30 am | Integrate iPad® and BYOD with Vernier Technology |
| 12:00 – 1:30 pm | Integrate iPad® and BYOD with Vernier Technology |
| 2:00 – 3:30 pm | Physics and Physical Science with Vernier |

Stop by our **Booth 825**
and enter to **WIN** a



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Registration, Travel, and Hotels

Meeting Location and Times

The conference hotel is the Hyatt Regency Denver. Conference registration, the exhibits, the NSTA Avenue, the NSTA Science Store, exhibitor workshops, and most sessions will be located at the Colorado Convention Center. Other sessions and events will be held at the Hyatt. The conference will begin on Thursday, December 12, at 8:00 AM, and end on Saturday, December 14, at 12 Noon.

Registration

Registration is required for participation in all conference activities and the exhibits. The lapel badge 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 (short courses, field trips, networking events, etc.).

Don't want to wait in line to register on-site? Please look for the “Self-Serve” signs in the NSTA Registration Area. Here you'll find two computer stations where you can register on your own.

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

| | |
|---------------|-----------------|
| Wed., Dec. 11 | 5:00–7:00 PM |
| Thu., Dec. 12 | 7:00 AM–5:00 PM |
| Fri., Dec. 13 | 7:00 AM–5:00 PM |
| Sat., Dec. 14 | 7:30 AM–12 Noon |

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

Purchasing Ticketed Events

The Denver Planning Committee has scheduled a variety of ticketed events, which require a separate fee and ticket. You may purchase tickets for these events, space permitting, in the NSTA Registration Area. See the Conference Program



—Photo of the Colorado Convention Center, courtesy of Scott Dressler-Martin / VISIT DENVER.

section (starting on page 34) for details. Note that some events may have required advance registration.

Airlines

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

Ground Transportation to/from Airport

Denver International Airport (DEN), the fifth busiest airport in the U.S., is a major airline hub. Taxi fare from the airport to the Central Business District in the area of the Convention Center runs around \$65–\$70.

Denver attendees can visit SuperShuttle and use code NSTA3 to receive a discount on travel to and from the airport. Shuttles operate daily from 4:30 AM until 12 Midnight, serving all downtown and Denver Tech Center hotels to/from the airport. Group rates and web links for easy booking available. Travel time is 45–60 minutes, depending on hotel location and number of stops. Shuttles will stop at the Convention Center with advance reservation (two-hour minimum notice). To access SuperShuttle, go to bit.ly/14St77x.

Getting Around Town

Public bus service is scheduled and provided within the local metro area by the Regional Transportation District (RTD). One highlight is RTD's FREE 16th Street MallRide. This is your ride to great restaurants, shops, tourist attractions, and businesses up and down 16th Street Mall. The FREE 16th Street MallRide runs seven days a week and stops on every block between Civic Center and Union Station. Service begins at 5:00 AM on weekdays, 5:30 AM on Saturdays, and 6:30 AM on Sundays/holidays and ends every night at 1:06 AM. To learn more, go to bit.ly/1zJRT.

Parking

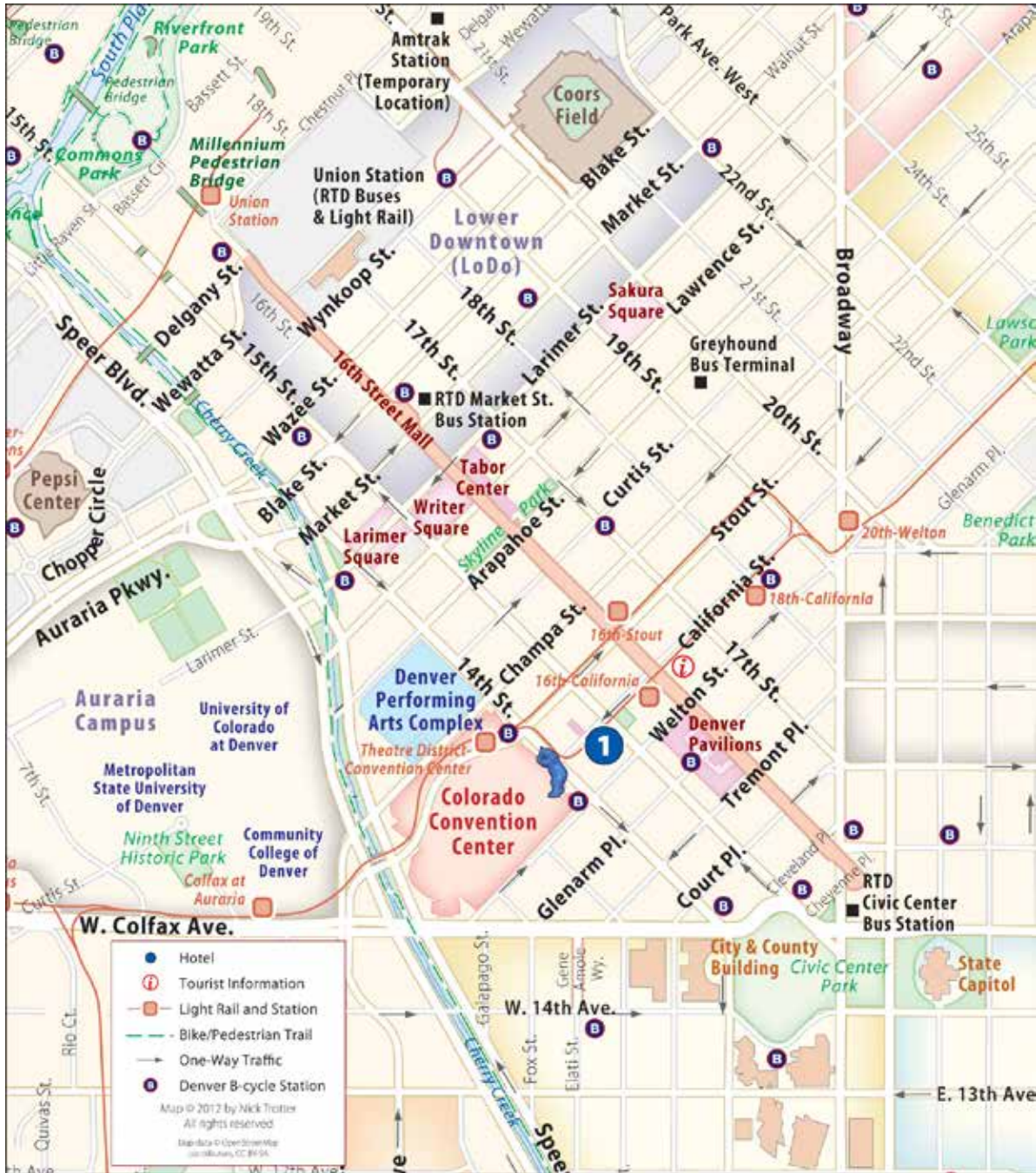
The Convention Center has a 1,000-space covered parking garage, including three reserved parking stalls for hybrid and electric vehicles for up to eight hours of free parking. For a map of other parking options, go to bit.ly/18zpDlu.

Discounted Rental Cars

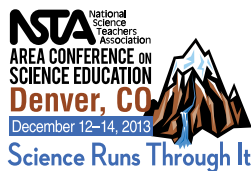
The toll-free number to contact an NSTA-designated car rental company is:

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.”



**1. Hyatt Regency Denver at Colorado Convention Center
650 15th St.**



Housing Questions or Concerns?

If you have any questions about your housing, please contact Hyatt Regency Denver—NSTA Reservations at 888-421-1442.





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 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. A map display of the Exhibit Hall will be on-site. A complete list of exhibitors and contact information starts on page 114.

Ribbon Cutting. An opening ceremony is scheduled on Thursday at 11:00 AM at the entrance to the NSTA exhibits.

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

Thu., Dec. 12 11:00 AM–5:00 PM

Fri., Dec. 13 9:00 AM–5:00 PM

Sat., Dec. 14 9:00 AM–12 Noon

Did you know that NSTA offers Exclusive Exhibits Hall hours—Thursday, 11:00 AM–12:30 PM? During these hours, there are no sessions or workshops scheduled and it's a perfect time to visit the exhibits and discover all the products and services companies and organizations have to offer.

Lead Retrieval. NSTA exhibitors use electronic 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 128 for a complete listing of exhibitor workshops.

NSTA Avenue

Stop by NSTA Avenue (Booth #638) and learn about NSTA's benefits, products, services, programs, and partners...and receive free gifts, too! Share with others, expand your knowledge, and earn rewards for you and your students. See pages 120–121 for a complete list of NSTA services and programs.

NSTA Science Store

The NSTA Science Store showcases the best new books of 2013 and a wide range of award-winning professional development titles. Pick up exclusive "I Love Science" T-shirts, mugs, and gifts for friends and colleagues. Located in the attendee registration area, stop by and check out our latest books—*Translating the NGSS for Classroom Instruction*; *The Case for STEM Education: Challenges and Opportunities*; and *Uncovering Student Ideas in Primary Science, Volume 1*—and take a peek at our brand-new line of children's books. We'll also be having special events throughout the conference and opportunities for you to meet our amazing authors.

Don't forget—all conference attendees enjoy a 20% discount on NSTA Press® titles along with free shipping for online orders placed during the conference!

NEW for Fall 2013! Come by and enjoy complimentary internet access at our e-mail stations. Make sure to shop with us on Wednesday night and receive a complimentary Welcome Pack with all purchases over \$25. Spend more than \$100 and receive a FREE collectible conference mug while supplies last.

Meet the Presidents and Board/Council

Be sure to stop by **Thursday** from 11:10 AM to 12:10 PM at the entrance to the Exhibit Hall 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!

Information Desk

Need help exploring Denver? An information specialist will be available in Lobby F at the Convention Center Thursday–Friday, 9:00 AM–5:30 PM. A second information desk is conveniently located at 16th and California—right on the 16th Street Mall. Be sure to stop by for dining and attraction suggestions. For more information, visit www.visitdenver.org.

Graduate Credit Opportunity

Denver conference attendees can earn one graduate-level credit in professional development through Framingham State University. To learn more about the assignment requirements and to access a registration form, visit the Framingham State University website: (www.framingham.edu/nsta). An NSTA transcript is required. *Note:* Credit is by pass/fail option only.

CAST Booth

The Colorado Association of Science Teachers (CAST) booth is located in the registration area of Hall A of the Convention Center. Stop by for information on the benefits of becoming a member of this organization. Membership forms and information on association activities will be available. This is your opportunity to update your information, renew your membership, or become a member. Find out what is happening in science education in Colorado! Also, be sure to ask us about our special invite to new teachers. First- and second-year teachers, please join CAST and Resource Area for Teachers (RAFT) for an evening of drinks, snacks, and a free tote bag of teaching supplies on Friday, December 13, 5:00–7:00 PM.

Presenters and Presiders Check-In

If you are presenting or presiding at a session, please check in and pick up your ribbon at the Presenters/Presiders booth in the Registration Area after you have registered for the conference and received your name badge.

Lost and Found

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

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, hotels, and Exhibit Hall; Social Media plugins; and a note-taking tool. Scan the QR code in promotion below or visit www.nsta.org/conferenceapp to download the app. *Note:* Make sure to create a CrowdCompass account when logging in to be able to export any notes taken with the app.

Wi-Fi in Convention Center

Free wireless internet is available in all common spaces of the Convention Center, which is inclusive of the street-level public spaces and prefunction space of Mile High and Four Seasons ballrooms. The name of the network is “Complimentary WIFI.”

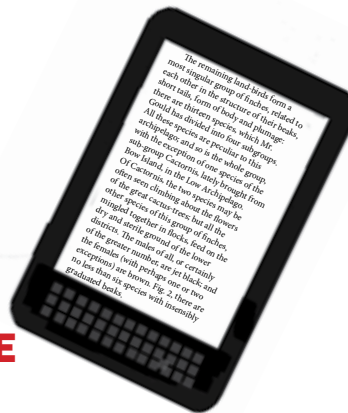
Help us with your feedback...and get a chance for a free Kindle Fire HDX 7"

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

When you log on to www.nsta.org/evaluations and fill out an evaluation, you get entered into a drawing for a chance to win the recently introduced Kindle Fire HDX 7" 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 THE NEW KINDLE FIRE HDX 7", 16 GB**



CONFERENCE APP



- Scan QR code below to access our NSTA Conference App.



Audiovisual Needs

NSTA will fulfill AV needs originally requested on the program proposals as long as the request is within the limits of equipment that NSTA provides. For any last-minute AV needs, presenters must arrange and pay for their own equipment. Audio Visual Production Services, the designated AV company on-site, will be located in the following rooms:

- Room 101, Convention Center
- Mineral Hall A, Hyatt

Message Center

A Message Center for conference attendees is available in the NSTA Registration Area. No messages, except extreme emergencies, can be broadcast over the public address system.

First Aid Services

First Aid is located in Lobby E, across from Room 507, in the Convention Center (a First Aid sign is displayed outside the door). Attendees in need of first aid may simply walk into the room, or call 303-228-8030. Dial extension 200 on the beige phones that are located throughout the Convention Center to reach Security who will dispatch assistance.

Conference Evaluation

All conference attendees are invited to complete a conference evaluation form online at www.surveymonkey.com/s/7P26W2K.

Business Services

Located off Lobby A in the Convention Center, the Business Center offers copies, flyers, computer workstations with printers, faxing, office supplies, and UPS/FedEx shipping. Hours during the conference are Thursday–Friday 7:30 AM–5:30 PM and Saturday 7:30 AM–2:00 PM. Attendees can store all of their conference items and ship them home for a fee. There is no extra charge to add to your box while attending the conference. To learn more about this service, go to bit.ly/18blyLq.

The FedEx Office Print & Ship CenterSM at the Hyatt Regency offers printing, packing, shipping, copying, and office supplies. Hours are Monday–Friday 7:00 AM–7:00 PM; and Saturday 9:00 AM–4:00 PM. For more information, call 303-298-8610 or e-mail usa0476@fedex.com.

Online Session Evaluations and Tracking Professional Development

All attendees can now evaluate sessions online while simultaneously tracking their professional development certification (based on clock hours).

Help NSTA's **GREEN** efforts by completing session evaluations online December 12–23, 2013, while the session is fresh in your mind! Visit www.nsta.org/evaluations to complete a short online session evaluation for each session you attend. **And this year, we're giving away a NEW Kindle Fire HDX 7" to one lucky attendee who completes a session evaluation! Remember, the more sessions you attend and evaluate, the more chances you have to win!**

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

To evaluate a session via www.nsta.org/evaluations:

- Enter your badge number (if you don't remember your badge number, click "help me find my badge number").
- Type the beginning of the session title in the "Lookup Session" field, scroll down to find the correct session, and click "Submit Session." The session information will appear and you can begin to evaluate the session.
- When finished evaluating the session, click "Submit Evaluation."
- Repeat this process for each session attended.

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

Beginning January 3, 2014, an attendee can view his or her transcript at the NSTA Learning Center (learningcenter.nsta.org) by clicking on "My PD Record and Certificates." Attendees can also document credit for activities that are not being evaluated (e.g., field trips, short courses, meetings, Exhibit Hall visits, etc.). 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 Denver conference attendees.

Denver Museum of Nature & Science

www.dmns.org



Present your NSTA conference badge and mention Code 1 at the Admissions Desk and receive \$4 off general admission (*limit one per person*). Spark your imagination by getting as close to a *T. rex* as you dare, uncovering dazzling gems and minerals, and exploring the cosmos. Not valid with other discounts or promotions, IMAX, or Gates Planetarium admission, groups, or school groups. The museum is home to the world's largest rhodochrosite crystal, a *Triceratops* skull, and more than 1.4 million other artifacts. Visit www.dmns.org to learn more.

Denver Zoo

www.denverzoo.org



Come visit Denver Zoo and see 3,500 different animals, representing more than 650 species. From Thursday, December 12, to Sunday, December 15, you can receive \$2 off general admission when you present your NSTA conference badge at the Admissions gate (*limit one per person*). Don't miss out on the chance to get a rare look at exotic animals like Amur leopards, king cobras, black rhinos, coral reef fish, elephants, zebras, vampire bats, gorillas, and more. Admission hours are 10:00 AM to 4:00 PM. Grounds close at 5:00 PM. Visit www.denverzoo.org for details.

Project Learning Tree

Use PLT and the environment to engage students in real world applications of STEM.

- Investigative, student-led learning
- Inquiry-based activities
- GreenSchools! investigations
- Grants for service-learning projects



Get free PLT materials at NSTA

Visit Exhibit Booth 441

Participate in PLT sessions

- Use Service Learning/STEM Projects to Turn Your School into a GreenSchool! – Friday, Dec 13, 2:00-3:00pm (Colorado Convention Center, 507)
- Putting the Engineering in STEM with PLT Papermaking – Friday, Dec 13, 3:30-4:30pm (Colorado Convention Center, MHB-4C)

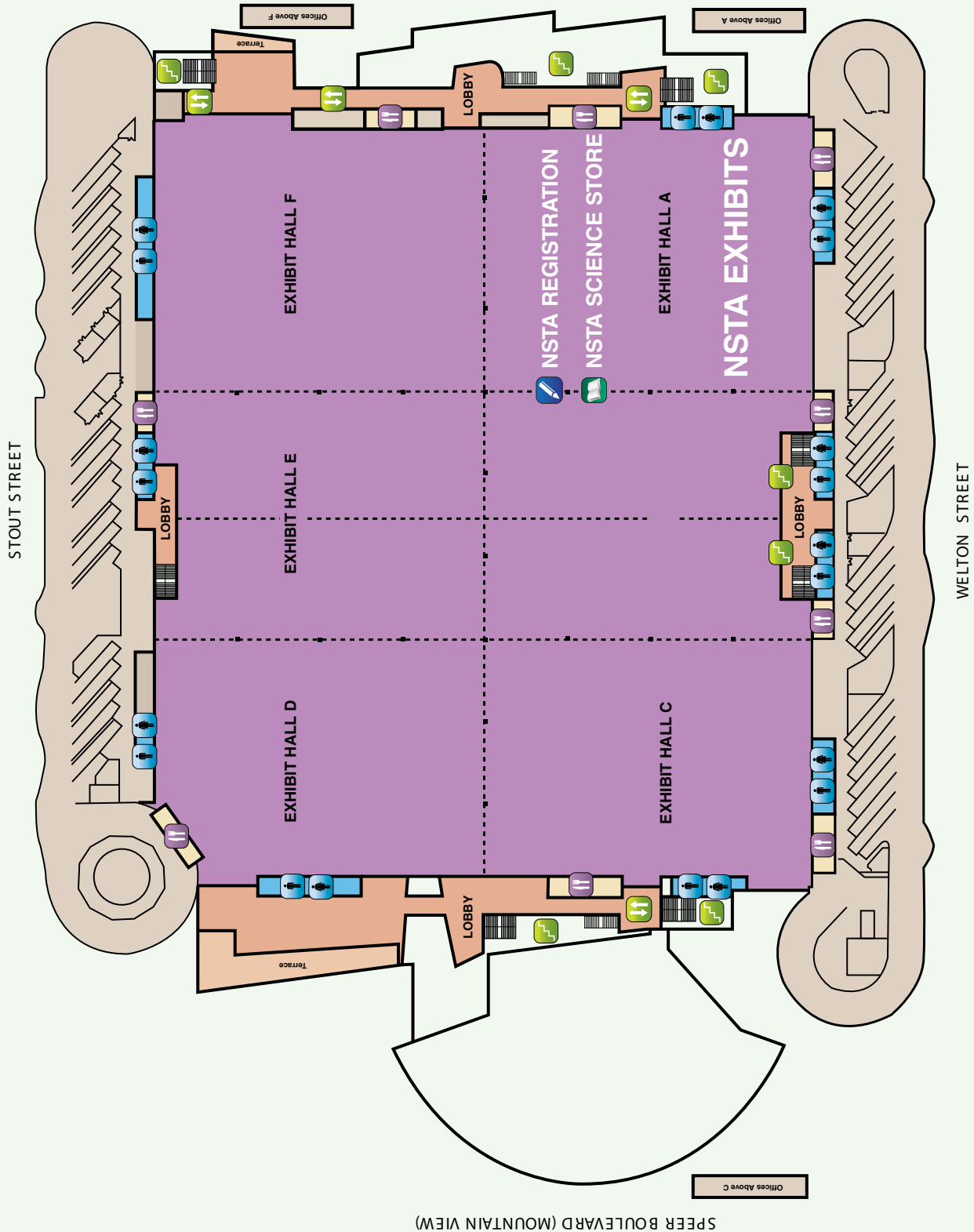
Or, get PLT materials by attending a PLT workshop in your state. Contact your state's PLT Coordinator for details.

www.plt.org

Colorado Convention Center

Exhibit Level

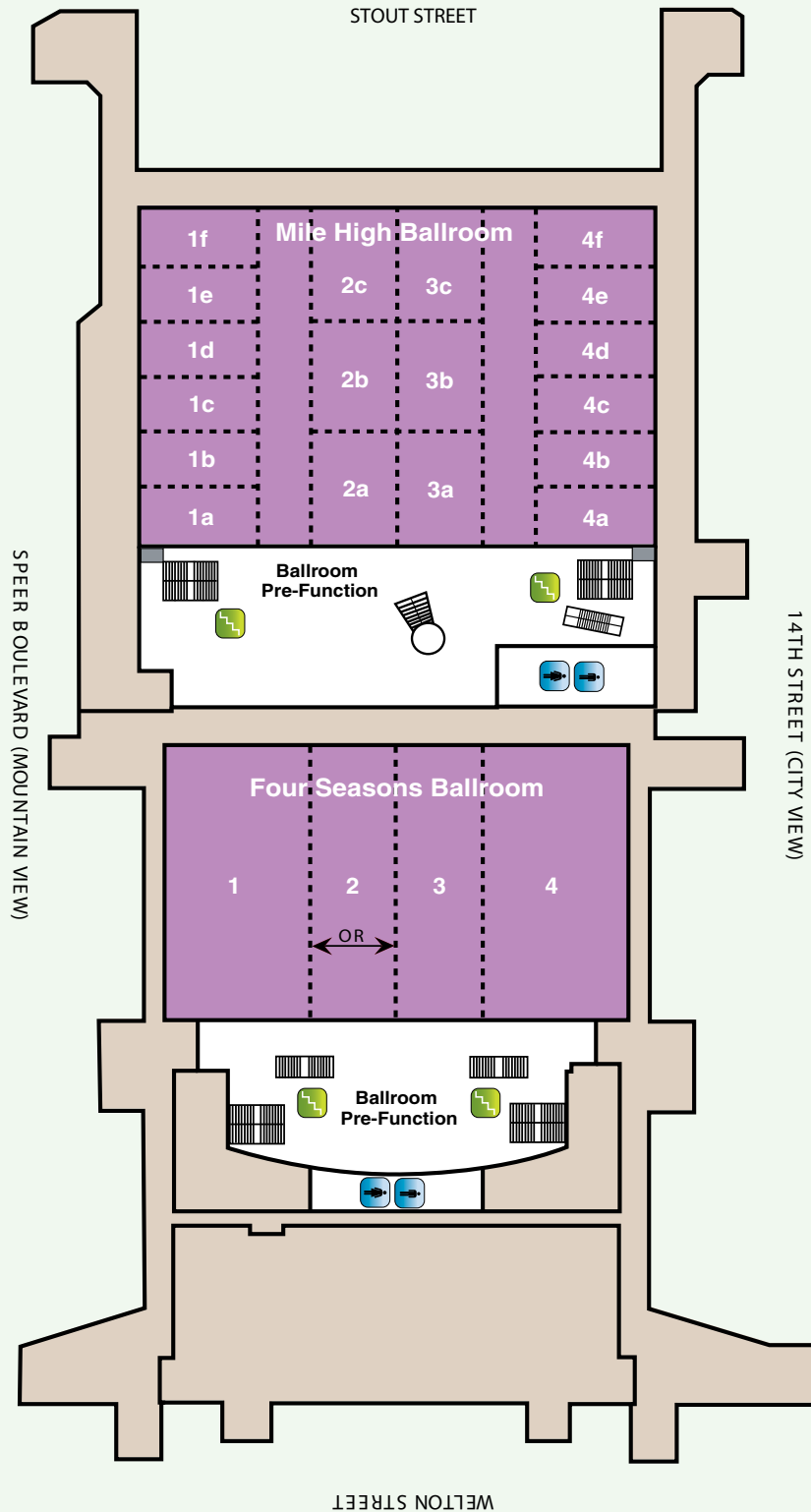
14TH STREET (CITY VIEW)



SPEER BOULEVARD (MOUNTAIN VIEW)

Colorado Convention Center

Ballroom Level



Colorado Convention Center

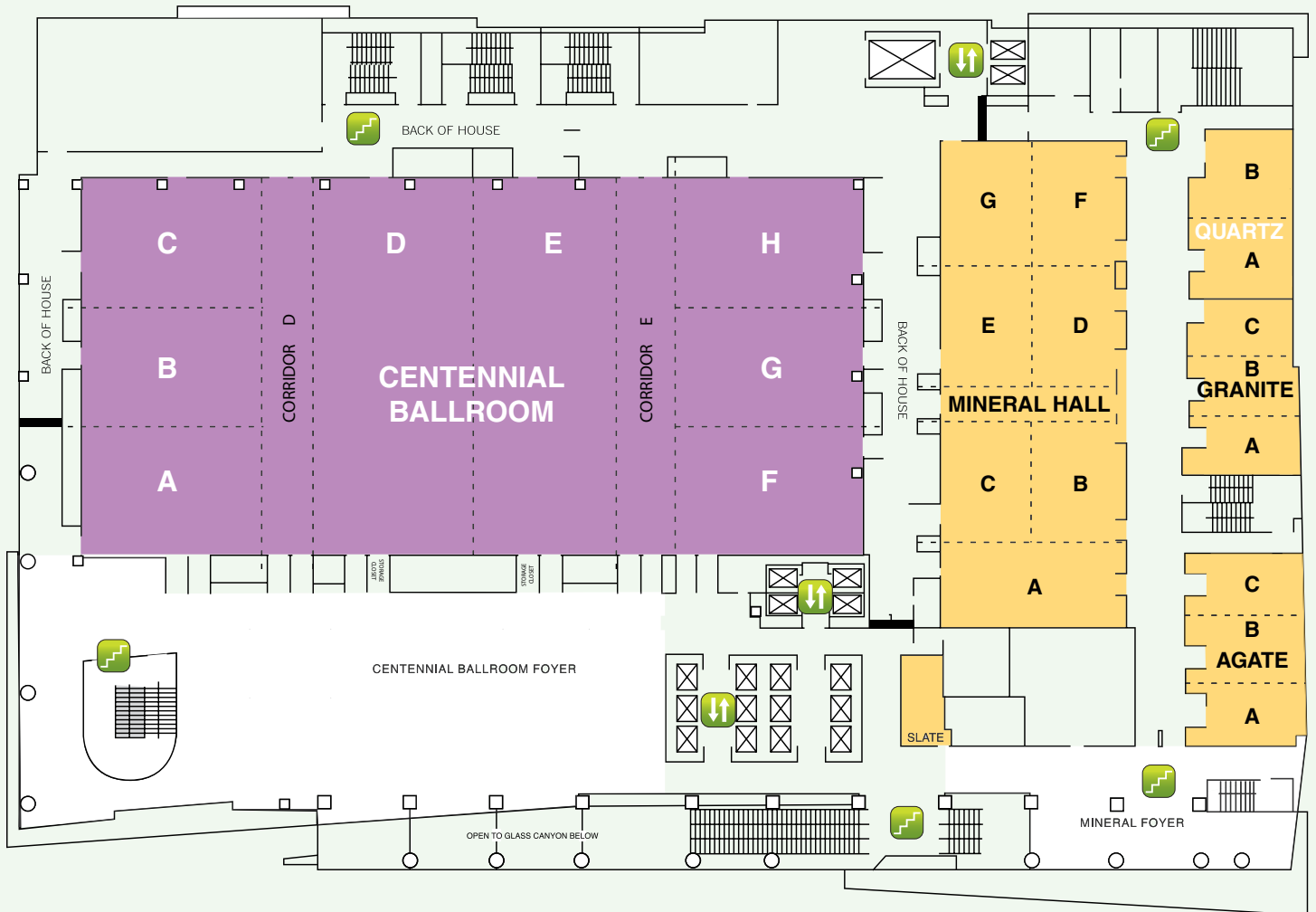
Meeting Room Level



SPIER BOULEVARD (MOUNTAIN VIEW)

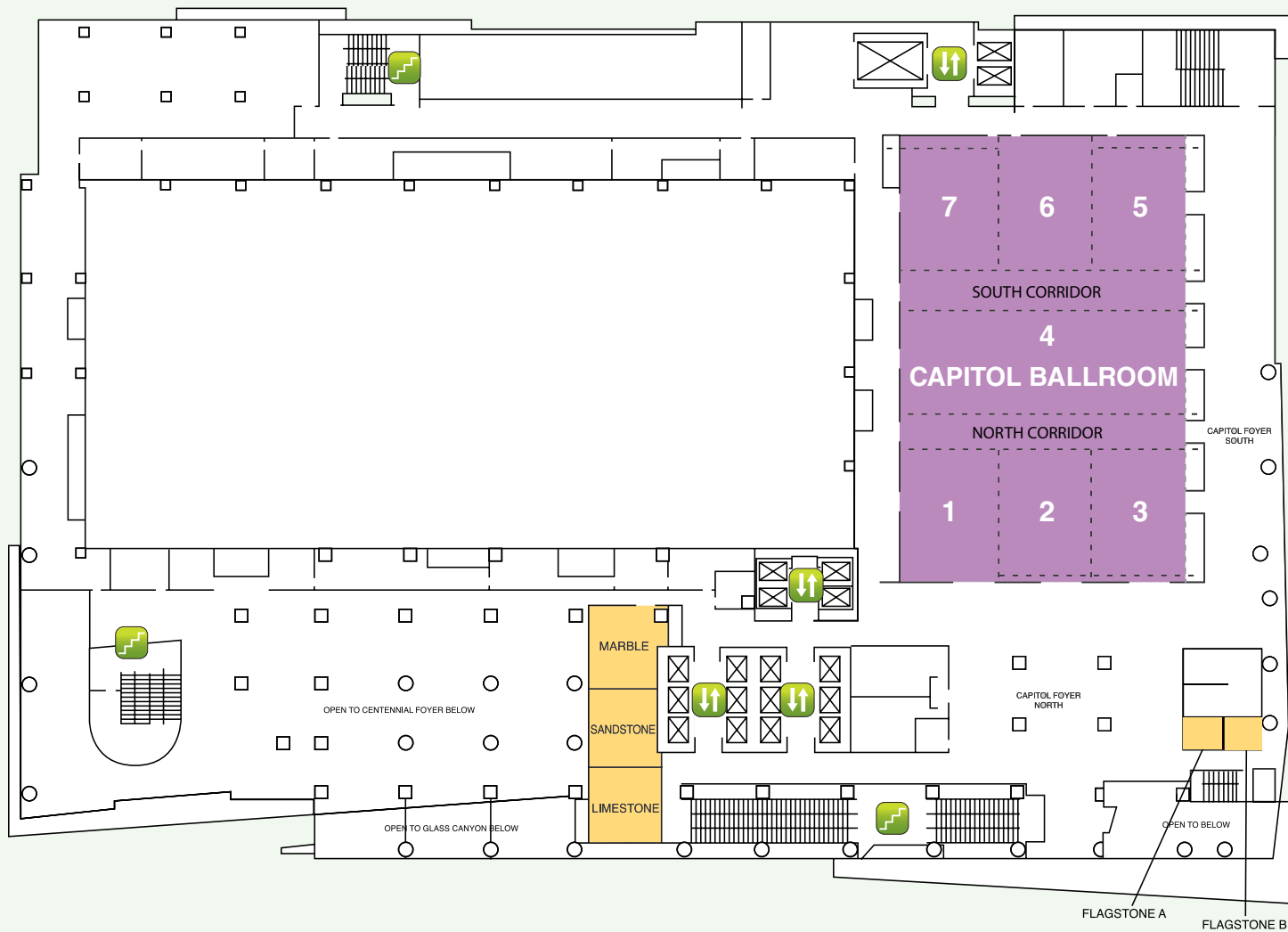
Hyatt Regency Denver at Colorado Convention Center

Level Three



Hyatt Regency Denver at Colorado Convention Center

Level Four





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- New Horizon community education programs
- Teacher Liaison program
- Lesson plans and activities
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Visit Dr. Leroy Chiao

Space Foundation Special Advisor -
Human Spaceflight and
Former NASA Astronaut

Thursday, December 12

2:30 - 3:30 p.m.

Friday, December 13

10:00 - 11:00 a.m. and

4:00 - 5:00 p.m.

at the Space Foundation's exhibit booth #435



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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

Boston, Massachusetts
April 3–6, 2014

Chicago, Illinois
March 26–29, 2015

Nashville, Tennessee
March 31–April 3, 2016

2014 STEM Forum & Expo

New Orleans, Louisiana
May 14–17

Area Conferences on Science Education

2014 Area Conferences

Richmond, Virginia—October 16–18
Orlando, Florida—November 6–8
Long Beach, California—December 4–6
(in Collaboration with CSTA)

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Philadelphia, Pennsylvania—November 12–14
Kansas City, Missouri—December 3–5

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November 6–8, 2014

Long Beach, California
—in Collaboration with CSTA
December 4–6, 2014

Proposal Deadline:
1/15/2014

For more information, visit
www.nsta.org/conferences

2015

National Conference on Science Education

Chicago, Illinois
March 26–29, 2015

Proposal Deadline:
4/15/2014



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- NSTA Science Store with 100s of professional development books; attendees receive a 20% discount
- *And much more!*

PROFESSIONAL DEVELOPMENT STRANDS

- Science and Literacy: A Symbiotic Relationship
- Teaching Elementary Science with Confidence!
- Leading from the Classroom
- Engineering and Science: Technological Partners



NATIONAL CONFERENCE
on **SCIENCE EDUCATION**

BOSTON

APRIL 3-6, 2014

For updates and information, visit
www.nsta.org/boston





—Courtesy of VISIT DENVER

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! There will also be a demo of our NSTA conference app. See page 45 for details.

Thursday, December 12

| | | |
|-------------------|---|----|
| 8:00–9:00 AM | Featured Presentation: Brett Moulding | 45 |
| 8:00–9:00 AM | First-Timers Conference Attendees' Orientation (Is This Your First NSTA Conference?) | 45 |
| 9:15–10:30 AM | General Session: Retired Col. Geoffrey Ling | 50 |
| 11:00–11:05 AM | Ribbon Cutting Ceremony/Exhibits Opening | 53 |
| 11:05 AM–5:00 PM | Exhibits (<i>Exclusive hours: 11:05 AM–12:30 PM</i>) | 53 |
| 11:10 AM–12:10 PM | Meet the Presidents and Board/Council | 54 |
| 2:00–3:00 PM | Featured Presentation: James McLurkin | 59 |
| 3:30–4:30 PM | Special Session: Jeffrey T. Kiehl | 65 |

Friday, December 13

| | | |
|-----------------|--|-----|
| 8:00 AM–4:30 PM | Biology Day | 32 |
| 8:00 AM–4:30 PM | Engineering Day | 30 |
| 8:00 AM–4:30 PM | Chemistry Day (For Grades 9–12) | 31 |
| 8:00 AM–4:30 PM | Middle School Chemistry Day | 31 |
| 8:00 AM–5:00 PM | Physics Day | 32 |
| 9:00 AM–5:00 PM | Exhibits | 78 |
| 9:30–10:30 AM | Featured Presentation: Kenneth Wesson | 79 |
| 9:30–11:30 AM | NSTA ESP Symposium | 84 |
| 12:30–1:30 PM | Featured Presentation: Diandra L. Leslie-Pelecky | 90 |
| 3:30–4:30 PM | Featured Presentation: Scott Sampson | 101 |

Saturday, December 14

| | | |
|-----------------|--------------------|-----|
| 9:00 AM–12 Noon | Exhibits | 109 |
|-----------------|--------------------|-----|



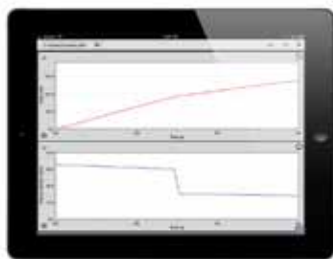
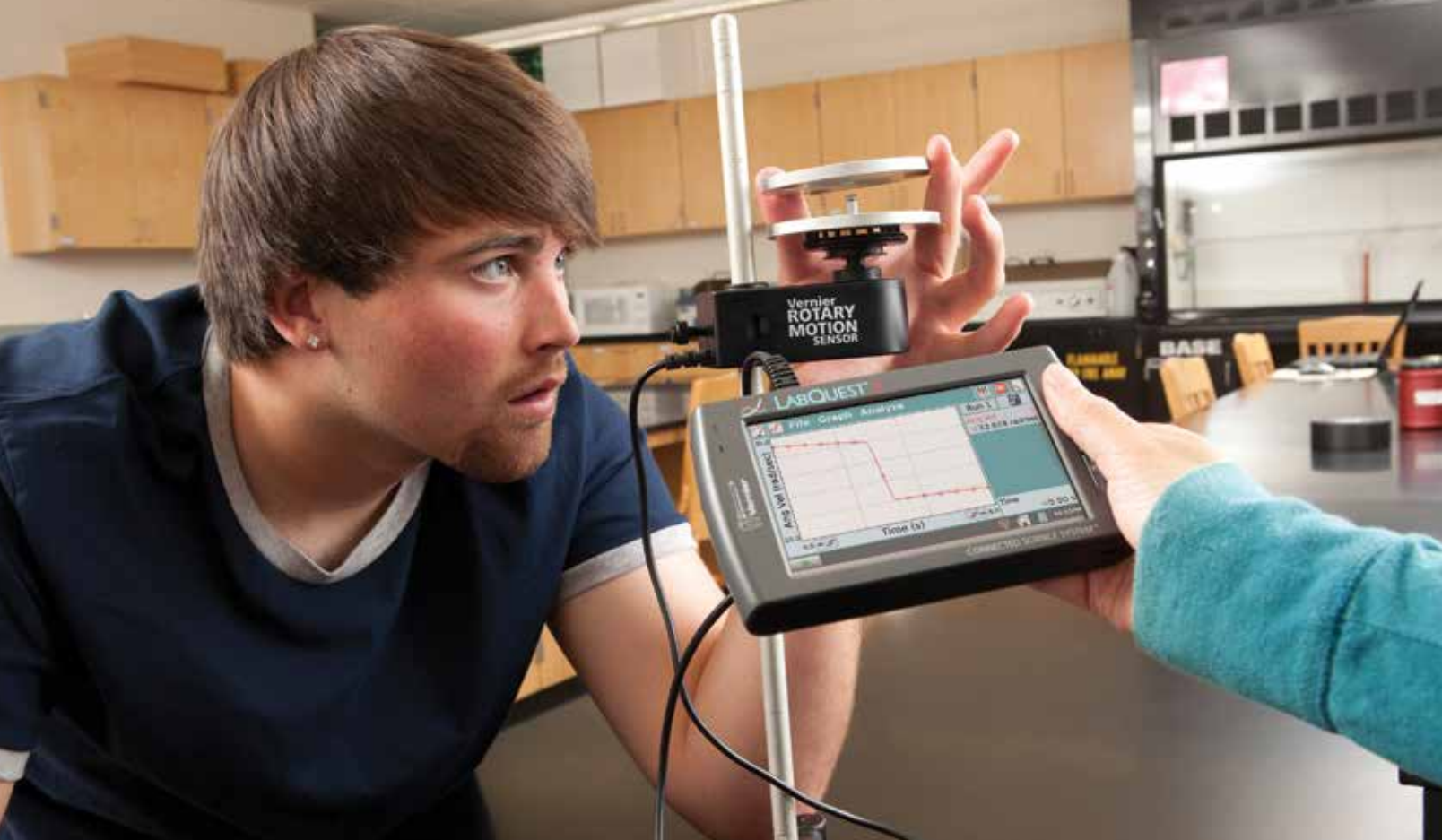
Win a round-trip Southwest travel scholarship to the **BOSTON** conference.

Thanks to the generosity of **Southwest Airlines**, we're giving away two Southwest Airline travel scholarships to the **NSTA Boston National Conference on Science Education, April 3–6, 2014!**

The drawings will be held at **4:00 PM** on Dec. 12 and Dec. 13 during the conference. You must be present to win.

Stop by the NSTA Membership Booth #638 in the Exhibit Hall for all the details!





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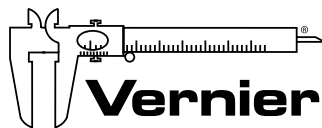
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The Denver Conference Committee has planned the conference around these three strands, enabling you to focus on a specific area of interest or need. Strand events are identified by icons throughout the daily program.



PreK–8 Science: A Playground for Literacy and Mathematics

Classrooms are the playgrounds that challenge and excite children. In these playgrounds, they practice, explore, and discover. Science gives students a relevant and engaging purpose for reading, writing, and problem solving. Research shows that the integration of science and literacy enhances the learning of preK–8 students. As reflected in the *Common Core State Standards* and the *NGSS*, integrating science into literacy and mathematics instruction improves students' thinking skills, such as cause and effect, summation, prediction, and analysis. Students who do science build and strengthen their reading, writing, speaking, listening, and problem-solving skills as they develop a deeper understanding of science.



Engineering the Engineering: Connecting the Why to the How

Engineering effectively provides foundational knowledge in science, technology, and math through innovative and creative approaches in the classroom, giving all students an opportunity to prepare for “their individual lives and for their roles as citizens in this technology-rich and scientifically complex world.” (NRC *Framework*). Students enter a classroom having experienced some form of engineering, ranging from cosmetics to robotics to smartphones. This empowers students and teachers to problematize, using personal connections and science concepts to solve real-world problems. This strand will highlight classroom practices that emphasize skills in critical thinking, leadership, problem solving, collaboration, communication, media, and technology in the transdisciplinary context of STEM.



Exploring STEM: Inside and Out

“Science, engineering, and technology permeate nearly every facet of modern life, and they also hold the key to meeting many of humanity’s most pressing current and future challenges” (NRC *Framework*). This strand focuses on helping teachers to implement innovative STEM instruction. For example, STEM inside and out refers to developing rich, authentic student-designed projects. This type of collaborative instruction involves teachers and students networking within and outside their classroom to call upon scientific expertise as well as community and global resources. To meet the needs of all students, educators must engage students to prepare for their individual lives and roles as citizens.

PreK–8 Science: A Playground for Literacy and Mathematics

Thursday, December 12

8:00–9:00 AM

Using Graphs to Organize Data

12:30–1:30 PM

S’COOL: Making Cloud Observations from the Playground

2:00–3:00 PM

Teaching Inquiry-based Science to English Language Learners with M&M’s® Investigations

3:30–4:30 PM

How Does Your Garden Grow?

5:00–6:00 PM

Cutting Across the Curriculum: Examining Lessons That Integrate Science, Literacy, and Mathematics

Friday, December 13

8:00–9:00 AM

Bringing Science to Life! Using Invertebrates to Enhance Classroom Teaching

8:00–11:00 AM

SC-3: Home and School Science Activities (Tickets required: \$60)

9:30–10:30 AM

Featured Presentation: Play and Science Running Together (Speaker: Kenneth Wesson)

11:00 AM–12 Noon

Make-and-Take: Science, Literacy, and Math

12:30–1:30 PM

Let’s Get Physical: Force and Motion

Sensational Science: Step-by-Step Strategies Across the Curriculum

3:30–4:30 PM

Literacy in Science Grades 6–8: Integrating Science Reading Strategies with the *Common Core State Standards* and the *Next Generation Science Standards*

Saturday, December 14

9:30–10:30 AM

SMILE with Physical Science

11:00 AM–12 Noon

Engaging Children in Scientific Explanation: Connecting Science and Literacy Using a “Question-Claim-Evidence-Reason” Framework

Engineering the Engineering: Connecting the Why to the How

Thursday, December 12

8:00–9:00 AM

Teaching Computational Thinking: Examples from Weather and Climate Modeling

12:30–1:30 PM

Engineering Solutions: Green Energy and Green Building

1:30–4:30 PM

SC-2: Teaching Science Outdoors Through Research and Engineering Design
(Tickets required: \$20)

2:00–3:00 PM

Engineering: Integrate the 3Ds in the NGSS

4:00–4:30 PM

Robotic Rewards: Recruiting Middle School Students for an Award-winning Robotics Team

5:00–6:00 PM

Integrating Nanotechnology in the High School Chemistry Classroom

Friday, December 13

8:00–9:00 AM

Fueling the Future: Energy Interconnections and Sustainable Choices

9:30–10:30 AM

Genetic Engineering on Steroids: BioBuilding a Cell to Do Anything You Want!

11:00 AM–12 Noon

Making Gas from Grass in the Classroom: Integrating the Practices of Science and Engineering

12:30–1:30 PM

Featured Presentation: Engineering Speed: Using NASCAR to Engage Students in Math, Science, and Engineering
(Speaker: Diandra L. Leslie-Pelecky)

2:00–3:00 PM

Can a Shoebox Fly?

3:30–4:30 PM

Exploring NASA Engineering Challenges—Something for Everyone!

Saturday, December 14

8:00–9:00 AM

It's eleSTEMary! STEM Education from Classroom to Community!

8:00–11:30 AM

SC-6: Nature to Nanotechnology: Water and Filtration
(Tickets required: \$25)

9:30–10:30 AM

The Amazing Atlas!

11:00 AM–12 Noon

Helping Students Teach Old “Dogs” New Tricks in Energy Savings

Exploring STEM: Inside and Out

Thursday, December 12

8:00–9:00 AM

Teaching Problem-solving Strategies in the Elementary Classroom: Helping Students See the Interconnectedness of Science, Technology, Engineering, and Mathematics

12:30–1:30 PM

STEM Throughout the Curriculum!

2:00–3:00 PM

Featured Presentation: Extreme Lesson Plans, Honey Bee Adventures, and Robots for Everyone—Putting Old-School Passion into Modern Technical Education
(Speaker: James McLurkin)

3:30–4:30 PM

Bioplastic—Going from Synthetic to Natural Polymers

5:00–6:00 PM

Assessment in the Modern Science Classroom

Develop Your Own STEM Center in Your Elementary Classroom

Friday, December 13

8:00–9:00 AM

What Works in Science Classrooms: Using Visual Tools and Virtual Manipulatives

9:30–10:30 AM

A Proposed Integrated STEM Framework

11:00 AM–12 Noon

NASA Engineering Activities Under \$1!

1:30–4:30 PM

SC-4: Explore STEM Practices with Outdoor Biology Instructional Strategies (OBIS)
(Tickets required: \$20)

2:00–3:00 PM

Use Molecules, Energy Transfer, and Microbes to Promote inquiry and STEM Bridges

3:30–4:30 PM

Place-based Collaborative STEM—Traps, Transects, Tips, Tools

Saturday, December 14

8:00–9:00 AM

Connecting Cultures; Exploring Science

8:00–11:00 AM

SC-5: ScienceLIVE and BSI: Bringing Lessons Based on Real Science into Your Classroom!
(Tickets required: \$30)

9:30–10:30 AM

Smashing Plates: Detecting Crustal Deformation with GPS

11:00 AM–12 Noon

Customizing STEM Instruction

NSTA Exemplary Science Program (ESP)

Unique Features of Programs That Meet
"More Emphasis" Features in the NSES



Friday, December 13, 9:30–11:30 AM
506, Convention Center

The National Science Education Standards offered four goals/justifications for science in K–6 settings, namely that all students would: 1) Experience the richness and excitement of knowing about and understanding the natural world; 2) Use appropriate scientific processes and principles in making personal decisions; 3) Engage intelligently in public discourse and debate about matters of scientific and technological concern; and 4) Increase their economic productivity through the use of the knowledge, understandings, and skills of the scientifically literate person in their careers.

The ESP series identifies people and places where the reforms recommended have emerged. The exemplars include 1) Exemplary Science in Grades PreK–4; 2) Exemplary Science in Grades 5–8; 3) Exemplary Science in Grades 9–12; 4) Exemplary Science: Best Practices in Professional Development; 5) Inquiry: The Key to Exemplary Science; 6) Exemplary Science in Informal Education Settings; and 7) Exemplary Science for Resolving Societal Challenges; 8) Exemplary Programs for Building Interest in STEM Careers; and 9) Exemplary College Science Teaching.

The series was conceived by Robert E. Yager (1982–1983 NSTA President), who continues ESP searches and ways of recognizing classroom successes while also encouraging more to try!

Coordinators:

Robert E. Yager, 1982–1983 NSTA President, and University of Iowa, Iowa City

Susan B. Koba, Science Education Consultant, Omaha, Neb.

Symposium Participants:

Modeling: Changes in Traditional Physics Instruction

Earl Legleiter, Legleiter Science Consulting, Englewood, Colo.

Community of Excellence in Mathematics and Science

Susan B. Koba, Science Education Consultant, Omaha, Neb.

Teaching Science with Pictures

Karl Spencer, The Visual Realization Program, Houston, Tex.

Engineering Day at NSTA

Sponsored by the American Society
for Engineering Education



Friday, December 13, 8:00 AM–4:30 PM
207, Convention Center

The American Society for Engineering Education (ASEE) 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 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 NASA, *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 | TeachEngineering.org: Free Resources for Engineering in K–12 (p. 74) |
| 9:30–10:30 AM | Introducing Engineering to Elementary School Students (p. 81) |
| 11:00 AM–12 Noon | ASEE's K–12 Outreach Program, eGFI: Engineering, Go For It and the Marshmallow Challenge (p. 88) |
| 12:30–1:30 PM | Challenge Your High School Students: Engineer Your World (p. 93) |
| 2:00–3:00 PM | Young Rocket Engineers (p. 98) |
| 3:30–4:30 PM | Adventure Engineering (p. 103) |
| | Project Learning Tree—Find STEM from Design to Testing for Desired Properties (p. 104) |



ACS
Chemistry for Life™

Chemistry Day at NSTA

Sponsored by the American Chemical Society

Chemical Concepts in a Changing World

For Grades 9–12

*Friday, December 13, 8:00 AM–4:30 PM
203, Convention Center*

Engage in activities, discussion, analyses, and assessment that help understand the relationships among basic chemical concepts, human activities that are changing the planet, and their roles in moving toward a more sustainable use of Earth's resources.

Research on teaching and learning indicates a positive correlation between teacher content knowledge and student learning. The goals of Chemistry Day are to enhance and enrich secondary chemistry teachers' knowledge of and interrelationships among chemical concepts and their consequences through engagement in activities, discussion, and analyses that demonstrate how lessons on these concepts can be presented in a way that stimulates student thinking and prompts exploration of the complexity of the concepts as they relate to sustainability.

The content and structure draws on several decades of experience the American Chemical Society has in activity-based curricula development, including incorporation of sustainability and Green Chemistry principles. This series of sessions includes bonding, entropy, and acid/base rates and equilibria—topics central to understanding the behavior of matter and chemical change in the environment. A complementary theme is incorporating activities as part of the assessment of student learning.

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|------------------|--|
| 8:00–9:00 AM | Chemical Bonding—Why Water Is Different (p. 74) |
| 9:30–10:30 AM | Entropy: Mixing and Unmixing (p. 81) |
| 11:00 AM–12 Noon | Entropy—Energy Transfer (p. 87) |
| 12:30–1:30 PM | Electromagnetic Radiation Energy (p. 92) |
| 2:00–3:00 PM | Rates—Concentration and Half-Life (p. 98) |
| 3:30–4:30 PM | Acid/Base Reactions—Carbon Dioxide (p. 103) |

Middle School Chemistry Day

Sponsored by the American Chemical Society

Middle School Chemistry— Big Ideas About the Very Small

*Friday, December 13, 8:00 AM–4:30 PM
201, Convention Center*

Come to one, two, or as many sessions as you like during this full day of activities and information for teaching and learning middle school chemistry. Staff from the American Chemical Society will introduce participants to the new free online resource *middleschoolchemistry.com*. Each of the six 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.

| | |
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| 8:00–9:00 AM | Matter: Solids, Liquids, and Gases (p. 74) |
| 9:30–10:30 AM | Changes of State—Evaporation and Condensation (p. 81) |
| 11:00 AM–12 Noon | Density—A Molecular View (p. 87) |
| 12:30–1:30 PM | The Periodic Table, Energy Levels, and Bonding (p. 92) |
| 2:00–3:00 PM | Polarity of the Water Molecule and Its Consequences (p. 98) |
| 3:30–4:30 PM | Chemical Change—Breaking and Making Bonds (p. 103) |

Physics Day at NSTA

Sponsored by the American Association of Physics Teachers (AAPT)
and the Colorado-Wyoming Section of AAPT



Friday, December 13, 8:00 AM–5:00 PM
210/212, Convention Center

The American Association of Physics Teachers offers a full day of physics content. Physics Days consists of interactive hands-on workshops covering important physics topics for today's world. Each of these workshops is organized by experienced science

educators and designed to deal with hard-to-express concepts that can be immediately applied in your classroom. Physics Day in Denver is being organized by the Colorado–Wyoming Section of the American Association of Physics Teachers.

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| 8:00–9:00 AM | Addressing the NGSS with Classroom Scientific Induction (p. 74) |
| 9:30–10:30 AM | Energy Conservations and Transformations (p. 81) |
| 11:00 AM–12 Noon | E.T. Phone Home (p. 88) |
| 12:30–1:30 PM | iModel, iCollaborate, and iInvestigate: Using iPads in the Science Classroom (p. 93) |

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|--------------|--|
| 2:00–3:00 PM | The Physics of Karate: Demonstrating Work and Energy with a Varying Force (p. 95) |
| 3:30–5:00 PM | “I Know What It Is, But How Do I DO It?!” A How-To Workshop on Inquiry Science Instruction (p. 105) |

Biology Day at NSTA

Sponsored by the National Association of Biology Teachers



Friday, December 13, 8:00 AM–4:30 PM
205, Convention Center

The National Association of Biology Teachers (NABT) is proud to present Biology Day. Join us for hands-on and informative sessions that highlight the resources and tools you need to excel as a biology and life science teacher. Sessions will include activities on biodiversity, evolution, and the revised AP Biology course.

From free resources to expert tips, Biology Day provides relevant information and pedagogy for every biology teacher at every level. Enhance your teaching, engage your students, and enjoy NABT Biology Day in Denver!

| | |
|------------------|--|
| 8:00–9:00 AM | Free Resources from HHMI on The Origin of Modern Humans (p. 76) |
| 9:30–10:30 AM | HHMI's Changing Planet: Past, Present, Future (p. 83) |
| 11:00 AM–12 Noon | HHMI's The Day the Mesozoic Died Classroom Resources (p. 89) |

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|---------------|---|
| 12:30–1:30 PM | Linking Evidence, Claims, and Inquiry (p. 92) |
| 2:00–3:00 PM | Understanding Enzymes (p. 98) |
| 3:30–4:30 PM | Adding Higher Levels of Inquiry to Cell Respiration (p. 103) |

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

NSTA 2013 Denver Area Conference Professional Development Documentation Form

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

Beginning January 3, 2014, Denver transcripts can be accessed at the NSTA Learning Center (*learning center.nsta.org*) by logging on with your Denver Badge ID# and then clicking on “My PD Record and Certificates.” Keep this form and use it to add the following activities to your Denver 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#** _____

Visit www.nsta.org/evaluations to evaluate sessions (workshops, presentations, and exhibitor workshops) online. See page 14 of the conference program for instructions. ***And don’t forget, the more sessions you attend and evaluate, the more chances you have to win a NEW Kindle Fire HDX 7”!***

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

Wednesday, December 11 8:00 AM–5:00 PM

| Start Time | End Time | Activity/Event Title |
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***We’re giving a Kindle Fire 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!***

Thursday, December 12 8:00 AM–6:00 PM

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Friday, December 13 8:00 AM–6:00 PM

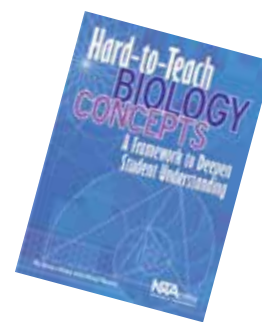
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Saturday, December 14 8:00 AM–5:00 PM

| Start Time | End Time | Activity/Event Title |
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NSTA Press Sessions

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



Thursday, December 12

- 8:00–9:00 AM The Authors' Picks! Teaching Science Through Trade Books (p. 47)
- 12:30–1:30 PM Outdoor Science and Bringing It In (p. 56)
- 2:00–3:00 PM *Scientific Argumentation in Biology* (p. 61)
- Uncovering Students' Ideas About Stars and the Universe (p. 62)
- 3:30–4:30 PM *Mastery Learning in the Science Classroom* (p. 65)
- 5:00–6:00 PM *Exemplary Science: Best Practices in Professional Development* (p. 69)

Friday, December 13

- 8:00–9:00 AM Special Needs Students in Science (p. 73)
- 9:30–10:30 AM *Picture-Perfect Science Lessons: Using Picture Books to Guide Inquiry* (p. 81)
- 11:00 AM–12 Noon Next Time You See a Sunset, a Seashell, a Firefly... (p. 88)
- 12:30–1:30 PM *Rise and Shine: A Practical Guide for the Beginning Science Teacher* (p. 91)
- 2:00–3:00 PM Stop Faking It! Finally Understand LIGHT AND SOUND So You Can Teach It (p. 98)
- Uncovering Elementary Students Ideas in Science (p. 98)
- 3:30–4:30 PM Designing Effective Science Instruction for the *Next Generation Science Standards* (p. 103)

Saturday, December 14

- 8:00–9:00 AM Classroom Activities for *Stop Faking It! Force and Motion* (p. 108)
- Hard-to-Teach Biology Topics (p. 108)
- 9:30–10:30 AM The Method: An Innovative Way to Teach and Understand Problem Solving (p. 111)



Conference Program • Meetings and Social Functions/ Ticketed Programs

Wednesday, December 11

FOSS 3rd Edition K–6 Institute

By Invitation Only

Centennial Ballroom A, Hyatt..... 8:00 AM–5:00 PM

FOSS Middle School Institute

By Invitation Only

Centennial Ballroom C, Hyatt 1:00–5:00 PM

Friday, December 13

NSTA/CAEP Development of Program Report Workshop

By Invitation Only

Granite, Hyatt 8:00–11:00 AM

Saturday, December 14

Teacher Professional Development Workshop: Engaging Your Students in Earth Systems Science and ArcGIS

Mineral Hall C, Hyatt..... 8:00 AM–5:00 PM

CAST Board Meeting

Quartz, Hyatt..... 12 Noon–1:00 PM

Symposium: Flight of the Monarch Butterflies (SYM-1)

Ann Hobbie (ann.s.hobbie@gmail.com) and **De Cansler** (decansler@gmail.com), University of Minnesota Dept. of Fisheries, Wildlife, and Conservation Biology, St. Paul

Level: Grades K–12

Date: Friday, December 13, 12:30–6:00 PM

Location: Off-site (Denver Museum of Nature & Science)

Registration Fee: \$54

NSTA is partnering with the Maryland Science Center, University of Minnesota, and the National Science Foundation to present an exciting symposium for educators, grades K–12, on the topic of monarch butterfly migration. During this half-day symposium, participants will see the film *Flight of the Butterflies* and take part in classroom activities focused on the monarchs' amazing migration across North America, as well as their habitats and life cycle. Attendees will hear from monarch experts about how teachers and students can become involved in citizen science projects to help the monarchs. Educational materials will be provided for classroom use. A drawing for door prizes will take place at the end of the program. Lunch will be served! Participants will be reimbursed \$75 after successful completion of the symposium, courtesy of the presenting groups. Visit bit.ly/13rZNF8 for more information.

Note: Please meet your symposium leader at the South Shuttle entrance to the Colorado Convention Center 15 minutes before departure time.



—Photos courtesy of Jim O'Leary/Maryland Science Center

Picture-Perfect Science Preconference Workshop (C-1)

Tickets for this preconference workshop were available by preregistration only.



Karen Ansberry

Karen Ansberry (karen@pictureperfect-science.com) and **Emily R. Morgan** (emily@pictureperfectscience.com), Classroom Veterans and Award-winning Authors of *Picture-Perfect Science Lessons, Expanded 2nd Edition: Using Children's Books to Guide Inquiry, 3–6*; *More Picture-Perfect Science Lessons: Using Children's Books to Guide Inquiry, K–4*; and *Even More Picture-Perfect Science Lessons (K–5)*; and co-authors of *Teaching Science Through Trade Books*.



Emily R. Morgan

Level: Grades K–5
 Date: Wednesday, December 11
 Time: 8:30 AM–3:30 PM
 Location: Capitol Ballroom 6/7, Hyatt

STEM education begins in elementary school, but it can be difficult for elementary teachers to fit science into the school day. *Picture-Perfect Science* integrates sci-



—Courtesy of Karen Ansberry and Emily Morgan

ence and reading in a meaningful way, so you can teach both subjects at once. In this full-day workshop, you will participate in model lessons that integrate science and reading, learn the benefits and cautions of using children's picture books in science, become familiar with the BSCS 5E model, and receive a bibliography of recommended science-related picture books. All attendees will also receive a copy of *Even More Picture-Perfect Science Lessons*, a \$37.95 value containing 15 classroom-ready lessons for grades K–5. Come to this Picture-Perfect Science Workshop and rejuvenate elementary science instruction in your school!

Science Formative Assessment Workshop: Uncovering What K–12 Students Really Know and Think (C-2)

Tickets for this preconference workshop were available by preregistration only.



Page Keeley

Page Keeley (pagekeeley@gmail.com), 2008–2009 NSTA President, and Author of 14 books, including the best-selling *Uncovering Student Ideas in Science* series and numerous journal articles.

Joyce Tugel (jtugel@mmsa.org), Maine Mathematics and Science Alliance, Augusta

Level: Grades K–12
 Date: Wednesday, December 11
 Time: 8:30 AM–3:30 PM
 Location: Capitol Ballroom 4, Hyatt



Joyce B. Tugel

Research has shown that the effective use of formative assessment can significantly improve learning for all students. Learn how to use formative assessment to transform instruction while simultaneously supporting learning. During this daylong workshop, participants will be introduced to the use of formative assessment in science, learn about the types of misconceptions students have and ways to surface and address them, practice strategies for questioning and monitoring student learning during different stages in a cycle of instruction, learn how to develop their own assessments that probe students' thinking, and combine formative assessment classroom techniques (FACTs) with the eight science practices in the *Next Generation Science Standards*. Both classroom and teacher learning applications will be addressed. All participants will receive a copy of *Uncovering Student Ideas in Science, Vol. 4*.



—Courtesy of Joanna Snyder

Teachers engage in an Outdoor Biology Instructional Strategies activity Plant Hunt (SC-2 and SC-4).

Formative Assessment: Feedback That Moves Learning Forward (SC-1)

Anne Tweed, (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

Level: Grades K–12

Date: Thursday, December 12, 8:00–11:00 AM

Location: Capitol Ballroom 5, Hyatt

Registration Fee: \$60

The purpose of formative assessment is to enable learning, not simply to measure what has been learned at the end of a period of instruction or what standards have been met at the end of the year. This short course will help participants learn about the process of formative assessment within science classrooms and find out about the online resources available to help teachers, schools, and districts learn how to implement it. Take home booklets: *Inside the Black Box: Assessment for Learning in the Science Classroom* and *Science Formative Assessment* as well as other handouts. Bring your laptop/tablet if possible.



Teaching Science Outdoors Through Research and Engineering Design (SC-2)

Joanna Snyder (joanna_snyder@berkeley.edu) and **Erica Beck Spencer** (ebspencer@berkeley.edu), The Lawrence Hall of Science, Berkeley, Calif.

Level: Grades K–8

Date: Thursday, December 12, 1:30–4:30 PM

Location: Agate, Hyatt

Registration Fee: \$20

Explore your local environment and strengthen connections to the natural world, while emphasizing elements of the science and engineering practices (NRC *Framework* and the *NGSS*). Participants will learn effective strategies for managing students through inquiry-based and design-based outdoor activities. You will also receive access to instructional resources created at The Lawrence Hall of Science. Be prepared to go outdoors. Visit www.outdoorbiology.com for more information.

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.



Home and School Science Activities (SC-3)

Bernard A. Horvath (bgrizwald@aol.com), Retired Teacher, Jeffersonville, Ind.

Kevin Horvath, Retired Educator, Lake Lotawana, Mo.

Level: Grades 4–8

Date: Friday, December 13, 8:00–11:00 AM

Location: Capitol Ballroom 2, Hyatt

Registration Fee: \$60

Join us and engage in innovative physical science demonstrations for grades 4–8 that promote inquiry, problem solving, and literacy. We'll compare and contrast basic activities related to the periodic table, its origination, and order. Next, we'll perform demonstrations providing circumstantial evidence for the kinetic molecular theory. Concepts will be physical and chemical changes, including expansion, contraction, evaporation, condensation, and melting. Activities include several variations of air pressure experiments—from the ideas of empty and full to the idea of a real tornado with the help of a vacuum cleaner to apply some Bernoulli's principle and surface tension. The related effects of gravity, friction, inertia, and centripetal force are from the viewpoints of airplane flight, the space shuttle, NASCAR, planetary orbits, and even ice skaters. Take home two resource books with 65 hands-on activities plus other activities, lesson plans, and handouts.



Explore STEM Practices with Outdoor Biology Instructional Strategies (OBIS) (SC-4)

Joanna Snyder (joanna_snyder@berkeley.edu) and **Erica Beck Spencer** (ebspencer@berkeley.edu), The Lawrence Hall of Science, University of California, Berkeley

Level: Grades K–8

Date: Friday, December 13, 1:30–4:30 PM

Location: Agate, Hyatt

Registration Fee: \$20

Explore your local environment and strengthen connections to the natural world, while emphasizing elements of STEM education (NRC *Framework* and the *NGSS*). Participants will experience the scientific and engineering practices in action, explore an interactive online digital photography project, learn strategies to manage students outside, and receive access to instructional resources created for formal and informal education. Most of the workshop will be outdoors. Visit www.outdoorbiology.com for more information.



ScienceLIVE and BSI: Bringing Lessons Based on Real Science into Your Classroom! (SC-5)

Peter Erb (*erbp@colorado.edu*), **Liesl P. Erb** (*liesl.erb@colorado.edu*), **Tammy A. Maldonado** (*tammy.maldonado@colorado.edu*), and **Kristin Swihart** (*swihart@colorado.edu*), University of Colorado, Boulder

Level: General

Date: Saturday, December 14, 8:00–11:00 AM

Location: Granite, Hyatt

Registration Fee: \$30

This short course will introduce you to ScienceLIVE, a unique web-based tool that connects active field research to your classrooms. ScienceLIVE allows K–12 students to experience the excitement of active field research and engage with scientists in the field through interactive maps, lesson plans, real-time blogs, videos, webinars, and social media. Engage in hands-on activities based on actual research data. Two research projects will be highlighted. First, teachers will explore ScienceLIVE’s online tools for the classroom while learning about research on the American pika (a small mammal that lives at high altitude). The second activity highlights local research in alpine hydrology and explores how glaciers move and change over time. Bring laptops if possible. Visit www.science-live.org for more information.



Nature to Nanotechnology: Water and Filtration (SC-6)

Christine Morrow (*christine.morrow@colorado.edu*) and **Douglas L. Gin** (*gin@spot.colorado.edu*), University of Colorado, Boulder

Anne Tweed (*tweed@mcrel.org*), 2004–2005 NSTA President, and McREL, Denver, Colo.

Level: Middle Level–High School

Date: Saturday, December 14, 8:00–11:30 AM

Location: Capitol Ballroom 6, Hyatt

Registration Fee: \$25

Emerging fields such as nanoscience and engineering promise to have a significant impact on our global society and economy and require today’s science teachers to understand and be able to teach content that they very likely have never studied formally. This short course addresses issues of water quality, how humans interact with their environment, and how leading-edge nanoscience engineering research is developing solutions for water purification. Alongside scientists and science educators, participants will collaboratively engage in critical reasoning activities in the context of the real-world issue of diminishing clean water resources and applying nanotechnology for filtration.



—Courtesy of Bruce Boyer / VISIT DENVER

Tickets for field trips may be purchased (space permitting) at the Ticket Sales Counter in the NSTA Registration Area. Meet your field trip leader at the South Shuttle entrance to the Convention Center 15 minutes before departure time.

National Renewable Energy Laboratory

\$37; by preregistration only

#T-1 Thurs., Dec. 12 8:00 AM–12:45 PM

Solar, wind, biomass, and geothermal energy are among the energy sources being researched by the National Renewable Energy Laboratory (NREL). NREL is the Department of Energy’s primary national laboratory for renewable energy and energy efficiency research and development. We’ll tour NREL’s South Table Mountain research campus, learning about current research from world-renowned scientists. Tour stops will include the ultra high-efficient Research Support Facility, the Science and Technology Facility, and the Energy Systems Integration Facility. Visit www.nrel.gov for more information. Cameras are not allowed in several of the research areas—the tour guide will let you know if pictures can be taken.

Note: This tour involves walking, so please wear comfortable clothes and shoes. Participants must wear long pants and close-toed shoes; no sandals, flip flops, shorts, water bottles, or other liquids allowed.

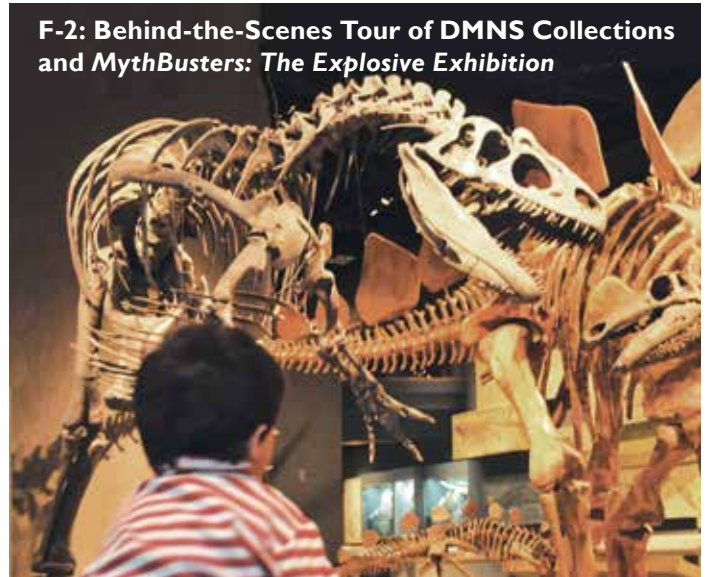
Special Note: Participants will need to provide a valid government-issued photo ID. Non U.S. citizens are required to complete a foreign national data card five days in advance of the site visit. November 25 is the deadline to sign up for this field trip.

National Center for Atmospheric Research

\$24; by preregistration only

#T-2 Thurs., Dec. 12 12:30–4:45 PM

Join us at the National Center for Atmospheric Research (NCAR), a federally funded research and development center devoted to service, research, and education in the atmospheric and related sciences. Explore exceptional exhibits on weather, climate, the Sun-Earth connection, and supercomputing/modeling. Experience a state-of-the-art scientific visualization environment, providing an immersive environment for visualizing complex datasets in stereo 3-D and collaborating across sites via high-definition video teleconferencing. Wander NCAR’s majestic Weather Trail beneath Boulder’s famed Flatirons and the foothills to the Rocky



F-2: Behind-the-Scenes Tour of DMNS Collections and MythBusters: The Explosive Exhibition

—Photo courtesy of Steve Crecelius/VISIT DENVER

Mountains, and experience as well as hear about NCAR’s landmark architecture designed by world-renowned architect I.M. Pei. Lastly, learn about educational resources on weather, climate, and other areas of the atmospheric sciences that you can put to use in your classroom right away plus professional development opportunities. There is something for everyone. For more information, visit www.ucar.edu and spark.ucar.edu.

Note: Outdoor activities are weather dependent. Elevation at NCAR is 6,118 feet. Proper winter clothing and good walking shoes are required along with sunblock and water. NCAR will provide bottled water to participants. Non-Colorado natives should drink plenty of water; there is a five-minute walk to entrance.

New Belgium Brewing Company

\$29

#T-3 Thurs., Dec. 12 12:30–5:30 PM

If you enjoy a cold brew then this field trip is for you! New Belgium Brewing, makers of Fat Tire Amber Ale and a host of Belgian-inspired beers, is recognized as one of *Outside Magazine’s* Best Places to Work and one of *The Wall Street Journal’s* Best Small Businesses. The 100% employee-owned brewery is a Platinum-level Bicycle Friendly Business as designated by the League of American Bicyclists, and one of World Blu’s most democratic U.S. businesses. Learn more at www.newbelgium.com. On your 90-minute tour of New Belgium Brewing Company, you will learn about the company’s history, company practices, and philosophies as well as enjoy some samples of our tasty beers developed with unconventional wisdom. Beer will be available to purchase as well as T-shirts, hats, and posters. Travel time is one hour each way.

Note: Close-toed shoes or sneakers required. Golf carts are available for individuals that might have concerns walking long distances.

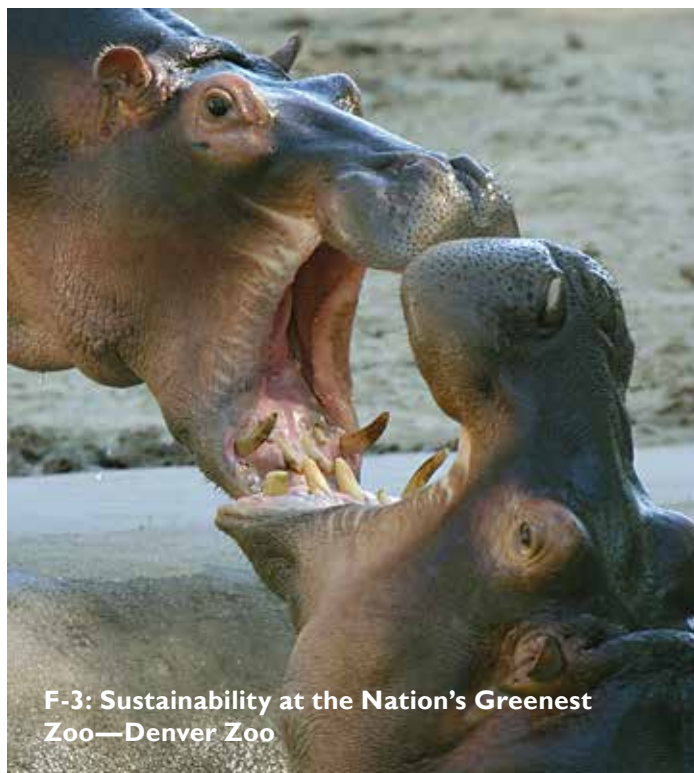
Geology and Paleontology of Red Rocks Park and Dinosaur Ridge \$74

#F-1 Fri., Dec. 13 8:30 AM–4:30 PM

Come join a great outdoor field trip to study rocks and fossils near Red Rocks Park and at Dinosaur Ridge, just 18 miles from downtown Denver. Located along the eastern slope of the Rocky Mountains, Red Rocks Park is named for the spectacular sandstone rock formations within its 868 acres. You will observe and be able to touch rocks to determine the environment of deposition millions of years ago.

Our next stop is Dinosaur Ridge, a hogback ridge that served as a beach on a vast inland sea that stretched farther than the eye can see, and dinosaurs migrated along its edge, leaving footprints in the sand. At Dinosaur Ridge, you will observe dinosaur fossil bones and tracks found in rocks from the Jurassic and Cretaceous periods while you walk through time outdoors. These fossils were discovered in 1877 by Arthur Lakes and represent some of the first dinosaur fossils found in western North America. Enjoy a box lunch at Dinosaur Ridge Visitors Center.

Note: This field trip will involve walking on gravel and pavement at 6,000 feet above sea level. Proper winter clothing and good walking shoes are required along with sunblock and water. No rock or fossil collecting is permitted. Outdoor activities are weather dependent and alternate plans include hands-on activities relating to tracks, fossils, and rocks.



F-3: Sustainability at the Nation's Greenest Zoo—Denver Zoo

—Photo courtesy of The Denver Zoo / VISIT DENVER

Behind-the-Scenes Tour of DMNS Collections and MythBusters: The Explosive Exhibition \$34

#F-2 Fri., Dec. 13 9:30 AM–1:20 PM

The Denver Museum of Nature & Science (DMNS) has 270,000 square feet of exhibition space; yet most people would never guess that 99% of the collection is preserved out of public view.

On this field trip, you will join Research & Collections Division staff for an exclusive behind-the-scenes tour of Anthropology, Earth Sciences, and Zoology collections. The Anthropology Collection includes exquisite American Indian beadwork, basketry, and artwork, Lewis & Clark's telescope, and archaeological treasures from around the world. Highlighted by the Ice Age discoveries made in Snowmass Village in 2010–2011, the Earth Sciences Collection documents our dynamic Earth and the biodiversity of the Rocky Mountain region from 500 million years ago to 10,000 years ago. From passenger pigeons to the last grizzly bear in Colorado, the Zoology Collection documents the ebb and flow of animal life and diversity in the Rocky Mountain region over the past 140 years.

Then let your curiosity run wild as you enter *MythBusters: The Explosive Exhibition*. Can you really huff and puff and blow a house down? Become a MythBuster and test out theories and bust or confirm others at *MythBusters: The Explosive Exhibition*! Try a dozen hands-on experiments that will get your heart and mind racing, watch live *MythBusting* demonstrations, and explore authentic props and gadgets direct from the *MythBusters* set. Put your scientific curiosity into action. Food and beverage are available for purchase at the T-Rex Cafe.

Sustainability at the Nation's Greenest Zoo—Denver Zoo \$42

#F-3 Fri., Dec. 13 1:30–5:00 PM

As the winner of the Association of Zoos and Aquariums' Greenest Zoo Award in 2012, Denver Zoo continually strives to be a leader in sustainability. Explore the zoo and get a behind-the-scenes look at some of our sustainability efforts, including Denver Zoo's one-of-a-kind waste to energy system. Learn more about programs that can link your students to sustainable actions they can take, and experience firsthand how up-close interaction with live animals creates connections that can inspire and empower your students to positively impact animals and the environment.

Note: Please wear comfortable walking shoes and dress to be outdoors. Cameras are encouraged for this exclusive experience. Food is available for purchase in our many restaurants or you can pack your own.

Conference Program • Affiliate Sessions

Council for Elementary Science International (CESI)

President: Julie Thomas

Thursday, December 12

| | | |
|--------------|---|-------------------------|
| 2:00–3:00 PM | Council for Elementary Science International Share-a-Thon | Centennial A/B/C, Hyatt |
|--------------|---|-------------------------|

Friday, December 13

| | | |
|---------------|---|----------------------|
| 12:30–1:30 PM | Get on Board with CESI and NASA's International Space Station | MHB-3C, Conv. Center |
|---------------|---|----------------------|

National Association for Research in Science Teaching (NARST)

President: Lynn Bryan

Friday, December 13

| | | |
|---------------|---|----------------------|
| 12:30–1:30 PM | Use of Evidence and Standards-based Reflection in Elementary Science Methods | MHB-4A, Conv. Center |
|---------------|---|----------------------|

| | | |
|--------------|--|----------------------|
| 2:00–3:00 PM | Writing About Socio-Scientific Issues in Middle School to Increase Decision-making Skills | MHB-4A, Conv. Center |
|--------------|--|----------------------|

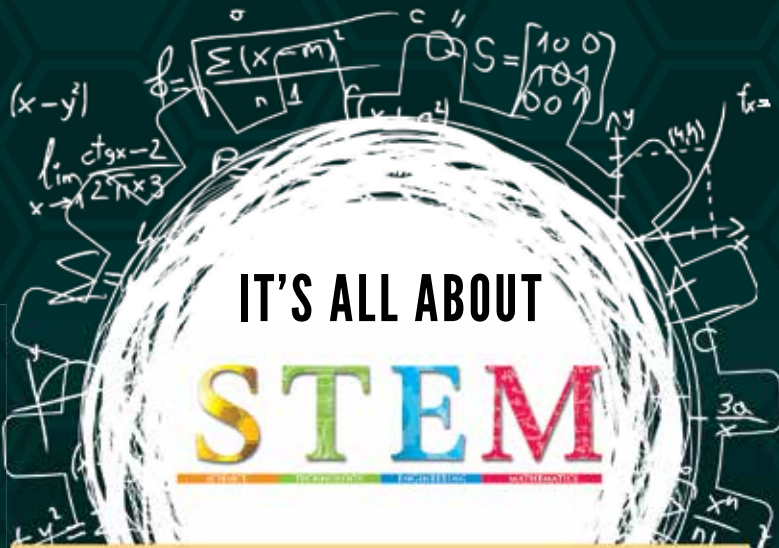
National Science Education Leadership Association (NSELA)

President: Darlene Ryan

Friday, December 13

| | | |
|---------------|-----------------------------------|----------------------|
| 9:30–10:30 AM | Tools for Science Leaders, Part I | MHB-4A, Conv. Center |
|---------------|-----------------------------------|----------------------|

| | | |
|------------------|------------------------------------|----------------------|
| 11:00 AM–12 Noon | Tools for Science Leaders, Part II | MHB-4A, Conv. Center |
|------------------|------------------------------------|----------------------|



IT'S ALL ABOUT

STEM

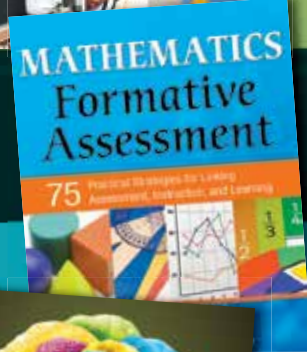
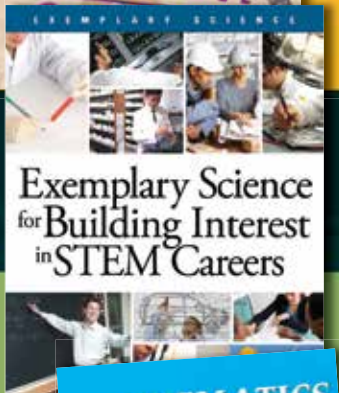
Looking for exciting STEM design challenges and activities to engage students?



Hoping to steer students toward STEM-related career fields?

Get ideas, inspiration, and much more from these books in NSTA's STEM collection.

To order or learn more, visit www.nsta.org/store





—Photo courtesy of Dennis Schroeder/NREL

Two competitors get ready to race at the Junior Solar Sprint and Hydrogen Fuel Cell Car Competition at Dakota Ridge High School in Littleton, Colorado, in May 2011.

8:00 AM–5:00 PM Meeting

FOSS 3rd Edition K–6 Institute

(By Invitation Only)

Centennial Ballroom A, Hyatt

8:30 AM–3:30 PM Preconference Workshops

Science Formative Assessment Workshop: Uncovering What K–12 Students Really Know and Think (C-2)

(Grades K–12)

Capitol Ballroom 4, Hyatt

By Preregistration Only

Page Keeley (pagekeeley@gmail.com), 2008–2009 NSTA President, Jefferson, Maine

Joyce B. Tugel (jtugel@mmsa.org), Maine Mathematics and Science Alliance, Augusta

For description, see page 35.

Picture-Perfect Science Preconference Workshop (C-1)

(Grades K–5)

Capitol Ballroom 6/7, Hyatt

By Preregistration Only

Karen Ansberry (karen@pictureperfectscience.com) and

Emily Morgan (emily@pictureperfectscience.com), Picture-Perfect Science, LLC, Lebanon, Ohio

For description, see page 35.

1:00–5:00 PM Meeting

FOSS Middle School Institute

(By Invitation Only)

Centennial Ballroom C, Hyatt

Science Area

A science area category is associated with each session. These categories are abbreviated in heavy type at the right immediately following the session title. On page 133, you will find the conference sessions grouped according to their assigned science area category.

The science areas and their abbreviations are:

| | | |
|----------------|---|-----------------------------------|
| (Bio) | = | Biology/Life Science |
| (Chem) | = | Chemistry/Physical Science |
| (Earth) | = | Earth/Space Science |
| (Env) | = | Environmental Science |
| (Gen) | = | Integrated/General Science |
| (Phys) | = | Physics/Physical Science |

Glossary

STEM stands for Science, Technology, Engineering, and Mathematics.

Strands

The Denver 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 28.



PreK–8 Science: A Playground for Literacy and Mathematics



Engineering the Engineering: Connecting the Why to the How



Exploring STEM: Inside and Out

The following icon will be used throughout this program.



NSTA Press® Sessions

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.



—Photo courtesy of Greg Throw / VISIT DENVER

8:00–9:00 AM Featured Presentation

Understanding the Vision for Science Education from the NRC Framework and the Next Generation Science Standards (Gen)

(General)

103/105, Convention Center



Brett Moulding (mouldingb@ogdensd.org), Director, Utah Partnership for Effective Science Teaching and Learning, Ogden

Presider: David L. Evans, NSTA Executive Director, Arlington, Va.

The NRC Framework and the NGSS provide a new vision for science instruction. Engaging all students in science performances at the intersection of crosscutting concepts, science and engineering practices, and core ideas is critical to aligning instruction to this new vision for science teaching and learning. This session provides insights into instructional shifts and ways to engage students in science performances consistent with this new vision.

Brett Moulding is currently director of the Utah Partnership for Effective Science Teaching and Learning. He was a member of the National Academy of Sciences Board on Science Education and a member of the National Research Council (NRC) Committee developing A Framework for K–12 Science Education. He served as one of the lead writers with a team of teachers on the Next Generation Science Standards. Brett served on the Board at the Triangle Coalition, the NAEP 2009 Framework Committee, and was president of the Council of State Science Supervisors from 2003 to 2006.

Brett was the state science education specialist and coordinator of Curriculum at the Utah State Office of Education from 1993 to 2004 and then director of Curriculum and Instruction for Utah. He taught chemistry for 20 years and received the Presidential Award for Excellence in Mathematics and Science.

8:00–9:00 AM Presentations

SESSION 1

A Journey Through Time: How Participating in Teacher Field Research Programs Improves Science Inquiry in the Classroom (Gen)

(General)

108/110, Convention Center

Lesley Urasky (lurasky@crbl.k12.wy.us), Rawlins High School, Rawlins, Wyo.

Attention will be paid to a variety of teacher field research programs available and how participation can lead to improved teaching of scientific inquiry in your classroom.

SESSION 2

Science, Pseudoscience, and Science Denial (Gen)

(General)

111/113, Convention Center

Paul K. Strode (paul.strode@bvsvd.org), Fairview High School, Boulder, Colo.

Join me for a discussion of irrational thinking in light of evidence and how it has led to an epidemic of pseudoscience and science denial in the U.S.

SESSION 3

Fifty Years of Field Science (Gen)

(General)

112, Convention Center

Terry J. Logue (tjlogue@una.edu) and **Dana P. Van Burgh** (vbbison@wyoming.com), Casper College, Casper, Wyo.

Beecher E. Strube, Retired Educator, Casper, Wyo.

The Field Science program received the NSTA SESE Award in 1983. Join us as we share 50 years of teaching field geology, biology, and history to high school students, teachers, and retired adults.

SESSION 4

First-Timer Conference Attendees Orientation—Is This Your First NSTA Conference? (Gen)

(General)

201/203, Convention Center

NSTA Board and Council

Feeling overwhelmed by all there is to see and do at an NSTA conference? Join us for an interactive walk through the conference program, and you'll learn how to get the most from your conference experience. We'll also have a brief demo of our NSTA conference app. Door prizes!

SESSION 5

STEM In Action: A Highly Successful High School Model for STEM Education (Gen)

(Middle Level–High School/Supv.) 507, Convention Center

Travis O’Hair (*ohair_michael@svvsd.org*), Skyline High School, Longmont, Colo.

Nationally recognized “Race to the Top” recipient Skyline High School presents a look at their pre-engineering STEM Academy, which is intended for a highly diverse student population.

SESSION 6

Bring the Science of Cars into the Classroom (Chem)

(Middle Level–High School) MHB-1A, Convention Center

Andrew Nydam (*andrewnydam@hotmail.com*), Polymer Ambassador, Olympia, Wash.

Debbie Goodwin (*nywin@hotmail.com*), Chillicothe High School, Chillicothe, Mo.

Students love cars but dislike science? Discover lessons using the car to teach major science concepts. Yes, even if you are mechanically challenged!

SESSION 7

Crosscutting Concepts: Ice Core Records—From Volcanoes to Supernovas (Earth)

(High School–College/Informal) MHB-1C, Convention Center

Donna L. Young (*donna@aavso.org*), Chandra E/PO Office, SAO/NASA, Bullhead City, Ariz.

Experience a unique ice core investigation that incorporates absolute and relative dating, history, volcanoes, solar proton events, energy cycles, Earth systems, terrestrial events, and supernovas.

SESSION 8

Teaching Online in Real Time (Phys)

(High School) MHB-1E, Convention Center

Steve Rapp (*srapp@hgs.k12.va.us*), A. Linwood Holton Governor’s School, Abingdon, Va.

Come find out how I teach my students via the internet using streaming video, interactive audio, synchronized web browsing, interactive whiteboards, and PowerPoint.

SESSION 9

Using Data in the Earth Science Classroom: Resources and Approaches Toward Digging into the Data (Earth)


(General) MHB-2B, Convention Center

Robert Payo (*robert.payo@dmns.org*) and **Meg John**, Denver Museum of Nature & Science, Denver, Colo.

How can teachers incorporate data more effectively in the

Earth science classroom? We’ll share approaches, examples from teachers, and local resources from museums and research centers.

SESSION 10

 **Teaching Problem-solving Strategies in the Elementary Classroom: Helping Students See the Interconnectedness of Science, Technology, Engineering, and Mathematics (Gen)**

(General) MHB-3C, Convention Center

Donna L. Knoell (*dknoell@sbcglobal.net*), Educational Consultant, Shawnee Mission, Kans.

I will identify and discuss essential problem-solving strategies and process skills, demonstrate how to develop these process skills across the curriculum, and showcase a wide range of engineering applications for these skills. Handouts!

SESSION 11

Story Time from Space—Integrating STEM and Literacy (Earth)

(Preschool–Middle Level/Informal) MHB-4B, Convention Center

Patricia Tribe (*patricia.tribe@gmail.com*), T² Science & Math Education Consultants, League City, Tex.

Benjamin Alvin Drew, NASA, Colorado Springs, Colo. Presider: **Jeffrey Bennett** (*jeff@bigkidscience.com*), Big Kid Science, Boulder, Colo.

Astronaut Alvin Drew will share his experience reading story books to children of Earth from space. Learn how to use these readings and curriculum support materials.

SESSION 12

Critical Science Pedagogy: Transforming Teaching by Enacting Research on Classroom Equity (Gen)

(General) MHB-4E, Convention Center

Deb Morrison (*2debmorrison@gmail.com*) and **Sara C. Heredia** (*sara.heredia@colorado.edu*), University of Colorado, Boulder

Join us for an interactive discussion on the latest research in critical science pedagogy and how it can be enacted in K–12 classrooms.

SESSION 13

Science + Literacy = Student Achievement (Gen)

(General) MHB-4F, Convention Center

Eileen Patrick (*eileen.patrick@adams12.org*), STEM Magnet Lab School, Northglenn, Colo.

Learn some literacy and vocabulary strategies to strengthen your students’ literacy skills while doing learning or any content area.

8:00–9:00 AM Workshops**NSTA Press® Session: The Authors' Picks! Teaching Science Through Trade Books (Gen)***(Elementary)* 501, Convention Center**Christine A. Royce** (*caroyce@aol.com*), Shippensburg University, Shippensburg, Pa.**Emily Morgan** (*emily@pictureperfectscience.com*) and **Karen Ansberry** (*karen@pictureperfectscience.com*), Picture-Perfect Science, LLC, Lebanon, OhioJoin the authors of *Science & Children's* "Teaching Science Through Trade Books" column as they share their favorite picks for trade book–inspired lessons featured in their book.**Data Collection Technology to Branch Math and Science (Chem)***(Middle Level–High School)* MHB-1B, Convention Center**Chris S. Coker** (*chemcoachcf@yahoo.com*), Camden Fairview Schools, Camden, Ark.

Give your students that "aha moment." Discover data collection in the science classroom that can help with understanding in the math classroom!

Facilitating Early Childhood Education with Project Learning Tree (Env)*(Preschool–Elementary/Informal)* MHB-1D, Convention Center**James McGirt** (*jmcgirt@plt.org*), Project Learning Tree, Washington, D.C.**Shawna Crocker** (*scrocker@colostate.edu*), Colorado State Forest Service, GoldenExperience effective hands-on activities that introduce science concepts (think STEM!) to children ages 3–6 using Project Learning Tree (PLT). Each participant will receive PLT's *Environmental Experiences for Early Childhood* activity guide and accompanying music CD.**Create a Unique Science Teacher Observation Form (Gen)***(General)* MHB-1F, Convention Center**Robb Gorr** (*rgorr@loyolahs.edu*), Loyola High School of Los Angeles, Calif.

Have you ever wondered why all teacher observation forms are the same? Common observation forms make NO sense; science is a unique subject that must be taught in unique ways. Learn how to personalize an observation form to fit the needs and beliefs of your department.



Need help navigating?

If this is your first NSTA conference, please join us at our conveniently offered session for first-time conference attendees where we'll walk through the program and you'll learn how to get the most from your conference experience. We'll also have a brief demo of our **NSTA conference app**. Door prizes!**● First-Timer Attendee Session • Thursday, December 12, 8:00–9:00 AM**
201/203, Colorado Convention Center

Math Integration into STEM Inquiries (Gen)
(Elementary) *MHB-2A, Convention Center*

Karl Topper (karltopper@gmail.com), Kihei Charter School, Kihei, Hawaii

Explore integrating math learning into STEM lessons that have been tested in grades 3–5. Participants will analyze videotaped implementation of the activities in the classroom, followed by hands-on data collection and analysis.

Ten Things Everyone Should Know About the Atmosphere (Earth)

(General) *MHB-2C, Convention Center*

Brian K. Jones (bjones@lamar.colostate.edu), **Sheila A. Ferguson** (sferguso@lamar.colostate.edu), **Tiffany Ray Few** (tif.few@gmail.com), **Adam Pearlstein** (physicsadam@gmail.com), and **Heather Michalak**, Colorado State University, Fort Collins

What do atmospheric scientists think is most important to understand about the atmosphere? Join Little Shop of Physics for these surprising hands-on investigations. Free lessons/supplies!



Teaching Computational Thinking: Examples from Weather and Climate Modeling (Earth)

(General) *MHB-3A, Convention Center*

Randy M. Russell (rrussell@ucar.edu), NCAR/UCAR, Boulder, Colo.

Teresa A. Eastburn (eastburn@ucar.edu), NCAR, Boulder, Colo.

Test-drive activities for teaching computational thinking and systems science. We'll share examples drawn from weather and climate modeling topics.



Using Graphs to Organize Data (Gen)

(Elementary–Middle Level) *MHB-3B, Convention Center*

Collin Sasaki (collin@sciencematters.tv), Science Matters in America, Littleton, Colo.

Join Science Matters as we perform hands-on experiments and discuss the importance of graphing as a way to organize data.

Using Crash Debates to Teach Logic, Bioethics, and Communication in AP and IB Sciences (Bio)

(High School–College) *MHB-4C, Convention Center*

Kristen R. Dotti (kristen_dotti@yahoo.com), Christ School, Arden, N.C.

Bring controversy into your classroom using debates that are well-researched, articulately presented, and taught using a quick, clean teaching structure.

Data: It's Not a Four-Letter Word (Gen)

(Middle Level–High School) *MHB-4D, Convention Center*

Britta Culbertson (brittaculbertson@gmail.com), Einstein Fellow, NOAA Office of Education, Washington, D.C.

NOAA's data are not your grandfather's data. Learn about NOAA data resources that are readily available and easy to use in your classroom.

8:00–9:15 AM Exhibitor Workshops**Mastering the Chemical Formula: An Effective Way to Teach Subscripts and Coefficients (Chem)***(Grades 9–12) 102, Convention Center*

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

What is the difference between subscripts and coefficients? What does “balancing” a chemical equation mean? Many students have trouble with these fundamental chemistry concepts. 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 from *A Natural Approach to Chemistry*, a new high school program that enables students of all levels to master the chemical formula and thereby move confidently into a deeper understanding of chemistry.

Comparative Vertebrate Anatomy with Carolina’s Perfect Solution® Specimens (Bio)*(Grades 6–12) 104, Convention Center*

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Explore animal diversity by comparing and contrasting anatomical adaptations of the pig, rat, shark, and frog. Participants use hands-on dissection to identify characteristics of these popular vertebrates. This is an excellent comparative dissection activity featuring our very best Carolina’s Perfect Solution specimens. Free dissection supplies and great door prizes.

Chemistry and the Atom: Fun with Atom Building Games! (Chem)*(Grades 6–9) 301, Convention Center*

Sponsor: CPO Science/School Specialty Science

Scott Eddleman, CPO Science/School Specialty Science, Nashua, N.H.

Understanding abstract concepts about atoms can be difficult. Use our model to experience innovative games and activities that present students with opportunities to grasp atomic structure and its connection to the periodic table.

STEM Projects, Science Fairs, and Student Performances (Gen)*(Grades K–8) 302, Convention Center*

Sponsor: Delta Education/School Specialty Science

Johanna Strange, Consultant, Richmond, Ky.

Having trouble helping students conceptualize science fair projects, STEM performances, and other competitions? Learn an effective method for teaching students to design experiments from simple investigations. The same process can help students crystallize engineering design ideas into products. Join us as we feature Delta products and resources.

“FOSStering” the Common Core State Standards, ELA: Science-centered Language Development (Gen)*(Grades K–6) 303, Convention Center*

Sponsor: Delta Education/School Specialty Science–FOSS

Brian Campbell and **Diana Velez**, The Lawrence Hall of Science, University of California, Berkeley

Discover the ways language is used to help elementary students make sense of their active learning FOSS experiences. We will model a FOSS investigation using listening and speaking, reading and writing, and language-development strategies to further content knowledge, science practices, and academic literacy.

DNA Replication and Transcription (Bio)*(Grades 5–12) 304, Convention Center*

Sponsor: K’NEX Education

Presenter to be announced

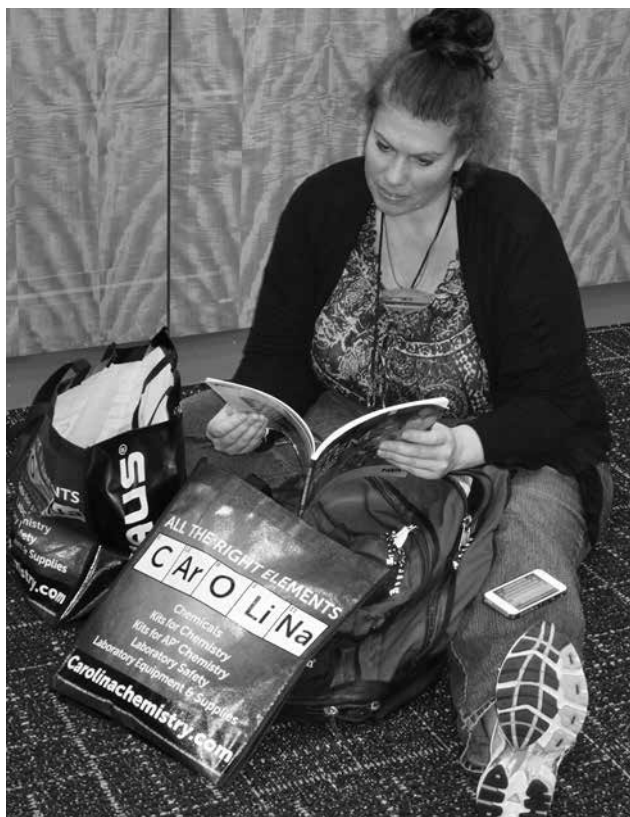
No more gumdrops and toothpicks! Use K’NEX® to build and explore functional DNA models that actually stay together. Twist DNA ladders to make a helix, replicate it, and transcribe the model to form mRNA. Color-coded nucleotides enable quick changes of the C, G, A, T, and U bases to produce new sequences. Standards-aligned STEM concepts will be emphasized.

33 Strategies for Integrating Disciplinary Literacy (Gen)*(Grades K–6) 401, Convention Center*

Sponsor: Amplify Education, Inc.

Traci Wierman and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley

Discover how to increase reading comprehension, disciplinary literacy skills, and science knowledge simultaneously for ALL students. Take away 33 ready-to-use strategies for incorporating science trade books into your classroom. Learn integration strategies that provide a better way to teach both science and literacy. Free classroom materials!



8:00–11:00 AM Short Course

Formative Assessment: Feedback That Moves Learning Forward (SC-1)

(Grades K–12)

Capitol Ballroom 5, Hyatt

Tickets Required: \$60

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

For description, see page 36.

8:30–9:45 AM Exhibitor Workshop

Solving the Case of the Missing Archive Using DNA Fingerprinting (Bio)

(Grades 9–College)

106, Convention Center

Sponsor: Edvotek Inc.

Danielle Snowflack, Maria Dayton, and Thomas Cynkar (info@edvotek.com), Edvotek Inc., Washington, D.C. Are you ready to perform a cutting-edge classroom forensic experiment? Complete a DNA fingerprinting exercise to determine who stole priceless historical documents from the Historical Society. We will identify the thief by comparing a DNA sample collected by forensic scientists at the crime scene to DNA from different suspects. Your students can solve the crime! Participants receive a free flash drive and entry into a T-shirt drawing at the end of the workshop.

9:15–10:30 AM General Session

Applying Science to Restore Patients

(General)

Four Seasons Ballroom 3/4, Convention Center



Retired Col. Geoffrey Ling, Deputy Director, Defense Sciences Office for Defense Advanced Research Projects Agency, Arlington, Va.

Prsident and Introduction of Speaker: Bill Badders, NSTA President, and Retired Director, Cleveland Math and Science Partnership, Cleveland, Ohio

Platform Guests: Retired Col. Geoffrey Ling; Bill Badders; Karen L. Ostlund, NSTA Retiring President, and Retired Professor, The University of Texas at Austin; Juliana Texley, NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.; Vicki Massey, NSTA Director, District XIV, and Mesa (Ariz.) Public Schools; Saverio Greto, CAST President, Colorado Springs, Colo.; Bev DeVore-Wedding, Chairperson, Denver Area Conference, and Meeker High School, Meeker, Colo.; Larisa Merrell, Program Coordinator, Denver Area Conference, and Northglenn High School, Northglenn, Colo.; Karen Hays, Local Arrangements Coordinator, Denver Area Conference, and Denver Museum of Nature & Science, Denver, Colo.; David L. Evans, NSTA Executive Director, Arlington, Va.

The Defense Advanced Research Projects Agency (DARPA) continues its mission to conduct scientific research that challenges the limits of science and engineering as well as the limits of imagination. Dr. Ling will update us on the progress of his work developing a prosthetic arm that is controlled directly by a patient's brain. To do this and more, DARPA depends on today's science teachers to prepare tomorrow's scientists and engineers. Beyond the traditional biology, chemistry, physics, and mathematics areas, today's educators will now need exposure to biomedical engineering, material science, robotics, neuroscience, system biology, nanotechnology, informatics, and more.

A recently retired colonel from the U.S. Army, Geoffrey Ling, MD, PhD, is an authority on traumatic brain injury (TBI), especially as it pertains to the military. Dr. Ling is presently the deputy director of the Defense Sciences Office at DARPA.

In addition to his DARPA programs, he serves as a neuro critical care physician at Johns Hopkins Hospital and is assistant director for Medical Innovation of the Science Division at the White House Office of Science and Technology Policy (OSTP).

9:30–10:30 AM Exhibitor Workshop**Investigating Stem Cell Differentiation (Bio)***(Grades 9–12)* 102, Convention Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

The human body is made of more than 200 types of cells, yet they all arise from a single fertilized egg cell. In this hands-on high school biology activity from SEPUP's *Science and Global Issues: Biology* program, you will experience how your students can investigate the development of specialized stem cells and consider bioethical issues in stem cell research.

Meet the Presidents and Board/Council

Come "meet and greet" with your elected NSTA officers on your way to the exhibits. Share some face-to-face time with the President, President-Elect, and Retiring President along with your Board and Council members. This Thursday special session runs from 11:10 AM to 12:10 PM at the entrance to the Exhibit Hall (page 54).

10:00–11:15 AM Exhibitor Workshops**Introduction to Wisconsin Fast Plants® (Bio)***(Grades K–12)* 104, Convention Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Students can actively take part in science with new hands-on activities using Wisconsin Fast Plants. These minuscule and quick-growing plants are ideal classroom tools for exploring environmental effects, variation, life cycle, and nutrient cycling. Participants work with hands-on activities such as planting seeds. Free materials!

Molecular-Level Visualization and Simulation: Getting Ready for the Next Generation Science Standards (Chem)*(Grades 5–College)* 109, Convention Center

Sponsor: Wavefunction, Inc.

Jurgen Schnitker (sales@wavefun.com), Wavefunction Education Labs, Irvine, Calif.

Would you like to teach chemistry more effectively with the help of molecular models and simulations that are scientifically sound? Bring your laptop (Windows or Mac OS X) to this hands-on workshop and start using *ODYSSEY* High School Chemistry to engage your students and address the *Next Generation Science Standards*.

Genetics: Crazy Traits (Bio)*(Grades 6–12)* 301, Convention Center

Sponsor: CPO Science/School Specialty Science

Scott Eddleman, CPO Science/School Specialty Science, Nashua, N.H.

Students learn new vocabulary when they experience genetics. Concepts like traits, alleles, phenotypes, genotypes, and heredity come alive as you use a unique kit to create crazy creatures and study the resulting population.

Science, the Literacy Connection, and the Common Core State Standards, ELA (Gen)*(Grades K–8)* 302, Convention Center

Sponsor: Delta Education/School Specialty Science

Johanna Strange, Consultant, Richmond, Ky.

Learn how your students can experience the enjoyment of learning science using Delta Science Modules and make the literacy connection to the *CCSS ELA* with Delta Science literacy resources. Receive a workshop packet containing *CCSS* strategy templates and other related Delta literacy materials.

Science Practices: What Does Argumentation Look Like in an Elementary Classroom? (Gen)*(Grades K–6)* 303, Convention CenterSponsor: Delta Education/School Specialty Science—FOSS **Brian Campbell** and **Diana Velez**, The Lawrence Hall of Science, University of California, Berkeley

Join FOSS developers to learn about the science practices within the context of the FOSS program. We'll analyze and interpret data, construct explanations, and engage in argumentation from evidence as tools to deepen student learning within a FOSS lesson.

Exploring Machines

(Grades 4–10)

Sponsor: K’NEX Education

Presenter to be announced

Bring the excitement of hands-on learning to your middle school classroom! Build and investigate simple machine models, take measurements, and gather data to determine work input and output, mechanical advantage, gear ratios, effort and resistance forces, and more. The exercises and explorations illustrate engineering and scientifically rich content through the use of models. Applying understandings of these models to real-world examples of machines leads to a better understanding of design and systems of machines in practical use. Standards-aligned STEM concepts will guide our exploration.

(Phys)

304, Convention Center

**Get Results with Science and Literacy Integration:
Seeds of Science/Roots of Reading® (Gen)**

(Grades 2–6)

401, Convention Center

Sponsor: Amplify Education, Inc.

Traci Wierman and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley

Investigate Models of Matter with the Seeds of Science/Roots of Reading unit! Experience next generation science practices using content-rich science books, scientific discourse, and writing activities. Together, these provide rich and varied opportunities to learn core science ideas and vocabulary. Effectiveness data will be shared as well as free samples.



UNI Overseas Recruiting Fair XXXVIII

January 31-February 2, 2014

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◆ *No Placement Fees*

“An incredible opportunity for science teachers to meet and interview with over 120 American K-12 schools from around the world.”



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Visit our Web site for registration materials. Registration deadline January 10, 2014.

Career Services, Cedar Falls, Iowa USA 50614-0390

Phone: (319) 273-2083 Fax: (319) 273-6998

E-mail: overseas.placement@uni.edu

Web site: www.uni.edu/placement/overseas

Comets—Beauties or Beasts? (Earth)

(Grades 6–12) 402, Convention Center

Sponsor: Simulation Curriculum Corp.

Herb Koller (*hkoller@simcur.com*), Simulation Curriculum Corp., Minnetonka, Minn.

Join us as we use Simulation Curriculum’s award-winning *Starry Night High School* to study the origin, importance, and possible dangers of comets. Watch as Earth passes through the tail of Halley’s Comet, predict the path of Comet ISON, and explore the relationship between comets and meteor showers.

New Advanced Inquiry Labs for AP Chemistry from Flinn Scientific (Chem)

(Grades 9–12) 403/404, Convention Center

Sponsor: Flinn Scientific, Inc.

Irene Cesa (*icesa@flinnsci.com*), Flinn Scientific, Inc., Batavia, Ill.

This hands-on interactive workshop can help you implement the revised laboratory investigations and curriculum framework for AP Chemistry! Join Flinn Scientific as we present two new guided inquiry chemistry experiments that support the integrated learning objectives and applied science practice skills your students will need for success. Pre-lab preparation and preliminary activities for each investigation have been optimized so teachers can effectively guide students and provide maximum opportunities for inquiry. Handouts provided for all activities!

10:15–11:30 AM Exhibitor Workshop

Wait! Were the Chips I Ate Genetically Modified?

(Bio)

(Grades 10–College) 106, Convention Center

Sponsor: Edvotek Inc.

Danielle Snowflack, Maria Dayton, and Thomas Cynkar (*info@edvotek.com*), Edvotek Inc., Washington, D.C. It is difficult to determine which products in your grocery store contain genetically modified ingredients because the FDA does not require foods to be labeled as such. In this workshop, participants will extract DNA from common snack foods like Fritos™ and soy chips. Using the polymerase chain reaction (PCR) and agarose gel electrophoresis, we will determine which snacks contain genetically modified ingredients. Participants receive a free flash drive and entry into a T-shirt drawing at the end of the workshop.

11:00–11:05 AM Ribbon Cutting Ceremony/ Exhibits Opening

Entrance to Exhibit Hall A, Convention Center

President: Bill Badders, NSTA President, and Retired Director, Cleveland Math and Science Partnership, Cleveland, Ohio

Welcoming Remarks: Bev DeVore-Wedding, Chairperson, Denver Area Conference, and Meeker High School, Meeker, Colo.

Special Guests: Karen L. Ostlund, NSTA Retiring President, and Retired Professor, The University of Texas at Austin; Juliana Texley, NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.; Vicki Massey, NSTA Director, District XIV, and Mesa (Ariz.) Public Schools; Saverio Greto, CAST President, Colorado Springs, Colo.; Larisa Merrell, Program Coordinator, Denver Area Conference, and Northglenn High School, Northglenn, Colo.; Karen Hays, Local Arrangements Coordinator, Denver Area Conference, and Denver Museum of Nature & Science, Denver, Colo.; David L. Evans, NSTA Executive Director, Arlington, Va.; Jason Sheldrake, Assistant Executive Director of Sales, NSTA, Arlington, Va.

Musical Entertainment: “The Six” Choral Group of the Denver School of the Arts, under the direction of Ahslyn Herd.

11:00 AM–12 Noon Exhibitor Workshop

Hot Bulbs: Investigating Energy Efficiency (Phys)

(Grades 6–8) 102, Convention Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

Why use compact fluorescent instead of incandescent bulbs? In this activity from the SEPUP middle level series *Issues and Physical Science*, participants use specially designed equipment to measure the energy lost as heat by small incandescent bulbs. Energy concepts include calories, heat transfer, efficiency, and more.

11:05 AM–5:00 PM Exhibits

Exhibit Hall A, Convention Center

Did you know that NSTA offers Exclusive Exhibit Hall hours today from 11:00 AM to 12:30 PM? During these hours, there are no sessions or workshops 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.

11:10 AM–12:10 PM Special Session

Meet the Presidents and Board/Council (Gen)

(General) Entrance to Exhibit Hall, Convention Center
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!

12:30–1:00 PM Exhibitor Workshop

A Change of Seasons (Earth)

(Grades 5–8) Booth #739, Exhibit Hall, Convention Center
Sponsor: Science First®/STARLAB®

Helmut Albrecht (halbrecht@starlab.com) and **Nathaniel Bell** (info@sciencefirst.com), Science First/STARLAB, Yulee, Fla.

In this in-dome workshop, we will introduce one of the Starry Night Small Dome lessons. Join us as we take a look at why we have seasons here on Earth.

12:30–1:30 PM Presentations

SESSION 1

Differentiating K–6 Science Instruction to Enable All Students to Inquire, Explore, Participate, and Achieve Success (Gen)

(Elementary) 108/110, Convention Center
Donna L. Knoell (dknoell@sbcglobal.net), Educational Consultant, Shawnee Mission, Kans.

I’ll provide an overview of the components of differentiation in the K–6 science classroom and suggest ways to differentiate effectively to maximize student participation and learning. Handouts!

SESSION 2

PolarTREC: Using Arctic and Antarctic Science Resources in Your Classroom (Env)

(Elementary–High School) 111/113, Convention Center
Mark L. Paricio (mparicio@cherrycreekschools.org), Smoky Hill High School, Aurora, Colo.

Melissa S. Barker (mbarker@dawsonschool.org), Alexander Dawson School, Lafayette, Colo.

William P. Schmoker (bill.schmoker@bvsd.org), Centennial Middle School, Boulder, Colo.

Presider: Mark L. Paricio

PolarTREC brings Arctic and Antarctic science resources to your classroom. Connect your class to polar field expeditions or use prepared lessons to teach field science!

SESSION 3

Mud, Cows, Bats, and Insects—Getting the Dirt on STEM Careers (Gen)

(Elementary–High School) 112, Convention Center
Stacy Baum (stacybaum@comcast.net), Rocky Mountain PBS, Denver, Colo.

More than 100 young STEM professionals on film! Take STEM career inspiration home to your students with free clips from pbslearningmedia.org. PBS prizes!

SESSION 4

STEM! How to Create Rigorous, Authentic Learning for All (Gen)

(Supervision/Administration) 507, Convention Center

Tracey M. Winey (twiney@psdschools.org), **Mary J. Klass** (mklass@psdschools.org), and **John M. Howe** (jhowe@psdschools.org), Preston Middle School, Fort Collins, Colo.

Find out how to incorporate the STEM philosophy into every school. Participants will be inspired to infuse technology and design into all curricula.

SESSION 5

What? Why? How? (Chem)

(High School) MHB-1B, Convention Center

Claudia H. Wallace (cwallace@colegacy.org), Colorado Legacy Foundation, Denver

Inquiry is a large part of the redesigned AP Chemistry framework. Let’s focus on activities and strategies that incorporate different levels of inquiry.

SESSION 6

Science Teaching for English Language Learners: An Elementary School and University Partnership (Gen)

(General) MHB-1F, Convention Center

Lori A. Reinsvold (lori.reinsvold@unco.edu), **Teresa Higgins** (teresa.higgins@unco.edu), and **Youngjin Song** (youngjin.song@unco.edu), University of Northern Colorado, Greeley

Discussion centers on how preservice and elementary teachers can collaborate with coaches and university faculty to provide effective strategies for English language learners in learning science.

**SESSION 7****S'COOL: Making Cloud Observations from the Playground (Earth)***(Elementary–Middle Level) MHB-3B, Convention Center***Preston M. Lewis** (*preston.lewis@nasa.gov*), NASA Langley Research Center, Hampton, Va.

Engage students in making cloud and weather observations for NASA. While reporting, your students can also be gaining a better understanding through reading and writing!

SESSION 8**Strengthening Partnerships to Promote Student Success in STEM (Gen)***(Middle Level–High School/Inf.) MHB-4B, Convention Center***Liz Henry** (*lhenry@earthforce.org*), Earth Force, Denver, Colo.

This interactive session features facilitated discussions and practical strategies that support student engagement in STEM learning—inside and outside the classroom walls—through community partnerships.

SESSION 9**NOAA in Your Backyard: Professional Development Opportunities and Local Educator Resources (Gen)***(Elementary–High School) MHB-4D, Convention Center***Britta Culbertson** (*brittaculbertson@gmail.com*), Einstein Fellow, NOAA Office of Education, Washington, D.C.

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.

SESSION 10**Climate Literacy and Energy Awareness Network (CLEAN): Instructional Resources for Science Educators (Gen)***(General) MHB-4E, Convention Center***Deb Morrison** (*2debmorrison@gmail.com*) and **Anne U. Gold** (*anne.u.gold@colorado.edu*), University of Colorado, Boulder

The CLEAN collection includes lessons and other educational resources developed by a wide variety of authors that have been vetted by teachers and scientists.

SESSION 11**Collaborative Structures to Support Scientific Literacy (Gen)***(General) MHB-4F, Convention Center***Jessica Noffsinger** (*jessica.noffsinger@adams12.org*), STEM Magnet Lab School, Northglenn, Colo.**Karen E. Johnson** (*karen.johnson@adams12.org*), Adams 12 Five Star Schools, Thornton, Colo.

Take home simple collaborative structures that can enhance scientific literacy and inquiry in your classroom tomorrow!

12:30–1:30 PM Workshops



NSTA Press® Session: Outdoor Science and Bringing It In (Gen)

(Elementary–Middle Level) 501, Convention Center
Steve Rich (bflywriter@comcast.net), NSTA Director, Professional Development, and West GYSTC, University of West Georgia, Carrollton

Whether taking it outside or bringing outdoor science in, explore school yard resources for teaching crosscutting concepts and discover how sticks and stems bring in STEM. Free seeds!

Inheritance with Pasta (Bio)

(Elementary–High School) MHB-1D, Convention Center
Kristin Swihart (swihart@colorado.edu), **Julie A. Graf** (julie.graf@colorado.edu), and **Lisa Romero de Mendoza** (romero@colorado.edu), University of Colorado, Boulder

Cook up new science learning in your classroom. Use dyed pasta of varied shapes (“alleles”) to visually explore standards-based “inheritance” in an activity adaptable to all grade levels and different styles of learners.

Using Kinesthetic Activities to Teach Abstract Concepts (Phy)

(General) MHB-1E, Convention Center
Brian K. Jones (bjones@lamar.colostate.edu), **Sheila A. Ferguson** (sferguso@lamar.colostate.edu), **Tiffany Ray Few** (tif.few@gmail.com), **Adam Pearlstein** (physicsadam@gmail.com), and **Heather Michalak**, Colorado State University, Fort Collins

Participate with Little Shop of Physics in exciting, active lessons featuring phase changes, the greenhouse effect, the Coriolis effect, hurricanes, and more. Free lessons/supplies!

Using Energy to Support Speaking and Listening Standards (Gen)

(Elementary) MHB-2A, Convention Center
Vernon Kimball (info@need.org), The NEED Project, Manassas, Va.

The *Common Core State Standards, ELA* require elementary-aged students to participate in a variety of discussions and presentations. Participants will be introduced to several activities that combine energy lessons with supporting these standards.

In a New Light: The Color of Weather and Climate (Earth)

(General) MHB-2B, Convention Center
Teresa A. Eastburn (eastburn@ucar.edu), NCAR, Boulder, Colo.

Tim Barnes (tbarnes@ucar.edu), NCAR/UCAR, Boulder, Colo.

Presenter: Marc Mueller, NCAR, Boulder, Colo.

Discover a hands-on thematic unit designed to enhance students’ understanding of weather and climate through an exploration of color and light aligned to national standards. The Sun’s energy is not only the engine for Earth’s weather and climate, it is also at the core of many of the scientific tools and technological wonders that help us better understand the world in which we live. Explore the wonders of sunlight and energy, and draw connections between them and many of the most pressing environmental challenges of our time. All workshop resources will be provided.



Engineering Solutions: Green Energy and Green Building (Env)

(Middle Level) MHB-3A, Convention Center
Eric W. Carpenter (eric.carpenter@colorado.edu), University of Colorado, Boulder

Join me for this interactive workshop exploring a range of hands-on activities focused on engineering, design, and problem solving for wind power, solar power, and green building.



STEM Throughout the Curriculum! (Gen)

(Preschool–Elementary) MHB-3C, Convention Center
DeLene Hoffner, School in the Woods, Colorado Springs, Colo.

Katie Poulsen (kpoulsen@d49.org), Evans International Elementary School, Colorado Springs, Colo.

It’s eleSTEMary! Discover effective instructional strategies for cross-curricular ways to bring STEM into every area of your elementary classroom. Browse exploration idea stations, including ways to use STEM to inspire students to read, write, and learn history while experiencing STEM—all embedded into a simple lesson from *Picture-Perfect Science*. Free materials and great resource information!

Uncovering Students' STEM Ideas (Gen)*(General) MHB-4A, Convention Center***Page Keeley** (*pagekeeley@gmail.com*), 2008–2009 NSTA President, Jefferson, Maine

Examine a variety of probes and FACTs that address the S, T, E, and M in STEM for the purpose of informing teaching and promoting learning.

Helping Students Write Their Own Scientific Experiments for Environmental Science (Env)*(High School–College) MHB-4C, Convention Center***Kristen R. Dotti** (*kristen_dotti@yahoo.com*), Christ School, Arden, N.C.

Project Based Learning (PBL) begins with an inquiry approach to science. Learn how to lead your students through explorations using a peer review process that results in excellent scientific thinking.

**12:30–1:45 PM Exhibitor Workshops****Using Climate Proxies to Learn About Earth's Climate History (Earth)***(Grades 9–12) 102, Convention Center*

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

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. Your students will analyze and graph samples of replicas of these organisms, and use this information to determine relative warm and cold periods in the past 200,000 years. This activity is from the climate unit of *EDC Earth Science*, a new NSF-supported high school Earth science program that uses an active (more than 60 labs and activities!) approach to the study of Earth science and Earth systems.

Engineer Excitement in Your Classroom with a Carolina STEM Challenge™ (Phys)*(Grades 6–12) 104, Convention Center*

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Catapult, float, and race your way into hands-on activities that can engage your middle and high school students. Foster both critical-thinking and creative problem-solving skills! Come experience how Carolina makes it easy to incorporate STEM into your classroom. Free handouts and door prizes!

Detection of Mad Cow Disease Using a Two-Step PCR Process (Bio)*(Grades 10–College) 106, Convention Center*

Sponsor: Edvotek Inc.

Danielle Snowflack, Maria Dayton, and Thomas Cynkar (*info@edvotek.com*), Edvotek Inc., Washington, D.C.

Bovine spongiform encephalopathy (Mad Cow Disease) is a fatal neurological condition characterized by the spongelike appearance of degenerated brain tissue. To prevent domestic cattle infection, the FDA inhibits the use of cow parts in bovine-specific DNA present in cattle feed. This quick and easy experiment can be completed in one lab session using Edvotek's user-friendly Edvocycler™! Participants receive a free flash drive and entry into a T-shirt drawing at the end of the workshop.

Motion Comes Alive with CPO's Velocity Sensor (Phys)*(Grades 6–12) 301, Convention Center*

Sponsor: CPO Science/School Specialty Science

Scott Eddleman, CPO Science/School Specialty Science, Nashua, N.H.

Our new Velocity Sensor uses sound waves to measure and display position, velocity, and acceleration data of moving objects. We'll investigate how the Energy Car moves on CPO's SmartTrack to explore Newton's laws, kinematics, friction, and the law of conservation of energy in this inquiry-based learning activity.

DSM and STEM: Challenges for the Elementary Student (Gen)

(Grades K–6) 302, Convention Center

Sponsor: Delta Education/School Specialty Science

Johanna Strange, Consultant, Richmond, Ky.

Activities from the Delta Science Modules program provide ample opportunity for elementary students to engage in STEM-based challenges. Discover a process that fosters the STEM initiative and receive a workshop packet and related Delta materials.

Online Assessment That Informs Instruction (Gen)

(Grades 3–6) 303, Convention Center

Sponsor: Delta Education/School Specialty Science—FOSS
Brian Campbell and **Kathy Long**, The Lawrence Hall of Science, University of California, Berkeley

Join developers for an introduction to the new assessment system created for FOSS 3rd Edition, including computer software (FOSSmap). Experience how formative assessment plays an integral role throughout the FOSS program. Grades 3–6 students can now take benchmark assessments online with most items automatically coded to generate useful reports.

Forces, Energy, and Motion (Phys)

(Grades 4–10) 304, Convention Center

Sponsor: K’NEX Education

Presenter to be announced

It’s off to the races! Join us as we investigate potential and kinetic energy as well as force and motion with K’NEX® cars. Gravity, rubber bands, springs, wind, battery motors, and flywheels will power models as we explore complex STEM concepts. How will your car perform? How would you redesign your model to make it a first-place car? Strategies that empower students to design and complete their own experiments from the teacher’s guide will be emphasized and standards-aligned STEM concepts will be stressed.

33 Strategies for Integrating Disciplinary Literacy (Gen)

(Grades K–6) 401, Convention Center

Sponsor: Amplify Education, Inc.

Traci Wierman and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley

Discover how to increase reading comprehension, disciplinary literacy skills, and science knowledge simultaneously for ALL students. Take away 33 ready-to-use strategies for incorporating science trade books into your classroom. Learn integration strategies that provide a better way to teach both science and literacy. Free classroom materials!

Applying Common Core State Standards, ELA Through Active Science Instruction in the K–5 Classroom (Gen)

(Grades K–5) 405, Convention Center

Sponsor: Sangari Active Science

Ellen Mintz, Charleston County Schools, Charleston, S.C.

The CCSS, ELA require students to read using informational text and write using skills encouraged through science instruction. Using a hands-on/minds-on activity, we will investigate and use the data we collect to write a claims and evidence response. Reading strategies will be used to tie our investigation to informational text.

Unleashing Your Students’ Inner Inventor—Robots, Video Games, and DIY! (Gen)

(Grades 8–College) 406, Convention Center

Sponsor: SparkFun Electronics

Brian Huang (brian.huang@sparkfun.com) and **Jeff Branson** (jeff.branson@sparkfun.com), SparkFun Electronics, Boulder, Colo.

In this workshop, we’ll use the wildly popular Arduino computer platform to explore creative project-based learning through programming and 21st-century digital literacy. This workshop assumes no previous experience.

You Drink What on the International Space Station?!? (Earth)


(Grades 5–12) 407, Convention Center

Sponsor: Space Foundation

Bryan DeBates (bdebates@spacefoundation.org), **Elias Molen** (emolen@spacefoundation.org), **Jami Sunkel** (jsunkel@spacefoundation.org), and **Leroy Chiao**, Space Foundation, Colorado Springs, Colo.

Former astronaut Dr. Leroy Chiao, ISS Expedition 10 commander, will discuss his experiences on the station. He will explain how urine and sweat are recycled into drinking water. Participants will then participate in a water filtration design challenge to design a filtration system to make “urine” potable.

1:30–4:30 PM Short Course

 **Teaching Science Outdoors Through Research and Engineering Design (SC-2)**


(Grades K–8) *Agate, Hyatt*

Tickets Required: \$20

Joanna Snyder (*joanna_snyder@berkeley.edu*) and **Erica Beck Spencer** (*ebspencer@berkeley.edu*), The Lawrence Hall of Science, University of California, Berkeley

For description, see page 36.

2:00–3:00 PM Featured Presentation

 **Extreme Lesson Plans, Honey Bee Adventures, and Robots for Everyone—Putting Old-School Passion into Modern Technical Education (Gen)**

(General) *103/105, Convention Center*



James McLurkin (*jmclurkin@rice.edu*), Assistant Professor of Computer Science, Rice University, Houston, Tex.

Presider: Jon Pedersen, Strand Leader, Denver Area Conference, and University of Nebraska—Lincoln

Over the past 15 years, James McLurkin has been building more and more technology to use in his teaching. Looking back, however, it is clear that what he was actually adding was more of his own interests and passions. The goal of this talk is to connect you to the key technology needed to make you the best teacher ever—You!

As a child, James McLurkin was constantly building with LEGO® bricks, cardboard boxes, or any other materials he could get his hands on. Today, James continues this tradition. Using Mother Nature as a model, his core research is developing distributed algorithms for multi-robot systems: the software for large swarms of autonomous robots. Inspired by the behavior of ants and bees, the SwarmBots perform individual tasks that collectively contribute to the goals of the group. They were originally created during his five-year post as lead research scientist at iRobot, one of the world's leading robotics companies.

Currently, James is an assistant professor at Rice University in the Department of Computer Science. His research focuses on developing software that produces complex group behaviors from the interactions of many simple individuals.

James was the 2003 recipient of the Lemelson-MIT Student Prize for Invention.

2:00–3:00 PM Presentations

SESSION 1

The NSTA Learning Center: Free Professional Development Resources and Opportunities for Educators (Gen)

(General) *112, Convention Center*

Flavio Mendez (*fmendez@nsta.org*), Senior Director, NSTA Learning Center, NSTA, Arlington, Va.

Lost when it comes to finding online professional development resources to enhance your content knowledge and skills? With more than 10,000 resources (25% of which are free) and quality PD opportunities to assist educators with core subject content, the Learning Center has the answers! Get free resources and ICE CREAM!

SESSION 2

Academic Preparation and Interest Among High School Females for STEM Careers (Gen)

(High School/Supervision) *507, Convention Center*

Natalie M. Peitsmeyer (*npeitsmeyer@comcast.net*), Campus Middle School, Englewood, Colo.

Discussion centers on the underrepresentation of women in STEM careers, research findings, and recommendations for improving female STEM education experiences. Additional time will be allotted for group discussion and questions.

SESSION 3

Introducing Nanotechnology into the Chemistry Classroom (Chem)

(High School) *MHB-1A, Convention Center*

Sherri C. Rukes (*lucchem@gmail.com*), Libertyville High School, Libertyville, Ill.

Nanotechnology is a topic that is taking off in many different areas of science. Learn about what nanotechnology is as well as applications from ancient time to present day. Take home handouts about activities and ideas to teach concepts.

SESSION 4

Content + Literacy = Common Core Success (Bio)

(General) *MHB-1C, Convention Center*

Linda S. Linnen (*lslinnen@aol.com*), Retired Educator, Aurora, Colo.

Appropriate-leveled excerpts from life, Earth, and physical science books will be used to demonstrate how to teach the *Common Core State Standards, ELA* for literacy while teaching science.

SESSION 5

PHYSICS FIRST: A Story of Adoption, Implementation, and Evaluation (Phys)

(High School)

MHB-1E, Convention Center

Craig E. Bouma, Loyola High School of Los Angeles, Calif. Join me as I tell the story of implementing an inquiry-based Physics First curriculum, evaluating it along the way, and the need for more teachers to do curricular research and share their results.

SESSION 6

Building STEM Education with Multinationals

(Gen)

(General)

MHB-1F, Convention Center

Lauren B. Birney (*lbirney@pace.edu*) and **Jonathan H. Hill**, Pace University, New York, N.Y.

Presider: Lauren B. Birney

The development of modalities to enhance and motivate students through the support of STEM partnerships and affiliations is a critical component of STEM education. Participants will explore the creation of partnership opportunities, mobile app building in the classroom through partnership support, and innovative teaching constituents formed through lucrative STEM multinationals.

SESSION 7 (two presentations)

(Preschool–Middle Level)

MHB-2A, Convention Center

Using Literacy to Promote the Understanding of Mathematics for PreK–8 Learners (Gen)

Marcia Yolander Walker, Trevecca Nazarene University, Nashville, Tenn.

For centuries, there has been a perceived connection between science and the arts, including literature. This connection is now being introduced to children as part of an effective curriculum that includes subject integration. Over the past two decades, educators have turned more attention toward integrated curricula, particularly the introduction of literature into science instruction.

Using Readers Theater to Improve Science and Math Instruction (Gen)

Michelle K. Tucker, Academy School District 20, Colorado Springs, Colo.

Students launch Readers Theater while infusing math and science vocabulary. Implementing proven reading strategies can produce dynamic results in math and science learning.

SESSION 8

Statistics in the Middle School Science Classroom: Going Beyond the Mean (Earth)

(Middle Level)

MHB-2B, Convention Center

Paul K. Strode (*paul.strode@bvsd.org*) and **Peter Szameitat** (*peter.szameitat@bvsd.org*), Fairview High School, Boulder, Colo.

Lori Cairns-Alspaugh (*lori.cairns@bvsd.org*), Southern Hills Middle School, Boulder, Colo.

Find out how to incorporate the new statistics objectives of the *Next Generation Science Standards* into your middle school science curriculum.

SESSION 9

Improving Effective Online Geoscience Instruction at Two-Year and Four-Year Colleges and Universities

(Earth)

(College)

MHB-4C, Convention Center

Suzanne T. Metlay (*suzanne.metlay@wgu.edu*), Western Governors University, Salt Lake City, Utah

Barbara Laton Pierpont (*bpierpont4612@ucumberlands.edu*), University of the Cumberlands, Williamsburg, Ky.

More introductory geoscience college students are online. How do faculty provide effective, enriching instruction that includes hands-on, collaborative, and/or field experiences? Join us as we share successful teaching strategies.

SESSION 10

Building Collaborative Partnerships to Advance K–12 STEM Education (Gen)

(General)

MHB-4D, Convention Center

Stacey A. Forsyth (*stacey.forsyth@colorado.edu*) and **Janet Yowell** (*janet.yowell@colorado.edu*), University of Colorado, Boulder

Presider: Connie Hoon Barclay, Colorado Collaborative for Girls in STEM, Boulder

In this interactive session, the Colorado Collaborative for Girls in STEM shares exemplary practices for building effective collaborations between formal and informal STEM education organizations.

2:00–3:00 PM Workshops

A Picture Is Worth a Thousand Words: Teaching Scientific Visual Literacy (Gen)

(General) 108/110, Convention Center

Jami Humphrey, Montana Office of Public Instruction, Butte

Is a picture really worth a thousand words? Find out as you construct 3-D graphic organizers to help your “eye generation” students become visually literate.

Help! I Need to Get Organized! (Gen)

(General) 111/113, Convention Center

Sarah B. Andres (*sbandres@interact.ccsd.net*), Hyde Park Middle School, Las Vegas, Nev.

Emphasis will be placed on the history and application of concept mapping in a science classroom. It also provides for assessment options using concept maps.



NSTA Press® Session: Scientific Argumentation in Biology (Bio)

(Middle Level–High School) 501, Convention Center

Victor Sampson (*victor.sampson@gmail.com*), Florida State University, Tallahassee

This workshop will introduce ways to engage students in the practice of arguing from evidence.

Engaging, Reflecting, Organizing, and Communicating with Interactive Notebooks (Gen)

(Elementary–High School) 505, Convention Center

Vicky Jordan, Deborah Caton (*dcaton@psdschools.org*), **Adam Krick**, and **Katie Zenisek** (*kzenisek@psdschools.org*), Wellington Middle School, Wellington, Colo.

Build an interactive notebook that can engage your students, help them keep track of their learning, and reflect in creative ways. Learn tricks for success!



“Life begins at retirement.”
 –Author Unknown

Join the NSTA Retired Advisory Board for an insightful information-sharing session. Fellow colleagues will share ideas about staying active both in and out of the profession.

Before and After Retirement—Practicalities and Possibilities

Thursday, December 12
3:30–4:30 PM
 Colorado Convention Center
 502

For more information on the Retired Members Advisory Board, contact Virginia Baltay, chair, at vbaltay@aol.com.

NSTA National Science Teachers Association


How Do We Know What We Know? Understanding Scientists' Confidence in Climate Science Data (Env)

(Middle Level–High School) MHB-1B, Convention Center

Becca Hatheway (hatheway@ucar.edu) and **Lisa Gardiner** (lisagard@ucar.edu), Spark: UCAR Science Education, Boulder, Colo.


Nathan Hobbs (nathan.hobbs@bvsd.org), Boulder High School, Boulder, Colo.

Climate scientists use data from paleoclimate proxies, current observations of the Earth system, and models of future climates to gain an understanding of Earth's climate.

 **Engineering: Integrate the 3Ds in the NGSS (Phys)**
(Elementary–Middle Level) MHB-3A, Convention Center

Karen L. Ostlund (klostlund@utexas.edu), NSTA Retiring President, and Retired Professor, The University of Texas at Austin


Experience a model lesson integrating the three dimensions (science and engineering practices, disciplinary ideas, and crosscutting concepts) in the *Next Generation Science Standards*.

 **Teaching Inquiry-based Science to English Language Learners with M&M's® Investigations (Chem)**
(Elementary) MHB-3B, Convention Center

Youngjin Song (youngjin.song@unco.edu) and **Teresa Higgins** (teresa.higgins@unco.edu), University of Northern Colorado, Greeley

Presenter: Veronica Maria Simpkins

Elementary teachers—discover how to build inquiry-based instructional strategies for teaching science to English language learners by engaging in M&M's investigations.

 **NSTA Press® Session: Uncovering Students' Ideas About Stars and the Universe (Earth)**

(General) MHB-4A, Convention Center

Page Keeley (pagekeeley@gmail.com), 2008–2009 NSTA President, Jefferson, Maine

Donna L. Young (donna@aavso.org), Chandra E/PO Office, SAO/NASA, Bullhead City, Ariz.

Explore how formative assessment probes are used to uncover the NGSS disciplinary core ideas about stars and the universe and inform next steps for instruction.

Using Forensics: Wildlife Crime Scene! DNA Fingerprinting Simulation as Evidence in Solving a Wildlife Crime, Part 1 (Gen)

(General) MHB-4B, Convention Center

Laura Arndt (laura.arndt1@gmail.com), Antelope Ridge Elementary School/Nature Connections, Aurora, Colo.

This DNA fingerprinting paper simulation facilitated by an NSTA Press® author will create an “ah-ha” moment. The results are evidence to solve a wildlife crime.

The STEM “Bookends”: Science and Mathematics—Integration Made Easy! (Gen)

(General) MHB-4E, Convention Center

Jeff Lukens (jeffrey.lukens@k12.sd.us), Roosevelt High School, Sioux Falls, S.Dak.

Integrating science and mathematics should be seamless, natural, and painless. Come see how the philosophy of STEM has been alive for a long time.

Creative Field Journals (Gen)

(General) MHB-4F, Convention Center

Jennifer C. Daniels (jendanie@coloradomesa.edu), **Nicole K. Thornton**, **Madison Everett**, **Danielle R. Sloan**, **Cara Giancaterino**, and **Jaclynn Brand**, Colorado Mesa University, Grand Junction, Colo.

Find out how to create an innovative and easy-to-work-with field journal from the Colorado Mesa University NSTA Student Chapter. They will share how they created and developed field journals based on their biodiversity trips to Costa Rica and local Colorado mountains.

CESI Session: Council for Elementary Science International Share-a-Thon (Gen)

(Elementary–Middle Level) Centennial A–C, Hyatt

Julie Thomas (julie.thomas@unl.edu), University of Nebraska–Lincoln

Join CESI as we share a wealth of ready-to-use, classroom-tested hands-on activities created for the K–8 teacher. Handouts and website links will be provided.

2:00–3:00 PM Exhibitor Workshop**Waves, Energy, and Color (Phys)***(Grades 6–8)**102, Convention Center*

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

Although we live an EM waves–enabled lifestyle, most of us, including our middle school students, have no idea how waves actually work. The *Next Generation Science Standards* specifically call for students to understand waves and their applications in technologies for information transfer. Join LAB-AIDS for an activity from the waves unit of SEPUP's *Issues and Physical Science* program. Explore properties of light by investigating colors of the visible spectrum and investigate the energy levels of the different colors of white light through the use of a phosphorescent material. Activities show how SEPUP embeds research-based practices and real issues to deliver powerful content learning.

**2:15–3:30 PM Exhibitor Workshops****The Next Generation Science Standards Are Here...Now What? Focus and Exploration of Implementation with Integrity K–8 (Gen)***(Grades K–8)**104, Convention Center*

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Focus on getting started and learn to easily read, interpret, and implement the *Next Generation Science Standards*. Explore the structure of the NGSS, develop your knowledge to communicate, and create a dynamic district interest that can highly engage your staff in implementation integrity. Leave with tools to accelerate your NGSS journey.

The Drunken Worms: Exploring Gene Function with *C. elegans* (Bio)*(Grades 10–College)**106, Convention Center*

Sponsor: Edvotek Inc.

Danielle Snowflack, Maria Dayton, and Thomas Cynkar (info@edvotek.com), Edvotek Inc., Washington, D.C. Model organisms allow us to study fundamental questions in developmental, neurological, and behavioral biology that may be difficult to study in humans. Join us for an exciting experience exploring alcohol metabolism using the nematode *C. elegans* as a model organism. Learn how to grow and feed *C. elegans* and how to test the effects of alcohol on the locomotion and health of normal and mutant worms. Participants receive a free flash drive and enter for a T-shirt drawing at the end of the workshop.

STEM Where? Integrating STEM into the Science Classroom in Anticipation of the Next Generation Science Standards (Gen)*(Grades 6–9)**107, Convention Center*

Sponsor: eCYBERMISSION

Sue Whitsett (swhitsett@nsta.org), eCYBERMISSION Outreach Manager, NSTA, Arlington, Va.

What is STEM? What role does it play in a science classroom? How can you incorporate engineering and math into your already full curriculum? What do the *Next Generation Science Standards* have to do with STEM? These questions and many more will be answered as we discuss how to bring STEM into grades 6–9 classrooms. Also, information will be provided on how the new NSTA competition, eCYBERMISSION, can help bring STEM into your classroom.

Create a Digital Wi-Fi Classroom! (Gen)*(Grades 6–College)**109, Convention Center*

Sponsor: Swift Optical Instruments, Inc.

David Doty (david@swiftoptical.com) and **Fred Gerlach, Jr.**, Swift Optical Instruments, Inc., Schertz, Tex.

Go digital...using STEM and Wi-Fi technology. Transform your labs, lesson plans, and activities into digital formats. Engage your students by incorporating Motic software, the new Wi-Fi Moticam X, and Swift microscopes into your lessons. Learn how to integrate digital Wi-Fi technology, student assessment, and motivation into your current curriculum. BYOD (bring your own device) for a true interactive experience.

Wind Turbine and the STEM Approach to Science Concepts (Phys)

(Grades 6–12) 301, Convention Center

Sponsor: CPO Science/School Specialty Science

Scott Eddleman, CPO Science/School Specialty Science, Nashua, N.H.

Explore energy transformations, electricity, and magnetism through hands-on experiences. Apply your knowledge to engineering a wind turbine. Build, test, and revise your model so that it generates as much power as possible. Take away STEM activities and an understanding of how to apply the engineering cycle in science classes.

Teaching Argumentation for Our Next Generation (Gen)

(Grades K–8) 302, Convention Center

Sponsor: Delta Education/School Specialty Science

Johanna Strange, Consultant, Richmond, Ky.

Argumentation is an important component of the science reform movement. Learn how to help students conduct investigations using claims and defend them with evidence, and to construct explanations using scientific principles. Join us as we feature Delta products and resources.

Asteroid! Will Earth Be Hit Again? (Earth)

(Grades 5–8) 303, Convention Center

Sponsor: Delta Education/School Specialty Science–FOSS

Jessica Penchos and **Virginia Reid**, The Lawrence Hall of Science, University of California, Berkeley

Earth has been hit in the past, but what lies ahead? Using data from the Moon, we will calculate the frequency of impacts and consider implications for Earth. We'll discuss how these questions guide students' exploration, and overview strategies, content, materials, and NGSS connections in the revised FOSS Planetary Science Course.

Renewable Energy (Phys)

(Grades 5–10) 304, Convention Center

Sponsor: K'NEX Education

Presenter to be announced

Explore Going Green renewable energy with your students! It's designed to address critical STEM concepts and provide instructional models that can enhance students' understanding of these concepts. Build a model and demonstrate how it can be operated with electricity generated from wind, water, and solar power. Explore other models that complete real-world tasks with these same three renewable power sources.

The Best of Both Worlds: How to Engage Students in NGSS Practices Through Science and Life (Gen)

(Grades 2–6) 401, Convention Center

Sponsor: Amplify Education, Inc.

Traci Wierman and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley

Explore an instructional approach that capitalizes on the synergies between science and literacy. The integrated units from Seeds of Science/Roots of Reading® are designed to help students learn and express essential science concepts while developing a set of cognitive skills that are generative and transferable across disciplines.

Stars—From Cradle to Grave (Earth)

(Grades 6–12) 402, Convention Center

Sponsor: Simulation Curriculum Corp.

Herb Koller (hkoller@simcur.com), Simulation Curriculum Corp., Minnetonka, Minn.

Where do stars come from? Why do they form? What happens during their lifetime? How do we know a star is dying? Where are the stellar graveyards? Join us as we answer these and other questions using Simulation Curriculum's award-winning *Starry Night* lessons and our feature-rich supplementary materials.

Seven Simple Ways You Can Change the World (and Your Classroom) (Env)

(Grades K–12) 405, Convention Center

Sponsor: *Siemens We Can Change the World Challenge*

Kyle Schutt, Discovery Education, Silver Spring, Md.

Changing the world doesn't have to start big. There are simple things you can do in your classroom to make a difference. From unplugging computers over the weekends to going paperless, we have tips to share. Embarking on the *Siemens We Can Change the World Challenge* (www.wecanchange.com), the premier national K–12 sustainability competition, we'll help your students explore and develop solutions to real-world problems. We'll highlight examples of other students' work in order to demonstrate strategies for learning about science and conservation. You'll leave with a wide variety of free digital resources and gifts that can help you and your class make an impact and improve the future for everyone.

Unleashing Your Students’ Inner Inventor—Robots, Video Games, and DIY! (Gen)

(Grades 8–College) 406, Convention Center
Sponsor: SparkFun Electronics

Brian Huang (*brian.huang@sparkfun.com*) and **Jeff Branson** (*jeff.branson@sparkfun.com*), SparkFun Electronics, Boulder, Colo.

In this workshop, we’ll use the wildly popular Arduino computer platform to explore creative project-based learning through programming and 21st-century digital literacy. This workshop assumes no previous experience.

3:30–4:30 PM Special Session

IPCC Fifth Assessment Report—A Teaching Perspective (Earth)

(General) 103/105, Convention Center



Jeffrey T. Kiehl, (*jtkon@ucar.edu*), Senior Scientist, Climate Change Research Section, National Center for Atmospheric Research, Boulder, Colo.

President: David L. Evans, NSTA Executive Director, Arlington, Va.

On September 27, 2013, Working Group I of the Intergovernmental Panel on Climate Change released its most recent comprehensive assessment of the physical science basis for understanding climate change on Earth (WGI AR5). This session will provide a brief overview of the IPCC process and the findings of the panel, and will focus on what has changed from previous assessment reports through the lens of Earth science educators.

Jeffrey Kiehl is a senior scientist at the National Center for Atmospheric Research, where he heads the Climate Change Research Section. Over the past 30 years, he has carried out research on a wide range of scientific questions regarding anthropogenic climate change. He has published more than 100 articles on the effects of greenhouse gases on Earth’s climate, the effects of stratospheric ozone depletion on climate, and the effects of aerosols and clouds on the climate system. He is the co-author of Frontiers of Climate Modeling published by Cambridge University Press.

He is a Fellow of both the American Meteorological Society and the American Geophysical Union and is currently participating in projects to better communicate climate change science to the public. He was the recipient of the 2012 Climate Communication Prize from the American Geophysical Union.

3:30–4:30 PM Presentations

SESSION 1

Science as a Playground for Literacy! (Gen)
(General) 108/110, Convention Center

Joy Hakim (*joyhakim@aol.com*), Author, Englewood, Colo. Science as a playground for literacy—it’s an idea that runs through my work. I believe it is why the *Common Core State Standards* cite some of my books as exemplary nonfiction. So, my presentation will focus on science as an exciting playground for literate learners.

SESSION 2

Using the 5Es for an Engaging Science Lesson (Gen)
(General) 111/113, Convention Center

Vicki M. Massey (*gvmassey@cox.net*), National Science Education Leadership Association, Mesa, Ariz. This interactive session on teaching science through the best practices 5E (Engage, Explore, Explain, Elaborate, and Evaluate) model of instruction sets the stage for enhancing students’ engagement and critical thinking.

SESSION 3

Beyond UFOs: The Search for Extraterrestrial Life and Its Astonishing Implications for Our Future (Gen)

(General) 112, Convention Center

Jeffrey Bennett, Big Kid Science, Boulder, Colo. President: Patricia Tribe (*patricia.tribe@gmail.com*), T² Science & Math Education Consultants, League City, Tex. Is there life beyond Earth? Learn about the latest research into this exciting possibility, and what a discovery—or non-discovery—would mean to our future.

SESSION 4

 **NSTA Press® Session: Mastery Learning in the Science Classroom (Gen)**

(Middle Level–High School/Supv.) 501, Convention Center

Kelly Morgan Dempewolf (*kellymdempewolf@gmail.com*), Kansas State University, Manhattan How can we close gaps while respecting and ensuring success for ALL students? Mastery Learning!

SESSION 5

Before and After Retirement—Practicalities and Possibilities (Gen)

(General) 502, Convention Center

Teshia Birts (tbirts@nsta.org), Senior Manager, Chapter Relations, NSTA, Arlington, Va.

The NSTA Retired Advisory Board invites you to a vibrant and useful information sharing session. Join your fellow colleagues and share your ideas about staying active both in and out of the profession.

SESSION 6

Incorporating the Common Core State Standards, ELA into Introductory Chemistry (Chem)

(High School) MHB-1B, Convention Center

Angela R. Powers (arpowers@comcast.net), Metropolitan State University of Denver, Colo.

Key science-related components of the CCSS will be discussed and participants will see how literacy skills can be incorporated into existing activities within the chemistry curriculum.

SESSION 7

STEM Instruction to Increase Content and Language Acquisition: Increasing Achievement for English Language Learners (and Others) (Gen)

(General) MHB-1F, Convention Center

Janelle M. Johnson (jjohn428@msudenver.edu), Metropolitan State University of Denver, Colo.

Emphasis will be placed on examining the National Science Education Standards and the *Next Generation Science Standards* and the ways they intersect with research-based second language acquisition practices.

SESSION 8

Teaching Climate and Energy: Classroom Resources to Support Your Teaching (Earth)

(General) MHB-2C, Convention Center

Anne U. Gold (anne.u.gold@colorado.edu), **Susan M. Buhr** (susan.buhr@colorado.edu), and **Lesley Smith** (lesley.smith@colorado.edu), University of Colorado, Boulder

Our free climate and energy learning resources can help you teach with confidence. Classroom materials available online include activities, videos, teaching tips, and standard alignments. Join us and learn more!

SESSION 9

How Does Your Garden Grow? (Env)

(Preschool–Middle Level) MHB-3B, Convention Center



Juliana Texley (jtexley@att.net), NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.

Steve Rich (bflywriter@comcast.net), NSTA Director, Professional Development, and West GYSTC, University of West Georgia, Carrollton

Is school gardening play, work, or scientific inquiry? It's all of the above. School gardens are ideal ways to integrate science, mathematics, design, and technology in a way that attracts the enthusiasm of all members of your school community.

SESSION 10



Bioplastic—Going from Synthetic to Natural Polymers (Chem)

(High School) MHB-3C, Convention Center

Sherrri C. Rukes (lucchem@gmail.com), Libertyville High School, Libertyville, Ill.

Many of the items that we use today are becoming more Earth friendly. Learn how a bioplastic is made and what plant materials are used. Take home a CD with information and activities.

SESSION 11

Engineering Your Instruction (Gen)

(High School) MHB-4A, Convention Center

Bev DeVore-Wedding (bdevorewedding@gmail.com), Chairperson, Denver Area Conference, and Meeker High School, Meeker, Colo.

Come learn how to adapt engineering practices into your instruction. Bring your own lessons or borrow from prepared lessons available at this session.

SESSION 12

Science Runs Through Archaeology: The Archaeology of Cactus Ruin—A Paper Excavation (Gen)

(Middle Level–High School/Inf.) MHB-4B, Convention Center

Molly E. Harpel (mharpel@crowcanyon.org), Crow Canyon Archaeological Center, Cortez, Colo.

Let's explore how the science of archaeology can be taught through a STEM inside-and-out lens using a paper excavation to solve research questions.

SESSION 13

STEM Lesson Study Research Projects (Gen)*(General)**MHB-4F, Convention Center*

Jennifer C. Daniels (*jendanie@coloradomesa.edu*), **Haley J. Yudnich** (*hyudnich@mavs.coloradomesa.edu*), **Danielle R. Sloan**, **Nicole K. Thornton**, **Madison Everett**, and **Cara Giancaterino**, Colorado Mesa University, Grand Junction

The Colorado Mesa University NSTA Student Chapter proudly presents their development of STEM Lesson Study Research Projects from developmental stages to implementation. Each participant will receive step-by-step instructions for developing their own STEM Lesson Study as well as hear the students share how they formed their research.

Evaluate Your Sessions Online!

This year, we're giving away a Kindle Fire HDX 7" to one lucky attendee who completes a session evaluation! Remember, the more sessions you attend and evaluate, the more chances you have to win! (See page 14 for details.)

3:30–4:30 PM Workshops**I Have an iPad—Now What? (Chem)***(Middle Level–High School)**MHB-1A, Convention Center*

Greg Dodd (*gbdodd@gmail.com*), George Washington High School, Charleston, W.Va.

Recently, many schools have become 1:1 iPad schools, but teachers have received little or no training in how to use the iPad effectively for science instruction. The goal of this workshop is to demonstrate how to use the iPad and all its potential effectively in the science classroom.

Fun with Adaptation (Bio)*(Elementary–Middle Level)**MHB-1C, Convention Center*

Anna Suggs (*asuggs@lcp.k12.nm.us*), Zia Middle School, Las Cruces, N.Mex.

Crystal Cobble, Cottonwood Valley Charter School, Socorro, N.Mex.

Experience hands-on activities that give students experiences with adaptation. Materials and modeling of labs and projects will be provided. Bring your sense of exploration and humor!

Food Chains: Using Field Surveys That Give Real Numbers (Bio)*(Middle Level)**MHB-1D, Convention Center*

Frederick E. Maier (*fredmaier@sbcglobal.net*), Village of Itasca, Ill.

Jack Tison (*globes@comcast.net*), Wheaton (Ill.) Park District

This workshop demonstrates three hands-on survey techniques that allow students to calculate actual numbers of plants, herbivores, and carnivores in creating a food chain.

Amazing Aircraft (Phys)*(Elementary)**MHB-2A, Convention Center*

Jon R. Welte (*education@hiller.org*), Hiller Aviation Museum, San Carlos, Calif.

Take your students on an aerial adventure in science! Experiment with forces using inexpensive gliders, airplanes, and helicopters in this exciting make-and-take workshop.

Ice Core Records: Earth Systems, Volcanoes, Solar Proton Events, and Supernovas (Earth)*(High School–College)**MHB-4C, Convention Center*

Donna L. Young, Chandra E/PO Office, SAO/NASA, Bullhead City, Ariz.

Apply absolute and relative dating techniques with high-resolution ice core data, volcanic eruptions, and solar photon events to correlate and date historic supernova events.

A How-To Workshop on Inquiry Science Instruction: Structures, Norms, and Classroom Culture (Gen)*(General)**MHB-4D, Convention Center*

Sara E. Severance (*sarasev14@gmail.com*), Bruce Randolph School, Denver, Colo.

Heather Waldron (*heather_waldron@englewood.k12.co.us*), Englewood High School, Englewood, Colo.

Emily J. Quinty (*emily.quinty@gmail.com*), Mapleton Expeditionary School of the Arts, Thornton, Colo.

Experience hands-on, guided inquiry lessons and be debriefed from science teachers in the CU–Boulder Streamline to Mastery Program about essential components of inquiry instruction.

Infect Your Biology Classroom with Mathematics!
(Gen)

(General) *MHB-4E, Convention Center*
Jeff Lukens (*jeffrey.lukens@k12.sd.us*), Roosevelt High School, Sioux Falls, S.Dak.

Integrating biology and mathematics shouldn't just be a good idea, it should be the law! Find out how easy, important, and fun it is to collect and analyze data as a part of good, solid, reponsible science education.

3:30–4:30 PM Exhibitor Workshop

Integrate Math Modeling and Problem Solving Through Racing
(Phys)

(Grades 6–12) *102, Convention Center*
Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.
Problem solving and math modeling are learned skills. Join us to explore and learn to explain them. In this workshop, you'll maximize the power of electric radio-controlled vehicles through data collection and graphing, and then apply the same process to solve a number of issues professionals face. You'll maximize torque through gearing, apply Newton's laws of motion to get the best handling, and use battery chemistry to explain an effective driving strategy...and you'll take home lessons (learned and in print). This activity is from the new Race Engineering Certifications curriculum module, part of the Ten80 Student Racing Challenge.

4:00–4:30 PM Presentation

SESSION 1



Robotic Rewards: Recruiting Middle School Students for an Award-winning Robotics Team (Gen)

(Middle Level) *MHB-3A, Convention Center*

Tevfik Eski, Kenilworth Science and Technology School, Baton Rouge, La.

Hear winning strategies on creating an award-winning Title I school robotics team and leveraging success into an opportunity for community engagement and positive public relations.

4:00–5:15 PM Exhibitor Workshops

Hands-On Science with Classroom Critters (Bio)

(Grades K–12) *104, Convention Center*
Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Here's a surefire boost to your class—live organisms. Whether you use a hands-on curriculum or develop your own lessons, animals broaden students' inquiry-based explorations and increase their interest in science. Participate in fun, simple hands-on activities with bessbugs, pill bugs, termites, and more. Free materials provided.

Using Enzyme-linked Immunosorbent Assay (ELISA) to Detect West Nile Virus Outbreak (Bio)

(Grades 9–College) *106, Convention Center*
Sponsor: Edvotek Inc.

Danielle Snowflack, **Maria Dayton**, and **Thomas Cynkar** (*info@edvotek.com*), Edvotek Inc., Washington, D.C.

The 2012 outbreak of the West Nile virus was the largest ever documented in the U.S.—more than 1,100 cases were reported to the CDC. Join us to discover how ELISA can be used as a diagnostic tool for detecting disease outbreaks. Participants will perform our new simple, foolproof single-antibody ELISA. Much faster than a traditional ELISA, this assay can be completed in 40 minutes or less. Participants receive a free flash drive and entry into a T-shirt drawing at the end of the workshop.

Sound and Waves

(Phys)

(Grades 6–12) *301, Convention Center*
Sponsor: CPO Science/School Specialty Science

Scott Eddleman, CPO Science/School Specialty Science, Nashua, N.H.

Create standing wave patterns on a vibrating string with CPO's wave machine. Investigate properties of waves, including amplitude, wavelength, and frequency. Take away STEM activities and an understanding of how to apply the engineering cycle in science classes.

Solving the Mystery of STEM Using Forensic Science (Earth)

(Grades 4–12) 302, Convention Center

Sponsor: Frey Scientific/School Specialty Science

Lou Loftin, Consultant, Reno, Nev.

Conduct a number of STEM-focused forensic activities that link the scientific method with analysis and investigative skills to solve multifaceted “cases” involving fingerprint, trace, DNA, and document evidence. Examine additional STEM-focused assets. Our program software allows the integration of virtual labs, investigative activities, the preparation of web-based content, and individualized assessment.

Evidence for Plate Movement (Earth)

(Grades 5–8) 303, Convention Center

Sponsor: Delta Education/School Specialty Science–FOSS

Jessica Penchos and **Virginia Reid**, The Lawrence Hall of Science, University of California, Berkeley

What evidence from rocks informs us about the history of

our planet? Explore Earth history concepts with hands-on activities and multimedia, and identify connections to the NGSS science and engineering practices. Be among the first to preview the revised FOSS Earth History Course, including new features, strategies, content, and materials.

Introduction to Simple Machines (Phys)

(Grades 3–6) 304, Convention Center

Sponsor: K’NEX Education

Presenter to be announced

Explore the common expression “simple machines make work easier” and investigate hands-on strategies to help students understand simple machine technologies. Build and use K’NEX® simple machine models and discover that simple machines make work easier by multiplying force and distance as well as changing the direction of force. Standards-aligned STEM concepts related to simple machines will be stressed.

5:00–6:00 PM Presentations

SESSION 1

Digital Science Notebooks (Gen)

(General) 108/110, Convention Center

Rob B. Funk (rbfunk@dcsdk12.org), Cresthill Middle School, Highlands Ranch, Colo.

Come learn how to use Google Docs to monitor student growth.

SESSION 2

Getting Groovy! Using Lava Lamps to Bring STEM to Life (Gen)

(General) 111/113, Convention Center

Jessica A. Noffsinger (jessica.noffsinger@adams12.org) and

Erin K. Brabant, (erin.k.brabant@adams12.org), STEM Magnet Lab School, Northglenn, Colo.

Use lava lamps to integrate science and engineering and help students master energy.

SESSION 3



NSTA Press® Session: Exemplary Science: Best Practices in Professional Development (Gen)

(General) 501, Convention Center

Susan B. Koba (skoba@cox.net), Science Education Consultant, Omaha, Neb.

Explore professional development programs that work in various settings and serve as case study protocols, professional development implementation templates, strategic planning aids, and university resources.

SESSION 4 (two presentations)

(Middle Level–High School/Inf.) MHB-1A, Convention Center

Digital Chemistry Resources That Teachers and Students Can Rely On (Chem)

Marta Gmurczyk (m_gmurczyk@acs.org), **Patrice Pages** (p_pages@acs.org), and **Karen M. Kaleuati**, American Chemical Society, Washington, D.C.

Steven Long (sjlong@rps.k12.ar.us), Rogers High School, Rogers, Ark.

Learn about the American Chemical Society’s innovative collection of reliable and free digital resources for high school teachers. Find out about the many uses of the Chemical Education Digital Library (ChemEd DL), including Models 360, ChemTeacher, and the award-winning Periodic Table Live! Also, watch *ChemMatters* video podcasts and discover the ChemClub collection of activities.

iScience: The Impact of iPads on Student Achievement and Engagement (Gen)

Mary Beth Cheversia (che015005@adams12.org), Thornton High School, Thornton, Colo.

Susan Nicholson-Dykstra (nic014314@adams12.org), Northglenn High School, Northglenn, Colo.

Let’s evaluate student use of tablet technology to carry out investigations, develop models, construct explanations, and communicate understanding in a 1:1 iPad environment.

SESSION 5

My Life with Charles Darwin (Bio)

(Middle Level–High School/Inf.) MHB-1C, Convention Center

Elizabeth B. Burck (lizburck@gmail.com), Retired Educator, Kasilof, Alaska

Emma Darwin has a story to tell. Her unique perspective weaves together science and society—revealing a deeper understanding of her husband and his work.

SESSION 6

Teaching Forensic DNA Using Models, Kinesthetic Learning, STR Activity, and Readings (Bio)

(High School) MHB-1D, Convention Center

Anthony Bertino (abertino@nycap.rr.com) and **Patricia Nolan Bertino** (nolanp@nycap.rr.com), Retired Educators, Scotia, N.Y.

Increase comprehension and interest using inexpensive models, kinesthetic learning activities, and nonfiction readings. Perform a STR activity to identify suspects, paternity, or missing persons. Take home a free resource CD!

SESSION 7

Traveling New Instructional Roads Through Technology (Gen)

(Middle Level–High School) MHB-1F, Convention Center

Sharla Dowding (sharla@tribcsp.com), **Doug Scribner** (scribnerd@weston1.k12.wy.us), and **James Stith**, Newcastle High School, Newcastle, Wyo.

As teachers that have gone through the transformation to a 1:1 laptop classroom, we'll share several tools—which may include but are not limited to—SMART Student Response Systems, Student Response Network, OneNote, Exam-View, Web-Assign, video downloader, My Big Campus academic networking, and some game websites. We'll share tips and advice for new teachers and veterans. Whether you already have a one-to-one classroom or are investigating the possibilities, you will pick up practical advice for management and utilization of computers in the science classroom.

SESSION 8 (two presentations)

(Elementary–High School) MHB-3C, Convention Center

 **Assessment in the Modern Science Classroom (Gen)**

Chris Ludwig (cludwig@lajunta.k12.co.us), La Junta High School, La Junta, Colo.

Come discuss how free online tools can be used to create a standards-based portfolio system for showcasing and evaluating student achievement in science.

 **Develop Your Own STEM Center in Your Elementary Classroom (Gen)**

Karl Topper (karltopper@gmail.com), Kihei Charter School, Kihei, Hawaii

Learn how you can transform your classroom into a STEM learning center in which students become excited to learn. You will gain insights on how this model is used to support a literacy-based STEAM program (LSTEAM).

SESSION 9

Nuestra Tierra Dinámica (Env)

(Informal Education) MHB-4B, Convention Center

Marina LaGrave (mlagrave@clace.us), Latin American Center for Arts, Science, and Education, Boulder, Colo.

CLACE (*Centro Latinoamericano Para Las Artes, Ciencia y Educación*) is a Latin-American Center for Arts, Science, and Education. In 2011 with NASA funding and resources, CLACE/OpEPA founded *Nuestra Tierra Dinámica* (NTD), focusing on K–12 Latino youth. We raise global climate change/Earth system literacy through culturally relevant, inquiry-based, hands-on activities and digital storytelling. Our aim is to provide high-quality STEM education as well as to build bilingual literacy skills.

SESSION 10

Putting the “T” in STEM—5E and Technology (Gen)

(General) MHB-4D, Convention Center

Lisa O. Brown (lobrown@shsu.edu), Sam Houston State University, Huntsville, Tex.

Are you interested in infusing technology into all stages of the 5E (Engage, Explore, Explain, Elaborate, and Evaluate) learning cycle? Join me for this informative session on developing 21st-century skills with 21st-century lessons. Let's put the “T” back in STEM!

SESSION 11

The State of STEM Education in Colorado (Gen)

(General) *MHB-4E, Convention Center*

Yeni Violeta Garcia (*garcia_v@cde.state.co.us*), Colorado Dept. of Education, Denver

Join me as I provide a brief overview of STEM initiatives in Colorado, including STEM curriculum samples, opportunities for students, and opportunities for professional development for teachers.

SESSION 12

Online Tools for Blended and Flipped Classrooms (Gen)

(General) *MHB-4F, Convention Center*

Lynee Zajac Beck (*lzajacbe@jeffcoschools.us*), Jeffco's 21st Century Virtual Academy, Arvada, Colo.

Learn and share at this fast-paced showcase of free and inexpensive tech tools! Walk away with fresh ideas to enhance your blended or flipped classroom.

5:00–6:00 PM Workshops

Inquiry in Action: Investigating Matter Through Inquiry (Chem)

(Elementary–Middle Level) *MHB-1B, Convention Center*

Patricia M. Galvan (*p_galvan@acs.org*), American Chemical Society, Washington, D.C.

Conduct simple tests on four identical-looking household liquids to tell them apart. Molecular model animations show why each liquid behaves as it does. Everything is at *www.inquiryinaction.org*.

Food Safety in Your School Garden (Gen)

(Elementary) *MHB-2A, Convention Center*

Monica Pastor, University of Arizona, Phoenix
School gardens are an excellent way for teachers to demonstrate to their students how science, math, and language arts are interconnected.

Exploring an Effective Pathway to Renewable Energy Education (Env)

(Elementary–Middle Level) *MHB-2C, Convention Center*

Wayne Robinson (*jwr@cdfun.org*) and **Lucien Scott** (*lgs@cdfun.org*), Creative Discovery Museum, Chattanooga, Tenn.

Farming For Fuels is a unique bioenergy project for students in grades 4–7 that incorporates current scientific research, hands-on learning, and a wide array of technological applications.



Integrating Nanotechnology in the High School Chemistry Classroom (Chem)

(High School) *MHB-3A, Convention Center*

Cheryl L. Paricio (*cparicio@cherrycreekschools.org*) and **Mary Bartholomew** (*mbartholomew@cherrycreekschools.org*), Smoky Hill High School, Aurora, Colo.

The sometimes unexpected behavior of materials at the nanoscale, where electrostatic forces dominate, will fascinate you and your students. Come explore its connection to chemistry!



Cutting Across the Curriculum: Examining Lessons That Integrate Science, Literacy, and Mathematics (Gen)

(Elementary) *MHB-3B, Convention Center*

Christine A. Royce (*caroyce@aol.com*), Shippensburg University, Shippensburg, Pa.

Join me as I model lessons that integrate literacy strategies and mathematical and science concepts as well as provide an overview of research and connections to *Common Core State Standards*.

Spectroscopy: Stairway to the Stars (Earth)

(High School–College) *MHB-4C, Convention Center*

Donna L. Young, Chandra E/PO Office, SAO/NASA, Bullhead City, Ariz.

Identify emission lines and calculate temperatures in actual stellar spectra to construct the stellar classification system and correlate with stellar masses and probable evolutionary histories.



Photo of fossils at the Denver Museum of Nature & Science.

—Photo courtesy of Rich Grant / VISIT DENVER

8:00–9:00 AM Presentations

SESSION 1

Classroom Management Strategies for the Secondary School Science Class (Gen)

(Middle Level—College) 111/113, Convention Center

Chuck Downing (dr.d@engage-in-science.com), Engage in Science, San Diego, Calif.

Join me as I demonstrate routines and procedures to effectively manage your classroom and laboratory experiences. Don't miss this valuable session for new teachers.

SESSION 2

Back to College: Connecting K–5 Teachers and College Professors (Gen)

(General) 112, Convention Center

Lynne Bleeker (lynne.bleeker@ankenyschools.org), Parkview Middle School, Ankeny, Iowa

Hear how effectively our summer science courses teach K–5 teachers accurate, up-to-date content through inquiry-based lessons, field trips, and exciting presentations by Iowa State faculty.

SESSION 3



NSTA Press® Session: Special Needs Students in Science (Gen)

(General) 501, Convention Center

Ed Linz (coachlinz@cox.net), Author and Education Consultant, Springfield, Va.

Mary Jane Heater, Springfield, Va.

Let's discuss what the science teacher MUST do, and what the science teacher SHOULD do for special needs students! We'll share a list of mostly DO's and a few DON'T's.

SESSION 4

Establishing a Flipped Classroom and Incorporating Standards-based Grading (Chem)

(Middle Level—High School) MHB-1A, Convention Center

Shannon Wachowski (shannonwachowski@re3j.com) and **Marcus Diamond** (marcusdiamond@re3j.com), Weld Central High School, Keenesburg, Colo.

Attention will be paid to techniques and challenges of implementing a flipped classroom as well as how to incorporate standards-based grading.

SESSION 5

CPR—Revive Writing in the Science Classroom Without Killing Yourself (Gen)

(High School—College) MHB-4C, Convention Center

Sharla Dowding (sharla@tribesp.com) and **James Stith**, Newcastle High School, Newcastle, Wyo.

President: Doug Scribner, Newcastle High School, Newcastle, Wyo.

Calibrated Peer Review (CPR)TM is a web-based program that enables frequent writing assignments and increases student mastery of content while reducing the time an instructor must spend reading and assessing student writing. CPR offers instructors the choice of creating their own writing assignments or using the rapidly expanding assignment library. CPR funding has been generously provided by the National Science Foundation and the Howard Hughes Medical Institute.

SESSION 6

Let the iPad Tell a Science (Digital) Story! (Gen)

(General) MHB-4D, Convention Center

Roger D. Pence (rogpence@yahoo.com), Benicia (Calif.) Unified School District

Find out how to use the iPad for crafting science digital stories with popular video-editing apps while promoting science writing and visual literacy skills. Samples, a live demonstration, and resources provided.

SESSION 7

Great Science Lesson = Presidential Award + \$10,000 (Gen)

(General) MHB-4E, Convention Center

Marilyn Suiter, National Science Foundation, Arlington, Va.

Presidential Awardees (PAEMST) share how they each took a quality science lesson and turned it into a meeting with the President, \$10,000, and leadership opportunities.

SESSION 8 (two presentations)

(General)

MHB-4F, Convention Center

Streamline to Mastery: A Model for STEM Professional Development (Gen)

Alisa P. Grimes (alisapaulinegrimes@yahoo.com) and **Angela M. Cannava** (cannava@gmail.com), University of Colorado, Boulder

In streamline to mastery, teachers, university faculty, and graduate researchers engage in collaborative discourse and conduct research to cultivate scientific thinking and implement educational change.

Partners in Progress: Best Practices for Building Partnerships with STEM-based Groups (Gen)

Tevfik Eski, Kenilworth Science and Technology School, Baton Rouge, La.

Learn how a Title I middle school developed effective partnerships with academic, business, and industry association groups to become a STEM pioneer in South Louisiana.



8:00–9:00 AM Workshops

ACS Middle Level Session: Matter: Solids, Liquids, and Gases (Chem)

(Middle Level)

201, Convention Center

James H. Kessler, American Chemical Society, Washington, D.C.

Explore solids, liquids, and gases through hands-on activities and molecular animations from the free completely developed 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans in www.middleschoolchemistry.com.

ACS Session One: Chemical Bonding—Why Water Is Different (Chem)

(High School)

203, Convention Center

Jerry A. Bell (j_bell@acs.org), American Chemical Society, Washington, D.C.

The properties of water that are essential for life on Earth are very different from the properties of similar molecules. Simple bonding models help us understand why water is so different. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

ASEE Session: TeachEngineering.org: Free Resources for Engineering in K–12 (Gen)

(General)

207, Convention Center

Malinda Zarske (malinda.zarske@colorado.edu) and **Janet Yowell** (janet.yowell@colorado.edu), University of Colorado, Boulder

President: Malinda Zarske

Become acquainted with *TeachEngineering.org*, a free online collection of standards-based engineering lessons and hands-on activities that help integrate innovative engineering trends into your K–12 classes.

AAPT Session: Addressing the NGSS with Classroom Scientific Induction (Phys)

(General)

210/212, Convention Center

Shelly Belleau, University of Colorado, Boulder

This workshop describes an instructional approach to science learning that, by its very design, addresses the model development practices described in the NGSS. Data will be presented that high school physics students from groups that are historically underrepresented in science can thrive in and even enjoy this learning context.

**Fueling the Future: Energy Interconnections and Sustainable Choices (Gen)***(General)* 503, Convention Center**Dave Wilton** (dave@facingthefuture.org), Facing the Future, Seattle, Wash.

Think critically about the science behind the headlines. Experience hands-on lessons that demonstrate the interconnections between energy sources, human choices, economic challenges, and environmental impacts. Free curriculum!

Integrated STEM (Gen)*(General)* 505, Convention Center**Louis Nadelson**, Boise State University, Boise, Idaho**Anne Seifert** (anne.seifert@inl.gov), Idaho National Laboratory, Idaho Falls

This workshop will involve hands-on/minds-on approaches for integrating STEM using projects and challenges to provide context for STEM content.

Life Cycle of the Monarch Butterfly (Bio)*(Informal Education)* MHB-1C, Convention Center**Ann Hobbie** (ann.s.hobbie@gmail.com) and **De Cansler** (decansler@gmail.com), University of Minnesota Dept. of Fisheries, Wildlife, and Conservation Biology, St. Paul

Observe live monarchs throughout their life cycle to learn about their biology and how you can raise these fascinating organisms in your classroom.

Seeing the Invisible: Making the Electromagnetic Spectrum Concrete (Phys)*(Middle Level)* MHB-1E, Convention Center**Christine A. Royce** (caroyce@aol.com), Shippensburg University, Shippensburg, Pa.

How do we “see” something that exists but is not visible? This workshop will allow participants to engage in activities that make the EMS a bit more concrete.

Ingredients for Cooking Up Weather in the Primary Classroom! (Earth)*(Elementary)* MHB-2A, Convention Center**Teresa A. Eastburn** (eastburn@ucar.edu), NCAR, Boulder, Colo.**Tim Barnes** (tbarnes@ucar.edu), NCAR/UCAR, Boulder, Colo.

Presenter: Eileen Carpenter, NCAR/UCAR, Boulder, Colo. NCAR field trip staff will share with you our most popular K–3 module—Convection Connection: Hot Plus Cold Makes Weather Bold! Using the 5E constructivist approach to learning (Engage, Explore, Explain, Elaborate, and Evaluate), we’ll walk you through activities that bring weather

to life and help students grasp the concepts of convection, weather fronts, and essential weather ingredients by making the invisible visible. All resources provided.

Facing the Future: Understanding Sustainability and Global Connections (Env)*(Middle Level)* MHB-2C, Convention Center**Pamela Whiffen** (pwpwr@aol.com), NASA Educator Ambassador, Phoenix, Ariz.

Experience a hands-on, inquiry-based curriculum that guides students through examinations of the issues surrounding global climate change. Interdisciplinary small group activities provided on CD.

**Bringing Science to Life! Using Invertebrates to Enhance Classroom Teaching (Bio)***(General)* MHB-3B, Convention Center**Marissa Copan** (mcopan@butterflies.org) and **Sarah Folzenlogen** (sfolzenlogen@butterflies.org), Butterfly Pavilion, Westminster, Colo.

Bring your curriculum to life with the Butterfly Pavilion as you discover how to use classroom animals as a teaching tool! Enhance life science, literacy, inquiry, and 21st-century skills in your classroom.

**What Works in Science Classrooms: Using Visual Tools and Virtual Manipulatives (Gen)***(General)* MHB-3C, Convention Center**Cynthia J. Long** (clong@mcrel.org), McREL, Denver, Colo.**Anne Tweed** (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

One significant strategy to help students make sense of science concepts is to use nonlinguistic representations and/or virtual manipulatives. Join us and discover strategies that help students understand content.

Using Natural Hazards as a Hook in the Earth and Space Science Classroom (Earth)*(Elementary–High School)* Centennial A–C, Hyatt**Roberta M. Johnson** (rmjohnsn@gmail.com), NESTA, Boulder, Colo.**Margaret A. Holzer** (mholzer@monmouth.com), Chatham High School, Chatham, N.J.

This NESTA workshop highlights effective approaches for leveraging dramatic natural events to engage your students and bring your classroom to life with high-impact hands-on activities!

8:00–9:00 AM Exhibitor Workshops

NABT Session: Free Resources from HHMI on *The Origin of Modern Humans* (Bio)

(Grades 7–12) 205, Convention Center

Sponsor: Howard Hughes Medical Institute

Anthony Bertino and **Patricia Nolan Bertino**, Retired Educators, Scotia, N.Y.

Where and when did humans arise? What distinguishes us from other species? Did our distant ancestors look and behave like us? Students probably don't realize how important genetic analysis and fossil evidence are to recent advances in understanding human origins. Participants will learn about and receive free resources from Howard Hughes Medical Institute to enhance classroom instruction on human evolution.

Merging the Three Dimensions of the *Next Generation Science Standards* (Gen)

(Grades 6–8) 303, Convention Center

Sponsor: It's About Time

Jennifer Nassar, Aurora (Colo.) Public Schools

One way the *Next Generation Science Standards* differ from previous documents is by merging core ideas in science with practices and crosscutting concepts. This workshop will illustrate how *Project-Based Inquiry Science* (PBIS) combines all three dimensions as students design, build, and test “whirligigs” and other aerodynamic structures.

8:00–9:15 AM Exhibitor Workshops

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

(Grades 6–12) 104, Convention Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Are you ready for a forensic dissection activity that is on the cutting edge? Engage students and revitalize your instruction of mammalian structure and function with a “real” classroom autopsy! Participants dissect a Carolina's Perfect Solution pig by modeling the protocols of a forensic pathologist. Free materials and door prizes!

Project Based Learning with the ANATOMY IN CLAY® Learning System (Bio)

(Grades 5–College) 107, Convention Center

Sponsor: ANATOMY IN CLAY Learning System

Leslie Peterson (leslie@anatomyinclay.com), ANATOMY IN CLAY Learning System, Loveland, Colo.

Join us for this hands-on workshop using our kinesthetic teaching tool to get students of all ages interested in the human body. You will experience the power of building in clay on a skeletal model and have lots of ideas to take back to the classroom to inspire your students.

PASCO's SPARKscience for High School Students—Free Starter Kits for Attendees! (Gen)

(Grades 9–12) 106, Convention Center

Sponsor: PASCO scientific

Jason Lovell, PASCO K–12 Education Consultant, San Diego, Calif.

Learn how SPARKscience engages students in science and engineering practices, affording a deeper understanding of scientific concepts. Participate in investigations to experience real-time data collection with probeware and SPARKvue® software. Free probeware starter kits, including five sensors and USB interface (a \$600 value), will be given to 20 lucky attendees!

Ocean Classrooms—Inspiring New Depths (Bio)

(Grades 9–12) 109, Convention Center

Sponsor: Ocean Classrooms

Mikki Kobza (mikki@oceanclassrooms.com) and **Sage Dalton** (sage@oceanfirstdivers.com), Ocean Classrooms, Boulder, Colo.

Ocean Classrooms is a movement into the future—where education, fascination, and conservation all happen in one interconnected experience. Our core belief is in immersive educational experiences that promote ocean literacy and awareness. We will highlight our online courses and innovative research technologies, including our LIVE underwater video cameras.

Forces, Energy, and Motion**(Phys)***(Grades 4–10)*

304, Convention Center

Sponsor: K'NEX Education

Presenter to be announced

It's off to the races! Join us as we investigate potential and kinetic energy as well as force and motion with K'NEX® cars. Gravity, rubber bands, springs, wind, battery motors, and flywheels will power models as we explore complex STEM concepts. How will your car perform? How would you redesign your model to make it a first-place car? Strategies that empower students to design and complete their own experiments from the teacher's guide will be emphasized and standards-aligned STEM concepts will be stressed.

Experience the Power of a Digital Middle School Program**(Gen)***(Grades 6–8)*

402, Convention Center

Sponsor: Achieve3000®

Kathy Warnert (kathy.warnert@achieve3000.com), Achieve3000, Lakewood, N.J.

Experience the power of digital with differentiated levels of rich content from National Geographic. eScience3000 is tightly aligned to CCSS, NGSS, and STEM initiatives. See how science, literacy, and real-life experiences come together in this engaging middle school resource.

Hands-On Integrated Science Activities for Middle School from Flinn Scientific**(Gen)***(Grades 6–8)*

403/404, Convention Center

Sponsor: Flinn Scientific, Inc.

Joan Berry (jberry@flinnsci.com), Flinn Scientific, Inc., Batavia, Ill.

Hands-on science leads to minds-on learning! Flinn Scientific presents relevant and age-appropriate activities for middle school—integrating life, Earth, and physical science topics. Workshop participants perform and observe experiments designed to capture the curiosity and engage the energy of adolescent students. Handouts provided for all activities.

IQWST Tablet Edition: Blending the Effectiveness of Learning-by-Doing with the Power of Connected Mobile Technology**(Gen)***(Grades 6–8)*

405, Convention Center

Sponsor: Sangari Active Science

Marilyn Schmidt (mschmidt@sangariglobaled.com), Educational Resource Specialist, Sangari Active Science, Centennial, Colo.

IQWST stands for Investigating and Questioning our World through Science and Technology (pronounced I-quest). Tablet computers are beginning to fulfill the long-held belief that technology can radically improve educational outcomes for students. The IQWST Tablet Edition merges a Learning-by-Doing middle school science curriculum with tablet technology to create an interactive student science notebook built on top of our NGSS Standards Engine. Come join us to learn about the future of middle school science.

Unleashing Your Students' Inner Inventor—Robots, Video Games, and DIY!**(Gen)***(Grades 8–College)*

406, Convention Center

Sponsor: SparkFun Electronics

Brian Huang (brian.huang@sparkfun.com) and **Jeff Branson** (jeff.branson@sparkfun.com), SparkFun Electronics, Boulder, Colo.

In this workshop, we'll use the wildly popular Arduino micro-controller platform to explore creative project-based learning through programming and 21st-century digital literacy. This workshop assumes no previous experience.

The STEM Energy Challenge**(Gen)***(Grades 2–8)*

407, Convention Center

Sponsor: Fisher Science Education

Robert Marshall (marshallr@carnegiesciencecenter.org), Carnegie Science Center, Pittsburgh, Pa.

STEM is all about preparing the future workforce of America to think in a new age, where robot cars and autonomous rovers on Mars are no longer fiction. First, use inquiry and the scientific method to find answers to testable questions about force, energy, and motion. Then, solve an energy problem using both creative and realistic world processes. Finally, support your understanding with team competition. You'll be surprised at how you reach conclusions and, more importantly, what activities you'll learn for your classroom.

8:00–9:30 AM Exhibitor Workshop

Chemistry and Biology with Vernier (Chem)

(Grades 7–College) 401, Convention Center

Sponsor: Vernier Software & Technology

Clarence Bakken (info@vernier.com), Retired Educator, Sunnyvale, Calif.

In this hands-on workshop, we will use various digital tools such as probeware to conduct experiments from our popular chemistry and biology lab books. Use LabQuest Mini with a computer or LabQuest 2 as a stand-alone device, with a computer, or wirelessly to iPad and BYOD environments.

8:00–11:00 AM Short Course

Home and School Science Activities (SC-3)

(Grades 4–8) Capitol Ballroom 2, Hyatt

Tickets Required: \$60

Bernard A. Horvath (bgrizwald@aol.com), Retired Teacher, Jeffersonville, Ind.

Kevin Horvath, Retired Educator, Lake Lotawana, Mo.

For description, see page 36.

8:00–11:00 AM Workshop

NSTA/CAEP Development of Program Report Workshop

(By Invitation Only)

Granite, Hyatt

8:30–9:00 AM Presentation

SESSION 1

Light at Night Analyses as Student Research Opportunities (Env)

(General) MHB-1D, Convention Center

Roger B. Culver (gnat@lamar.colostate.edu), Colorado State University, Fort Collins

Light pollution measurement is an important new area of environmental study. I'll describe tools, protocols, and projects for student research in this area.

8:30–11:00 AM Exhibitor Workshop

Generate a DNA Barcode and Identify Species (Bio)

(Grades 10–College) 302, Convention Center

Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

Extract genomic DNA, amplify it with PCR, and classify species using sequencing and bioinformatics to determine if that fish you just bought is really what the label says it is. Learn about the International Barcode of Life, which uses barcoding, and find out how you can be a part of this initiative!

9:00 AM–5:00 PM Exhibits

Exhibit Hall A, Convention Center

Come see the most up-to-date science textbooks, software, equipment, and other teaching materials. Some exhibitors will offer materials for sale.



9:30–10:30 AM Featured Presentation

**Play and Science Running Together (Gen)***(General)*

103/105, Convention Center



Kenneth Wesson (*kenawesson@aol.com*), Educational Consultant, Neuroscience, San Jose, Calif.

Presider: Melissa R. Free, Strand Leader, Denver Area Conference, and Turnberry Elementary School, Commerce City, Colo.

Play encourages the production of emotional memories, which are among the strongest memories of all. Deep and long-lasting learning begins with positive emotional engagement. For all learners, cognition begins with emotions serving as the primary drivers of attention.

It should come as no surprise to elementary school teachers that students gravitate toward nearly any opportunity to engage in active science experiences. Young learners are easily absorbed in their own thoughts and reflections as they try to understand science. They should be similarly immersed in learning how to read and write effectively in science, how to use mathematics in science, and how to use the wealth of today's available resources in order to validate and support their explanations in science. If we are not making science engaging, challenging, and fun for children, then we may be closing the window on learning in science for a lifetime!

A former college and university-level faculty member and administrator, Kenneth works as a keynote speaker and educational consultant for preschool through university institutions and organizations. An expert on the neuroscience of learning, he regularly speaks throughout the world on methods for creating classrooms and learning environments that are "brain-considerate." Wesson also speaks on the subjects of early brain development, design and engineering, STEM and STREAM, contextual learning, and curriculum development.

His work is frequently referenced in Parents Magazine and the journal Brain World.

9:30–10:30 AM Presentations

SESSION 1

Science at "C" Level: A Creative, Cooperative, Cross-Disciplinary Approach to Critical Thinking (Gen)*(Middle Level–High School)*

111/113, Convention Center

Chuck Downing (*dr.d@engage-in-science.com*), Engage in Science, San Diego, Calif.

Engage in a typical lesson demonstration, take home reproducible materials, and learn how to create your own lesson of this type.

SESSION 2

Experimental Design...Be the Scientist for STEM Connections (Gen)*(Middle Level)*

502, Convention Center

Lynn Lauterbach (*lynnlauterbach@gmail.com*), Loveland, Colo.

Discover how a free online program models scientists doing experimentation and then use the graphic organizer/Post-it® Note method to teach students their own experimental design. Handouts!

SESSION 3

Write Your Way to Success: Grant-writing Strategies for You and Your Chemistry Students (Chem)*(High School)*

MHB-1B, Convention Center

Kenetia Thompson (*k_thompson2@acs.org*) and **Karen M. Kaleuati** (*k_kaleuati@acs.org*), American Chemical Society, Washington, D.C.

Walk away with top strategies for writing a fundable grant that improves your students' chemistry experience.

SESSION 4

Max Goes to Space: Science Adventures Read from Orbit (Earth)*(Elementary–Middle Level)*

MHB-2B, Convention Center

Jeffrey Bennett (*jeff@bigkids-science.com*), Big Kid Science, Boulder, Colo.

Presider: Patricia Tribe (*patricia.tribe@gmail.com*), T² Science & Math Education Consultants, League City, Tex.

This winter, author Jeffrey Bennett's books for children will be read from the International Space Station. Learn how to integrate this program into your class.

SESSION 5

Creating “Deep Time” Diaries (Earth)

(Middle Level) *MHB-2C, Convention Center*

Vicky Jordan, Wellington Middle School, Wellington, Colo.

Gary Raham (*grahambios@aol.com*), Biostration, Wellington, Colo.

Discover how to create “deep time diaries” to improve student writing, speaking, and language skills while meeting middle school science standards.

SESSION 6


 **Genetic Engineering on Steroids: BioBuilding a Cell to Do Anything You Want! (Bio)**

(Informal Education) *MHB-3A, Convention Center*

Lynne A. Williams (*willila@d11.org*), Coronado High School, Colorado Springs, Colo.

Synthetic biology is part science, part engineering, and part imagination and design. BioBuilder’s curricula rely on a molecular biology and authentic research to spark engagement and learning.

SESSION 7

 **A Proposed Integrated STEM Framework (Gen)**

(General) *MHB-3C, Convention Center*

Andrea C. Burrows (*aburrow1@uwyo.edu*) and **Timothy F. Slater** (*timslaterwyo@gmail.com*), University of Wyoming, Laramie

We propose and encourage feedback on a novel and actionable framework for analyzing and enhancing teachers’ level of complexity in integrating knowledge, skills, and attitudes across STEM disciplines (science, technology, engineering and mathematics).

SESSION 8

NSELA Session: Tools for Science Leaders, Part 1 (Gen)

(General) *MHB-4A, Convention Center*

Darlene Ryan (*dryan@chccs.k12.nc.us*), Glenwood Elementary School, Chapel Hill, N.C.

Elizabeth A. Allan (*eallan@uco.edu*), University of Central Oklahoma, Edmond

The various tools and strategies shared with science leaders in this session will support them in their work to enhance teaching and learning in their context.

SESSION 9

An Inquiry Approach to Teaching the Rock Cycle and Igneous Rocks (Earth)

(Informal Education) *MHB-4B, Convention Center*

Davida Buehler (*dbuehler@geosociety.org*), The Geological Society of America, Boulder, Colo.

Walk away with numerous inquiry-based activities that you can use immediately in your upcoming lessons on the rock cycle and igneous rocks!

SESSION 10

Time Will Tell: Using Time-Lapse Photography and Digital Storytelling to Observe Change (Gen)

(Elementary–High School) *MHB-4D, Convention Center*

Roger D. Pence (*rogpence@yahoo.com*), Benicia (Calif.) Unified School District

Observation of slow-moving events in time can be described using time-lapse photography and narrated via techniques used in digital storytelling. This session will explore methods, equipment, and applications. Take home resources and samples.

SESSION 11

Teaching Science in Literature (Gen)

(General) *MHB-4F, Convention Center*

Tara A. Kristoff (*tara_kristoff@yahoo.com*), Summit (Ill.) School District 104

Teachers and administrators—come learn how to incorporate science concepts within any novel, poem, or short story to enhance and maximize student learning.



9:30–10:30 AM Workshops**Spinning Your Way into STEM (Gen)**
(Elementary) 108/110, Convention Center

John J. Zenchak (jjzenchak@noctrl.edu) and **Mary Jean Lynch** (mlynch@noctrl.edu), North Central College, Naperville, Ill.

From our after-school science program for grades 4–5 students, we share an engaging STEM design activity that can easily be done in your classroom.

ACS Middle Level Session: Changes of State—Evaporation and Condensation (Chem)

(Middle Level) 201, Convention Center

James H. Kessler, American Chemical Society, Washington, D.C.

Explore evaporation and condensation through hands-on activities and molecular animations from the free completely developed 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans in www.middleschoolchemistry.com.

ACS Session Two: Entropy—Mixing and Unmixing (Chem)

(High School) 203, Convention Center

Jerry A. Bell (j_bell@acs.org), American Chemical Society, Washington, D.C.

Approaching the concept of entropy from a molecular viewpoint gives it a more easily visualized and intuitive meaning. Using this molecular view helps us understand how both mixing and unmixing are spontaneous processes under the appropriate conditions. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

ASEE Session: Introducing Engineering to Elementary School Students (Gen)

(Elementary) 207, Convention Center

Malinda Zarske (malinda.zarske@colorado.edu), University of Colorado, Boulder

Become acquainted with the Engineering is Elementary® (EiE) program and learn a hands-on way to introduce the engineering design process to any grade level.

AAPT Session: Energy Conservations and Transformations (Phys)

(General) 210/212, Convention Center

Elaine Gwinn (jgwinn@shenandoah.k12.in.us), Shenandoah High School, Middletown, Ind.

Experience various activities designed to help students learn about energy conservation and transformations. There will be plenty of “energy” in the room for all grade levels.

 **NSTA Press® Session: Picture-Perfect Science Lessons: Using Picture Books to Guide Inquiry (Gen)**

(Elementary) 501, Convention Center

Emily Morgan (emily@pictureperfectscience.com), Picture-Perfect Science, LLC, West Chester, Ohio

Join one of the authors of NSTA’s award-winning *Picture-Perfect Science* series to learn how to use picture books to teach science and reading together.

“Stuff,” STEM, and Sustainability—Examining and Reengineering Systems, Resources, and Consumption (Gen)

(General) 503, Convention Center

Dave Wilton (dave@facingthefuture.org), Facing the Future, Seattle, Wash.

STEM offers tools to answer questions and create solutions. What are the questions? What needs solving? Explore the materials economy, systems, and sustainable design to create solutions in ways that benefit people, economies, and environments.

Classroom Activities for *Stop Faking It: Energy* (Phys)

(Elementary–High School) 507, Convention Center

Bill Robertson (wrobert9@ix.netcom.com), Bill Robertson Science, Inc., Woodland Park, Colo.

In response to teacher demand, I’m developing a set of classroom activities on energy to accompany the *Stop Faking It! Energy* book. We incorporate the learning cycle into an easy-to-use, teacher-friendly, research-based curriculum for upper elementary and conceptually based high school curricula that can help your students truly understand energy concepts. Join the author for activities from the upcoming book.

Fun Science to Stimulate Inquiry Bridges (Chem)

(Middle Level–High School) MHB-1A, Convention Center

John W. Fedors (jfedors@wavecable.com), Science Activities, Lincoln, Calif.

Bridge the sciences with hands-on activities in diffusion, active/passive transport, simulated organelles, MRI, hydrophilic/hydrophobic properties, intimate microbes energy transfer, and forensics.



Life Cycle of the Monarch Butterfly (Bio)
(Informal Education) *MHB-1C, Convention Center*
Ann Hobbie (ann.s.hobbie@gmail.com) and **De Cansler** (decansler@gmail.com), University of Minnesota Dept. of Fisheries, Wildlife, and Conservation Biology, St. Paul
Observe live monarchs throughout their life cycle to learn about their biology and how you can raise these fascinating organisms in your classroom.

Uncovering Students' and Teachers' Ideas in Science (Gen)
(General) *MHB-1D, Convention Center*
Page Keeley (pagekeeley@gmail.com), 2008–2009 NSTA President, Jefferson, Maine
Joyce B. Tugel (jtugel@mmsa.org), Maine Mathematics and Science Alliance, Augusta
Learn about and experience a variety of probes and interactive strategies for uncovering students' and teachers' ideas for the purpose of informing instruction and promoting learning.

Inspiring Achievement Through Rigorous, Innovative, and Authentic Experiences (Gen)
(Elementary) *MHB-2A, Convention Center*
Allison Silvaggio (asilvaggio@adams50.org), Colorado STEM Academy, Westminster
Leave with a deeper understanding of how to provide authentic STEM-based experiences utilizing science standards, excursions, and technology. Join us for a memorable hands-on activity and receive resources.

Genomics and Personalized Medicine: Teaching Tomorrow's Science (Bio)
(High School–College) *MHB-4C, Convention Center*
Margaret Franzen (franzen@msoe.edu) and **Tim Herman** (herman@msoe.edu), Milwaukee School of Engineering, Milwaukee, Wis.
Learn how genome sequencing is done using engaging hands-on teaching tools and explore examples of how genome sequencing has helped to diagnose and treat patients.

Scaffolding Science Instruction in the Secondary Classroom (Gen)
(Middle Level–High School) *MHB-4E, Convention Center*
Mark Little (mark.little@bvsd.org), Broomfield High School, Broomfield, Colo.
In this workshop, you will learn about scaffolding teaching techniques and engage in a lab activity. Handouts!

Effective Approaches for Addressing the Next Generation Science Standards in the Earth and Space Science Classroom (Earth)
(Elementary–High School) *Centennial A–C, Hyatt*
Roberta M. Johnson (rmjohnsn@gmail.com), NESTA, Boulder, Colo.
Margaret A. Holzer (mholzer@monmouth.com), Chatham High School, Chatham, N.J.
This NESTA hands-on workshop highlights lessons and strategies using the NGSS crosscutting concepts to unite core ideas and science and engineering practices for the geoscience classroom.

9:30–10:30 AM Exhibitor Workshops

NABT Session: HHMI’s *Changing Planet: Past, Present, Future* (Earth)

(Grades 9–College) 205, Convention Center

Sponsor: Howard Hughes Medical Institute
Anthony Bertino and **Patricia Nolan Bertino**, Retired Educators, Scotia, N.Y.

What did life on Earth look like three billion years ago? How has Earth’s climate changed in the last two million years? What does Earth’s climate in the distant past tell us about the future? Join us as we explore these and other questions using HHMI’s latest *Holiday Lectures on Science* DVD, *Changing Planet: Past, Present, Future*. Participants will receive free classroom-ready resources to use in their life, Earth, and environmental science classes.

Engineering in the Next Generation Science Standards (Gen)

(Grades 9–12) 303, Convention Center

Sponsor: It’s About Time
Lee Pulis, It’s About Time, Mount Kisco, N.Y.

The NGSS will break from previous documents by merging science and engineering. This workshop will illustrate how a new high school curriculum—Engineering the Future: Science, Engineering, and the Design Process—can help students learn core ideas about energy by designing, building, and testing various structures.

I Want to Be a Science Teacher— Now What?

Are you a preservice or new teacher interested in learning more about the science education profession? Join us for an interactive session with experienced teachers and NSTA Staff.

Friday, December 13
2:00–3:00 PM
Colorado Convention Center
112

NSTA National Science Teachers Association

9:30–11:30 AM NSTA ESP Symposium

ESP: Unique Features of Programs That Meet “More Emphasis” Features in the NSES (Gen)

(General) 506, Convention Center

The Standards offered but Four Goals/Justifications for Science in K–6 Settings, namely that all students would: 1) Experience the richness and excitement of knowing about and understanding the natural world; 2) Use appropriate scientific processes and principles in making personal decisions; 3) Engage intelligently in public discourse and debate about matters of scientific and technological concern; and 4) Increase their economic productivity through the use of the knowledge, understandings, and skills of the scientifically literate person in their careers.

The ESP series identifies people and places where the reforms recommended have emerged. The exemplars include: 1) Exemplary Science in Grades PreK–4; 2) Exemplary Science in Grades 5–8; 3) Exemplary Science in Grades 9–12; 4) Exemplary Science: Best Practices in Professional Development; 5) Inquiry: The Key to Exemplary Science; 6) Exemplary Science in Informal Education Settings; 7) Exemplary Science for Resolving Societal Challenges; 8) Exemplary Programs for Building Interest in STEM Careers; and 9) Exemplary College Science Teaching.

The series was conceived by Robert E. Yager (1982–1983 NSTA President), who continues ESP searches and ways of recognizing classroom successes while also encouraging more to try!

Coordinators:

Robert E. Yager (*robert-yager@uiowa.edu*), 1982–1983 NSTA President, and University of Iowa, Iowa City

Susan B. Koba (*skoba@cox.net*), Science Education Consultant, Omaha, Neb.

Symposium Participants:

Modeling: Changes in Traditional Physics Instruction

Earl Legleiter (*elegleiter@hotmail.com*), Legleiter Science Consulting, Englewood, Colo.

Community of Excellence in Mathematics and Science

Susan B. Koba (*skoba@cox.net*), Science Education Consultant, Omaha, Neb.

Teaching Science with Pictures

Karl Spencer (*karl.spencer@visualrealization.com*), The Visual Realization Program, Houston, Tex.

10:00–11:15 AM Exhibitor Workshops

The NGSS...and the CCSS? Reflection and Application of *Common Core State Standards*, in English Language Arts and Mathematics Integration K–8 (Gen)

(Grades K–8) 104, Convention Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Let’s reflect on the makeup of the *Next Generation Science Standards*—disciplinary core ideas, science and engineering practices, crosscutting concepts, and performance expectations. We’ll apply this knowledge and understanding to integrate the *Common Core State Standards*, in English language arts and mathematics connections. Leave with tools that can make resource selection simpler for your district.

PASCO’s SPARKscience for K–8 Students—Free Starter Kits for Attendees! (Gen)

(Grades K–8) 106, Convention Center

Sponsor: PASCO scientific

Jason Lovell, PASCO K–12 Education Consultant, San Diego, Calif.

Learn how SPARKscience engages students in science and engineering practices, affording a deeper understanding of scientific concepts. Participate in investigations to experience real-time data collection with probeware and SPARKvue® software. Free probeware starter kits, including five sensors and USB interface (a \$600 value), will be given to 20 lucky attendees!

Student Collaboration in the Science Classroom

(Gen)

(Grades 6–9) 107, Convention Center

Sponsor: eCYBERMISSION

Sue Whitsett (*swhitsett@nsta.org*), eCYBERMISSION Outreach Manager, NSTA, Arlington, Va.

Grades 6–9 students will either jump (literally) at the idea of working in a group or loathe the idea. Many teachers want their students to work in groups, but how can this be done efficiently and successfully? How can problems with group work be resolved? How can group work enhance the learning for ALL students and be a benefit to the teacher? This session will work to answer these questions and share how a new NSTA competition, eCYBERMISSION, sets up and uses groups to solve a scientific or engineering problem.

Molecular Modeling and the Revised AP Chemistry Curriculum Framework—Challenges and Opportunities (Chem)

(Grades 9–College) 109, Convention Center

Sponsor: Wavefunction, Inc.

Jurgen Schnitker (sales@wavefun.com), Wavefunction Education Labs, Irvine, Calif.

The new 2013–2014 Curriculum Framework introduces a slew of issues to the teaching of AP Chemistry. Bring your laptop (Windows or Mac OS X) to this hands-on workshop, install *ODYSSEY* AP Chemistry, and learn how to teach with molecular modeling software that is routinely encountered in college chemistry classes.

Renewable Energy (Phys)

(Grades 5–10) 304, Convention Center

Sponsor: K’NEX Education

Presenter to be announced

Explore Going Green renewable energy with your students! It’s designed to address critical STEM concepts and provide instructional models that can enhance students’ understanding of these concepts. Build a model and demonstrate how it can be operated with electricity generated from wind, water, and solar power. Explore other models that complete real-world tasks with these same three renewable power sources.

Plate Tectonics: Continents on the Move (Earth)

(Grades 6–12) 402, Convention Center

Sponsor: Simulation Curriculum Corp.

Herb Koller (hkoller@simcur.com), Simulation Curriculum Corp., Minnetonka, Minn.

Join us as we use Simulation Curriculum’s *The Layered Earth* to investigate continental drift and the theory of plate tectonics. Classroom-ready lessons engage students with interactive learning activities, thought-provoking exercises, and historical links while displaying a contextual and interactive model of Earth.

Cool! Can We Do That Again?! (Gen)

(Grades 1–8) 403/404, Convention Center

Sponsor: Educational Innovations, Inc.

Jeff Feidler, Educational Innovations, Inc., Bethel, Conn. Tired of hearing “Do we have to do that?” from your students? Come check out some of the coolest activities involving color, light, and mirrors. Your students will be asking if they can do that again! Door prizes, freebies, and fun!

The NGSS and Science Practices—More Than Photo-shopping Models’ Flaws (Gen)

(Grades 6–8) 405, Convention Center

Sponsor: Sangari Active Science

Marilyn Schmidt (mschmidt@sangariglobaled.com), Educational Resource Specialist, Sangari Active Science, Centennial, Colo.

What comes to mind when you hear the word “model”? Solar system mobiles? Cells in pie plates? The NGSS requires going beyond the models used in science for years! Come engage in modeling activities for middle-schoolers and unpack how to think about current models in use in ways consistent with the NGSS.

Unleashing Your Students’ Inner Inventor—Robots, Video Games, and DIY! (Gen)

(Grades 8–College) 406, Convention Center

Sponsor: SparkFun Electronics

Brian Huang (brian.huang@sparkfun.com) and **Jeff Branson** (jeff.branson@sparkfun.com), SparkFun Electronics, Boulder, Colo.

In this workshop, we’ll use the wildly popular Arduino micro-controller platform to explore creative project-based learning through programming and 21st-century digital literacy. This workshop assumes no previous experience.

Chemical and Environmental Technology (Env)

(Grades 8–12) 407, Convention Center

Sponsor: Fisher Science Education

Robert Marshall (marshallr@carnegiesciencecenter.org), Carnegie Science Center, Pittsburgh, Pa.

Chemical and environmental science just got techy! Flip your classroom with innovative lab solutions that can put the power in your students’ hands and make your preparation a breeze—from water quality testing to chemical cleanup. Familiarize yourself with real-world environmental techniques and fun chemistry, and learn how these two tracks are merging into a single STEM career field. If you have an iPhone, iPad, or iPod, please bring it. If not, we will share ours.

10:00–11:30 AM Exhibitor Workshop

Integrate iPad and BYOD with Vernier Technology (Gen)

(Grades 3–College) 401, Convention Center

Sponsor: Vernier Software & Technology

Clarence Bakken (info@vernier.com), Retired Educator, Sunnyvale, Calif.

In this hands-on workshop, you will use Vernier’s digital tools such as probeware to conduct an investigation with either Graphical Analysis for iPad or Vernier Data Share for tablets, Chromebooks, and BYOD environments. These tools can help you address the NGSS practices and performance expectations, as well as many states’ standards.



11:00 AM–12 Noon Presentations

SESSION 1

Integrating Science and Literacy (Gen)

(Elementary–Middle Level) 108/110, Convention Center

Linda J. Morris (linda_morris@dpsk12.org), Denver (Colo.) Public Schools

Join me and watch a video of Denver Public School elementary students integrating science and literacy using CER (Claims, Evidence, Reasoning) pedagogy developed by McNeill and Krajcik.

SESSION 2

Creating K–6 Classrooms That Embrace Science Inquiry: Helping Students Think, Apply Problem-solving Skills, and Unleash and Engage Their Curiosities (Gen)

(Elementary) 111/113, Convention Center

Donna L. Knoell (dknoell@sbcglobal.net), Educational Consultant, Shawnee Mission, Kans.

Let’s discuss what inquiry encompasses and how to create a classroom environment that embraces it. I’ll share the benefits of teaching science as inquiry, including the student learning and engagement that result. Handouts!

SESSION 3

Creative Problem Solving with Toshiba/NSTA ExploraVision (Gen)

(General) 112, Convention Center

Barbara R. Pietrucha, Point Pleasant, N.J.

Motivate students and challenge them to think creatively! Learn how the ExploraVision competition encourages developmental skills necessary for success in STEM and utilizes the natural curiosity of students to enhance their science achievement. ExploraVision activities illustrate standards

based connections between science and technology. Session participants have an increased chance to win a Toshiba product!

SESSION 4

Magical Illusions for Science—It’s Showtime! (Gen)

(General) 502, Convention Center

Alan McCormack (amccorma@mail.sdsu.edu), 2010–2011 NSTA President, and San Diego State University, San Diego, Calif.

Storylines, discrepant events, and magic develop concepts in both physical and biological sciences, pique students’ interest and imagination, and build creative and logical thinking skills.

SESSION 5

Enhancing Chemistry Activities to Develop Science and Engineering Practices (Chem)

(High School) MHB-1A, Convention Center

Angela R. Powers (arpowers@comcast.net), Metropolitan State University of Denver, Colo.

Expand your knowledge of how modeling and investigations in introductory chemistry can be modified to explicitly address science and engineering practices emphasized in the new science education standards.

SESSION 6**STEM Inquiry and Problem-Based Learning (PBL)
(Gen)***(Elementary)**MHB-2A, Convention Center***Allison Silvaggio** (*asilvaggio@adams50.org*), Colorado STEM Academy, Westminster

Authentic inquiry promotes STEM students in PBL settings. See developed, unique, and innovative solutions. Join us for authentic experiences with scientists, researchers, experts, and high-tech presentations.

SESSION 7**Stories from Earth: Teaching About Changing Landscapes Using 25 Years of Satellite Observations
(Earth)***(General)**MHB-2B, Convention Center***Peder Nelson** (*peder.nelson@oregonstate.edu*), Oregon State University, Corvallis

Connect your students with the natural and human-caused landscape changes using Landsat satellite imagery to research and collect data to inform their understanding of Earth science.

SESSION 8**NSELA Session: Tools for Science Leaders, Part 2
(Gen)***(General)**MHB-4A, Convention Center***Darlene Ryan** (*dryan@chccs.k12.nc.us*), Glenwood Elementary School, Chapel Hill, N.C.**Elizabeth A. Allan** (*eallan@uco.edu*), University of Central Oklahoma, Edmond

The various tools and strategies shared with science leaders in this session support them in their work to enhance teaching and learning in their context.

SESSION 9 (two presentations)*(General)**MHB-4B, Convention Center***Making the Connection Between Formal and Informal Education
(Gen)****Tanya M. Breeling** (*tanya.breeling@dmns.org*), Denver Museum of Nature & Science, Denver, Colo.

Come hear about partnership programs offered through Denver Museum of Nature & Science that make the connection between informal and formal education.

**Participating in the Eclipse Megamovie
(Earth)****Scott W. McIntosh** (*mscott@ucar.edu*), NCAR, Boulder, Colo.

In 2017, a total solar eclipse will cross the entire continental United States. We are excited to start a collaboration with teachers and students about how to participate.

SESSION 10**Science in the Clouds
(Gen)***(Elementary–High School)**MHB-4E, Convention Center***Kathryn McEntire** (*kmcentire@jps.k12.co.us*), Littleton Academy, Littleton, Colo.

Come explore the tools available in the web that work in enhancing student engagement, learning, and ownership.

11:00 AM–12 Noon Workshops**ACS Middle Level Session: Density—A Molecular View
(Chem)***(Middle Level)**201, Convention Center***James H. Kessler**, American Chemical Society, Washington, D.C.

Explore the density of different materials on the molecular level through hands-on activities and animations from the free completely developed 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans in www.middleschool-chemistry.com.

**ACS Session Three: Entropy—Energy Transfer
(Chem)***(High School)**203, Convention Center***Jerry A. Bell** (*j_bell@acs.org*), American Chemical Society, Washington, D.C.

Net energy transfer is always one way—from warmer objects to cooler objects. Combining molecular views of entropy and energy helps us understand why. The combination can also lead to an understanding of the conditions for equilibrium. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

ASEE Session: ASEE’s K–12 Outreach Program, eGFI: Engineering, Go For It and the Marshmallow Challenge (Gen)

(General) 207, Convention Center

Malinda Zarske (malinda.zarske@colorado.edu), University of Colorado, Boulder

The American Society for Engineering Education and its K–12 division will introduce teachers to innovative ways to bring engineering into the K–12 classroom.

AAPT Session: E.T. Phone Home (Phys)

General) 210/212, Convention Center

Elaine Gwinn (jgwinn@shenandoah.k12.in.us) Shenandoah High School, Middletown, Ind.

Experience a lesson developed by the Perimeter Institute designed to help students understand abstract concepts relating GPS and relativity. You can’t “phone home” without it.



NSTA Press® Session: Next Time You See a Sunset, a Seashell, a Firefly... (Gen)

(Elementary) 501, Convention Center

Emily Morgan (emily@pictureperfectscience.com), Picture-Perfect Science, LLC, West Chester, Ohio

The author of NSTA’s new *Next Time You See* picture book series will demonstrate some before- and after-reading activities that can inspire a sense of wonder in your students!

Chemical Nomenclature Rummy: Naming Compounds and Ion Combination Rules (Chem)

(Middle Level–High School) MHB-1B, Convention Center

Mark D. Greenman, Boston University, Boston, Mass.

Discover a fun student-centered activity using a Rummy-like card game to teach basic rules for ion combinations and naming ionic compounds.

The Human Microbiome (Bio)

(High School) MHB-1C, Convention Center

Louisa Stark (louisa.stark@utah.edu), University of Utah, Salt Lake City

Explore the ecosystem of the human body. Learn what we’re discovering about the body’s microbes and how they influence our health. Visit learn.genetics.utah.edu for free materials.

NASA Brings You Newton’s Laws of Motion (Phys)

(Middle Level–High School) MHB-1E, Convention Center

David P. Beier, The Barstow School, Kansas City, Mo.

Come join a NASA Astrophysics Ambassador for 25 hands-on Newton’s laws of motion activities. Lots of free NASA materials plus access to the website with all of these activities in detail, along with assessment ideas. Plan to be active for this workshop.

Fermi Problems with the Fermi Space Telescope (Earth)

(Middle Level–College) MHB-2C, Convention Center

Robert T. Sparks (rspark@noao.edu), National Optical Astronomy Observatory, Tucson, Ariz.

Add new learning to your science classroom. Encounter simple mathematical tricks you can use to estimate anything from the number of grains of sand on a beach to the number of atoms in the universe!



Making Gas from Grass in the Classroom: Integrating the Practices of Science and Engineering (Bio)

(High School–College) MHB-3A, Convention Center

John M. Greenler (jgreenler@glbc.wisc.edu) and **Leith Nye**, University of Wisconsin–Madison

Fuel new learning in your classroom. Learn about simple engineering- and science-informed techniques to convert cellulosic biomass sources such as grass, sawdust, and corn stover into biofuels.



Make-and-Take: Science, Literacy, and Math (Gen)

(Preschool–Elementary) MHB-3B, Convention Center

Teresa Higgins (teresa.higgins@unco.edu) and **Youngjin Song** (youngjin.song@unco.edu), University of Northern Colorado, Greeley

Foster new ideas to engage learners with integrated science activities that you make on-site and then take back to the classroom. Resources and standards and literacy/math connections provided with materials.



NASA Engineering Activities Under \$1! (Phys)

(Middle Level) MHB-3C, Convention Center

Samantha M. Rogers (samantha.m.rogers@nasa.gov), NASA Kennedy Space Center, Fla.

Help students understand the engineering design process in your classroom using items you already have or can find at a dollar store. Discover six activities you can use in your classroom, including a hands-on activity to build a landing system that will protect two “astronauts.”

Using Models and Motion for DNA and Protein Synthesis (Bio)

(High School–College) *MHB-4C, Convention Center*
Carol A. Robertson (*crobertson@fulton58.org*), Fulton High School, Fulton, Mo.

Engage in kinesthetic activities and build inexpensive models to help students learn DNA structure, DNA replication, and protein synthesis.

Powerful Strategies to Accelerate the Acquisition and Retention of Science Vocabulary (Gen)

(Middle Level–High School) *MHB-4D, Convention Center*
Joanne M. Billingsley (*jbillingsley@satx.rr.com*), San Antonio, Tex.

Encounter new research-based techniques that can turn mundane vocabulary assignments into a multisensory experience, in which students hear, see, and use new vocabulary words. Tap into the power of music, technology, and imagery to enhance science literacy.

Analyzing Data on Mountain Gorillas' DNA Fingerprints and Ecosystems (Gen)

(General) *MHB-4F, Convention Center*
Laura Arndt (*laura.arndt1@gmail.com*), Antelope Ridge Elementary School/Nature Connections, Aurora, Colo.

Who's the dad? What do gorillas eat? Make DNA fingerprinting and food webs real as students interpret actual data on mountain gorillas to uncover mysteries.

Effective Strategies for Sharing Climate Change Science and Energy Consumption Implications in the Classroom (Earth)

(Elementary–High School) *Centennial A–C, Hyatt*
Roberta M. Johnson (*rmjohnsn@gmail.com*), NESTA, Boulder, Colo.

Margaret A. Holzer (*mholzer@monmouth.com*), Chatham High School, Chatham, N.J.

Explore the scientific foundations of what we know about climate change, greenhouse gases, and energy consumption through NESTA's effective hands-on and data-rich classroom activities.

11:00 AM–12 Noon Exhibitor Workshops**NABT Session: HHMI's *The Day the Mesozoic Died* Classroom Resources (Earth)**

(Grades 7–12) *205, Convention Center*
 Sponsor: Howard Hughes Medical Institute

Cindy J. Gay (*cgay@sssd.k12.co.us*), Steamboat Springs High School, Steamboat Springs, Colo.

Discover how HHMI's short film *The Day the Mesozoic Died* can enrich your teaching of the nature and power of the scientific method. The film follows scientists as they uncover key clues leading to the stunning conclusion that an asteroid impact 66 million years ago triggered a mass extinction of animals, plants, and even microorganisms. Participants will receive free lessons and activities that address key concepts presented in the film, emphasizing the connections among all science disciplines.

Active Physics—Ahead of Its Time in Capturing the Essence of the NGSS and STEM (Phys)

(Grades 9–12) *303, Convention Center*
 Sponsor: It's About Time

Arthur Eisenkraft, UMass Boston, Mass.

Learn from the author, Dr. Arthur Eisenkraft, how this proven program implements STEM and the essence of the *Next Generation Science Standards*. Understand the benefits of the Engineering Design Cycle and learn how physicists, teachers, and science educators designed this project-driven course, which is recognized for the positive impact it has on students of all levels.

12 Noon–1:15 PM Exhibitor Workshops**Bring Visual Science into K–8 Classrooms—It's a Game Changer! (Gen)**

(Grades K–8) *104, Convention Center*
 Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Learn techniques to engage students in visual, auditory, and hands-on science learning. Harvey Bagshaw discusses and models how he teaches science with video and activities to support blended learning. Discover how to integrate compelling visuals and video and receive a one-year subscription to Carolina's Tigtag or Twig online video-based learning program.

**PASCO’s SPARKscience for High School Students—
Free Starter Kits for Attendees! (Gen)**

(Grades 9–12) 106, Convention Center

Sponsor: PASCO scientific

Jason Lovell, PASCO K–12 Education Consultant, San Diego, Calif.

Learn how SPARKscience engages students in science and engineering practices, affording a deeper understanding of scientific concepts. Participate in investigations to experience real-time data collection with probeware and SPARKvue® software. Free probeware starter kits, including five sensors and a USB interface (a \$600 value), will be given to 20 lucky attendees!

Introduction to Simple Machines (Phys)

(Grades 3–6) 304, Convention Center

Sponsor: K’NEX Education

Presenter to be announced

Explore the common expression “simple machines make work easier” and investigate hands-on strategies to help students understand simple machine technologies. Build and use K’NEX® simple machine models and discover that simple machines make work easier by multiplying force and distance as well as changing the direction of force. Standards-aligned STEM concepts related to simple machines will be stressed.

12 Noon–1:30 PM Exhibitor Workshop

Integrate iPad and BYOD with Vernier Technology (Gen)

(Grades 3–College) 401, Convention Center

Sponsor: Vernier Software & Technology

Clarence Bakken (info@vernier.com), Retired Educator, Sunnyvale, Calif.

In this hands-on workshop, you will use Vernier’s digital tools such as probeware to conduct an investigation with either Graphical Analysis for iPad or Vernier Data Share for tablets, Chromebooks, and BYOD environments. These tools can help you address the NGSS practices and performance expectations, as well as many states’ standards.

12:30–1:30 PM Featured Presentation

 **Engineering Speed: Using NASCAR to Engage Students in Math, Science, and Engineering (Gen)**

(General) 103/105, Convention Center



Diandra L. Leslie-Pelecky (diandra@diandra.info), Author of *The Physics of NASCAR*, and Professor of Physics, West Virginia University, Morgantown
@drdiandra

President: Teresa Coons, Strand Leader, Denver Area Conference, and John McConnell Math and Science Center, Grand Junction, Colo.

Science, technology, engineering, and mathematics play a unique role in motorsports. While other sports can be analyzed for STEM themes after the fact, racing is one of the few sports in which you must get the science, math, and engineering right in order to win. Motorsports are also unique in showcasing engineers on television, radio, and on the web, thus providing role models for those students constantly asking, “When am I ever going to use this?” Join Dr. Diandra Leslie-Pelecky as she introduces some existing classroom resources and addresses the biggest challenge in using real-life situations to teach STEM topics: What to do when the approximations and simplifications are non-negligible—as they are on a racetrack.

Dr. Diandra Leslie-Pelecky, a PhD physicist, was not a race fan...until the day she saw something on a television race broadcast that she couldn't explain. Her innate scientific curiosity—and inability to take “no” for an answer—led her to write The Physics of NASCAR, which takes readers behind the scenes to understand how race cars are optimized for speed and safety. Her time in the garage, at race shops, and even doing 160 mph on the track at Texas Motor Speedway fueled her quest to understand how the science and math of motorsports could be used to engage and teach students.

Diandra is currently a professor of physics at West Virginia University. Her research focuses on magnetic nanomaterials, structures that are a few thousandths the width of a human hair. The materials she and her research group develop are fundamentally interesting, but also have potential applications in improving magnetic resonance imaging and cancer treatment.

Diandra blogs about science and cars (at www.buildingspeed.org/blog) and is a weekly guest on Sirius Speedway on SiriusXM NASCAR radio, where she debunks common myths about NASCAR using science and scientific reasoning.

12:30–1:30 PM Presentations**SESSION 1****Engineering in the Science Classroom—We Put the “E” in STEM (Gen)***(General)* 112, Convention Center**Sue Whitsett** (swhitsett@nsta.org), eCYBERMISSION Outreach Manager, NSTA, Arlington, Va.

Many science teachers are working on bringing engineering (the “E” in STEM) into their science classes. But with limited time, state requirements, and plenty of science content to cover, it can be a challenge. This session will help you understand the value of having engineering in your science class and give you some tips on how to make the integration seamless. There will also be an explanation of the eCYBERMISSION competition and how it relates to engineering in the science classroom.

SESSION 2**NSTA Press® Session: Rise and Shine: A Practical Guide for the Beginning Science Teacher (Gen)***(Middle Level–High School)* 501, Convention Center**Linda Froschauer** (fro2@me.com), 2006–2007 NSTA President, and Field Editor, *Science & Children*, Westport, Conn. **Mary L. Bigelow** (tramaire@gmail.com), Retired Educator, Middletown, Pa.

Are you new to science teaching? Do you mentor new teachers? We’ll share strategies to help new teachers be successful from the very first day.

SESSION 3**Dazzling Deceptions: Discrepant Events That Delight and Mystify! (Gen)***(General)* 502, Convention Center**Alan McCormack** (amccorma@mail.sdsu.edu), 2010–2011 NSTA President, and San Diego State University, San Diego, Calif.

Join me and discover how science experiences that seem contrary to “common sense” can be great motivators.

SESSION 4**Using Modeling Activities in the High School Chemistry Class (Chem)***(Supervision/Administration)* 507, Convention Center**Michael T. Mury** (m_mury@acs.org), American Chemical Society, Washington, D.C.

Visualization is difficult for many students. Join me for a discussion and demonstration of several modeling activities you can use in your chemistry class.

SESSION 5**Corrosion Is Everywhere—Use It to Make Chemistry Relevant and Fun (Chem)***(High School)* MHB-1B, Convention Center**Debbie Goodwin** (nywin@hotmail.com), Chillicothe High School, Chillicothe, Mo.**Andrew Nydam** (andrewnydam@hotmail.com), Polymer Ambassador, Olympia, Wash.

Use corrosion to teach practical applications of chemistry concepts. Make reactivity, oxidation/reduction, solution chemistry, and corrosion engineering exciting and relevant. Handouts!

SESSION 6**Using Reading and Writing as a Tool in Science Instruction (Bio)***(Elementary–Middle Level)* MHB-1C, Convention Center**Linda S. Linnen** (lslinnen@aol.com), Retired Educator, Aurora, Colo.

This strategy-filled presentation will arm participants with many applications for teaching science and literacy simultaneously. Receive materials, handouts, and ideas to take home for immediate classroom implementation.

SESSION 7**The True Path: Science and Math Integrated Curriculum for Teacher Professional Development (Phys)***(General)* MHB-1E, Convention Center**Jiyoon Yoon** and **Joohi Lee** (joohilee@uta.edu), The University of Texas at Arlington

Review a research project that developed a science and math integrated curriculum for teacher professional development and investigate its effectiveness.

SESSION 8**Distance Learning—Making Science Personally Relevant! (Gen)***(General)* MHB-1F, Convention Center**Gianna M. Sullivan** (gianna.sullivan@dmns.org), Denver Museum of Nature & Science, Denver, Colo.

Explore how distance learning personally engages students in scientific discoveries and career paths. Learn how distance learning technology is changing, and experience collaborative opportunities outside your classroom walls.

SESSION 9



Let's Get Physical: Force and Motion (Gen)

(Preschool–Elementary) MHB-2A, Convention Center

Juliana Texley (jtexley@att.net), NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.

Ruth Ruud (ruth.ruud@yahoo.com), Venice, Fla.

Don't look now—but the CCSS asks that you teach physical science as early as kindergarten, and the NGSS have very specific goals for the early primary. No more procrastinating. The good news is that you already have your equipment. Come get easy activities, lit links, and basic teacher background so that you can start right away.

SESSION 10



Sensational Science: Step-by-Step Strategies Across the Curriculum (Gen)

(Elementary) MHB-3B, Convention Center

Jennifer M. Troncale (jtroncal@jsu.edu), Jacksonville State University, Jacksonville, Ala.

This session will pass on the love of science through strategies that connect to the *Common Core State Standards*, in English language arts and mathematics.

SESSION 11

NARST Session: Use of Evidence and Standards-based Reflection in Elementary Science Methods (Gen)

(General) MHB-4A, Convention Center

Wendy P. Ruchti (ruchwend@isu.edu), Idaho State University, Pocatello

Emphasis will be placed on an analysis of preservice elementary science teachers' ability to reflect on their teaching through prompts that required claims and evidence.

12:30–1:30 PM Workshops

Igniting Interest and Engaging Learning with 3-D Graphic Organizers (Gen)

(General) 108/110, Convention Center

Kathie A. Hogen, Arizona State University, Phoenix

See how to turn on the motivation factor with 3-D graphic organizers and discover how to morph student notebooks into dimensional, individualized, and brain-smart tools.

ACS Middle Level Session: The Periodic Table, Energy Levels, and Bonding (Chem)

(Middle Level) 201, Convention Center

James H. Kessler, American Chemical Society, Washington, D.C.

Explore the periodic table and bonding through a card game, molecular animations, and video from the free, completely developed 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans in www.middleschoolchemistry.com.

ACS Session Four: Electromagnetic Radiation Energy (Chem)

(High School) 203, Convention Center

Jerry A. Bell (j_bell@acs.org), American Chemical Society, Washington, D.C.

The energy of electromagnetic radiation (light) is evident to anyone standing in the sunlight on a bright summer day. Less obvious is the radiation emitted by the warmed planetary sur-

face. The characteristics of these electromagnetic radiations and their consequences are important for maintaining life as we know it on Earth. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

NABT Session: Linking Evidence, Claims, and Inquiry (Bio)

(High School–College) 205, Convention Center

Cindy J. Gay (cgay@sssd.k12.co.us), Steamboat Springs High School, Steamboat Springs, Colo.

Robin I. Walters (robinwalters63@gmail.com), Sand Creek High School, Colorado Springs, Colo.

Mark Little (mark.little@bvsd.org), Broomfield High School, Broomfield, Colo.

Tamara M. Pennington (tamara.p@sidsolve.com), Windsor High School, Windsor, Colo.

President: Cindy J. Gay

Experience a powerful tool to help students make evidence-based claims. Join AP Biology Leadership Academy members to link student inquiry with deep understanding of content.

ASEE Session: Challenge Your High School Students: Engineer Your World (Gen)

(High School) 207, Convention Center

Cheryl Farmer (cheryl.farmer@mail.utexas.edu), The University of Texas at Austin

Presider: Malinda Zarske (malinda.zarske@colorado.edu), University of Colorado, Boulder

Experience how *Engineer Your World* engages students in authentic engineering practice through design. Learn about implementation grants to help bring this innovative course to your school.

AAPT Session: iModel, iCollaborate, and iInvestigate: Using iPads in the Science Classroom (Phys)

(General) 210/212, Convention Center

Mary Beth Cheversia (che015005@adams12.org), Thornton High School, Thornton, Colo.

Susan Nicholson-Dykstra (nic014314@adams12.org), Northglenn High School, Northglenn, Colo.

Ben Van Dusen (benjamin.vandusen@colorado.edu), University of Colorado, Boulder

In this hands-on workshop, participants will explore apps and create exemplars that allow students to create models, collaborate, and conduct investigations in the science classroom.

Addressing Student Misconceptions (Gen)

(General) 503, Convention Center

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

Sandra Weeks (sweeks@mcrel.org), McREL, Denver, Colo. Students can provide the right word, definition, or formula, yet still hold misconceptions. Learn more about an instructional process that teachers can use to address misconceptions. Handouts!

Bringing Renewable Energies Back to the Classroom (Chem)

(Middle Level–High School) MHB-1A, Convention Center

Stephan Graham (sgraham@arrupemail.org), Arrupe Jesuit High School, Denver, Colo.

Linda D. Lung (linda.lung@nrel.gov) and **Marcus Giron** (marcus.giron@nrel.gov), National Renewable Energy Laboratory, Denver, Colo.

Presider: Linda D. Lung

The National Renewable Energy Laboratory offers an exciting one-week hands-on Energy Institute for Teachers to incorporate renewable energy and energy efficiency components into existing middle and high school science curricula.

Modeling—Water, Water Everywhere (Bio)

(Middle Level–High School) MHB-1D, Convention Center

Margaret Franzen (franzen@msoe.edu) and **Tim Herman** (herman@msoe.edu), Milwaukee School of Engineering, Milwaukee, Wis.

Come use engaging magnetic water models to explore why water is so essential to life. We'll use an inquiry approach to explore water properties. Handouts!

Hands-On Learning with GLOBE (Env)

(Elementary–Middle Level) MHB-2B, Convention Center

Julie Malmberg (malmberg@globe.gov) and **Kristin Wegner** (kwegner@globe.gov), The GLOBE Program, Boulder, Colo.

Grab your students' attention with Elementary GLOBE story-books for K–4 as well as other hands-on science activities for grades K–8.

Seeing the Invisible Universe (Earth)

(Middle Level–High School) MHB-2C, Convention Center

Robert T. Sparks (rsparks@noao.edu), National Optical Astronomy Observatory, Tucson, Ariz.

Examine the invisible universe through the lens of light. Find out how astronomers use light beyond the visible spectrum to study the universe with hands-on activities. Free NASA materials!

CESI Session: Get on Board with CESI and NASA's International Space Station (Earth)

(Elementary–Middle Level) MHB-3C, Convention Center

Julie Thomas (julie.thomas@unl.edu), University of Nebraska–Lincoln

Participate in K–8 hands-on activities and learn how NASA's Teaching From Space (TFS) resources provide classroom access to NASA missions, NASA experts, and NASA equipment.

Bringing the Zooniverse into the Classroom (Gen)

(Informal Education) MHB-4B, Convention Center

Kelly Borden (kborden@adlerplanetarium.org), Adler Planetarium, Chicago, Ill.

Zooniverse.org is a collection of online citizen science projects. Join us to find out how your students can contribute to science using real data.

Preparing Students for Guided Inquiry in AP Chemistry (Chem)

(High School–College) *MHB-4C, Convention Center*
Serena Magrogan (*smagrogan@collegeboard.org*), The College Board, Duluth, Ga.

Engage in a guided inquiry learning experience and learn how to transform teacher-directed labs into inquiry-based labs for the redesigned AP Chemistry course.

Planning and Designing Safe, Sustainable, and Flexible Facilities for STEM-based Science (Science Facilities 101) (Gen)

(General) *MHB-4D, Convention Center*
LaMoine L. Motz (*llmotz@comcast.net*), 1988–1989 NSTA President, and Science Education/Facilities Specialist, White Lake, Mich.

So you want new science facilities? Does your curriculum define your science teaching facility? With more than 20 years of conducting visits and presentations of new and renovated school science facilities, join the author team of *NSTA Guide to Planning School Science Facilities*, 2nd edition, and learn the “basics” of science facility planning, design, and budgeting for safe and sustainable facilities.

Putting It All Together: Developing Connections Between the CCSS and the NGSS (Gen)

(General) *MHB-4E, Convention Center*
David W. Brothers (*davidbrothers@wentzville.k12.mo.us*) and **Keri Skeeters** (*keriskeeters@wentzville.k12.mo.us*), Wentzville (Mo.) R-IV School District

Join us for engaging activities that reveal close relationships

among the NGSS science and engineering practices, CCSS Mathematics, and CCSS ELA.

Using Forensics: Wildlife Crime Scene! to Solve a Wildlife Crime, Part 2 (Gen)

(Informal Education) *MHB-4F, Convention Center*
Laura Arndt (*laura.arndt1@gmail.com*), Antelope Ridge Elementary School/Nature Connections, Aurora, Colo.

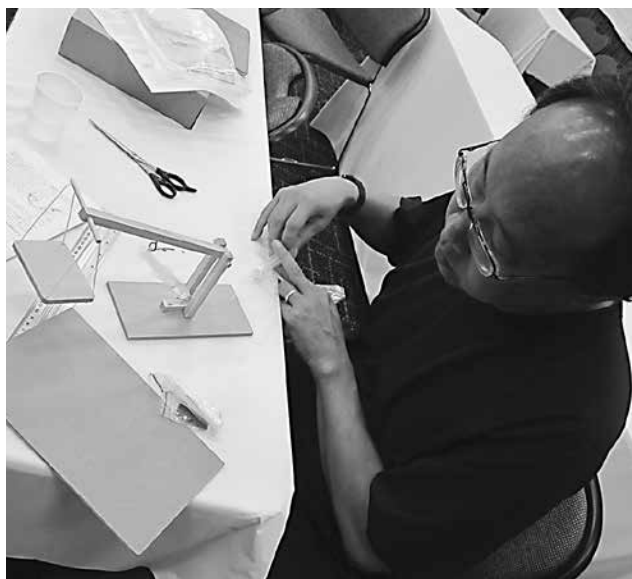
Investigate and solve a local wildlife crime by analyzing forensic evidence and clues from crime scene interviews. This workshop is facilitated by an NSTA Press author. *Note:* Part 1 (page 62) is not a prerequisite.

High-Impact Classroom Earth Science in a STEM World (Earth)

(Elementary–High School) *Centennial A–C, Hyatt*
Roberta M. Johnson (*rmjohnsn@gmail.com*), NESTA, Boulder, Colo.

Presider: Margaret A. Holzer (*mholzer@monmouth.com*), Chatham High School, Chatham, N.J.

This NESTA workshop presents exemplary activities addressing fundamental concepts in Earth system science with an emphasis on the solid Earth, STEM practices, and the NGSS.



12:30–1:30 PM Exhibitor Workshop

Active Chemistry—Ahead of Its Time in Capturing the Essence of the NGSS and STEM (Chem)

(Grades 9–College) *303, Convention Center*
Sponsor: It’s About Time

Arthur Eisenkraft, 2000–2001 NSTA President, and UMass Boston, Mass.

Before the NGSS or STEM, Dr. Arthur Eisenkraft recognized the need and developed this proven program, which can help you implement STEM and the essence of the *Next Generation Science Standards*. See the Engineering Design Cycle and learn how chemists, teachers, and science educators designed a true project-driven course for Next Generation students of all levels.

12:30–6:00 PM Symposium**Flight of the Monarch Butterflies (SYM-1)**

(Grades K–12) *Denver Museum of Nature & Science*
Tickets Required; \$54

Ann Hobbie (ann.s.hobbie@gmail.com) and **De Cansler** (decansler@gmail.com), University of Minnesota Dept. of Fisheries, Wildlife, and Conservation Biology, St. Paul
 For description, see page 34.

1:00–1:30 PM Exhibitor Workshop**Shaping Earth (Earth)**

(Grades 5–12) *Booth #739, Exhibit Hall*
 Sponsor: Science First®/STARLAB®

Helmut Albrecht (halbrecht@starlab.com) and **Nathaniel Bell** (info@sciencefirst.com), Science First/STARLAB, Yulee, Fla.

This in-dome workshop introduces the internal and external processes that modified Earth's surface. By using an in-dome version of *The Layered Earth*, this lesson creates an immersive teaching experience.

1:00–2:30 PM Exhibitor Workshop**Ecology to Enzymes to Industry (AP Big Idea 4) (Bio)**

(Grades 10–College) *302, Convention Center*
 Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

In this inquiry-based hands-on workshop, learn to use ecological knowledge of the kingdom fungi to find and characterize novel cellobiase enzymes for application in cellulosic biofuel production. The enzyme cellobiase is easy to extract from mushrooms and a colorimetric system for assaying activity can be used to determine how pH, temperature, and concentrations affect the rate of reaction.

1:30–4:30 PM Short Course**Explore STEM Practices with Outdoor Biology Instructional Strategies (OBIS) (SC-4)**

(Grades K–8) *Agate, Hyatt*
Tickets Required; \$20

Joanna Snyder (joanna_snyder@berkeley.edu) and **Erica Beck Spencer** (ebspencer@berkeley.edu), The Lawrence Hall of Science, University of California, Berkeley
 For description, see page 36.

2:00–3:00 PM Presentations**SESSION 1**

Science Plus Literacy—Blended and Seamless (Gen)
 (Middle Level) *108/110, Convention Center*

Stacy Baum (stacybaum@comcast.net), Rocky Mountain PBS, Denver, Colo.

Inspire middle school literacy! Blended lessons to engage students in science topics while supporting CCSS ELA are free at pbslearningmedia.org. Raffle!

SESSION 2

STEM Projects for the Middle School Classroom (Gen)

(Middle Level) *111/113, Convention Center*

DJ West (djwest78@gmail.com), Schoolcraft College, Livonia, Mich.

This session will look at a variety of projects that can be used in middle school science to integrate STEM concepts into the classroom. Take home instructions for each of the projects discussed.

SESSION 3

I Want to Be a Science Teacher—Now What? (Gen)
 (General) *112, Convention Center*

Teshia Birts (tbirts@nsta.org), Senior Manager, Chapter Relations, NSTA, Arlington, Va.

Preservice teachers will join with experienced teachers and NSTA staff to guide this interactive hands-on session for students and new professionals.

SESSION 4

AAPT Session: The Physics of Karate: Demonstrating Work and Energy with a Varying Force (Phys)
 (General) *210/212, Convention Center*

Chuck Stone (cstone@mines.edu) and **Elise Dugwyler** (edugwyler@mymail.mines.edu), Colorado School of Mines, Golden

Come learn how to measure the amount of “work” that must be done to break a wooden board, and how much kinetic energy a karate chop can generate. You’ll leave this session with a better appreciation of how karate artists break wooden boards with their bare hands.

SESSION 5

Linking Science Writing and Research Through the DuPont Challenge (Gen)

General 502, Convention Center

Barbara R. Pietrucha, Point Pleasant, N.J.

Brian P. Short (*bshort@nsta.org*), Director, Science Education Competitions, NSTA, Arlington, Va.

Join us to learn a natural way of integrating research and writing into your curriculum that encourages developmental skills necessary for success in STEM and meets local, state, and national standards.

SESSION 6

The NSTA Learning Center: A Tool to Develop Preservice Teachers (Gen)

General 503, Convention Center

Flavio Mendez (*fmendez@nsta.org*), Senior Director, NSTA Learning Center, NSTA, Arlington, Va.

Come learn about a new online system to assist professors in creating customized e-textbooks for their preservice teachers using NSTA Learning Center interactive and e-print resources.

SESSION 7 (two presentations)

High School/Informal MHB-1A, Convention Center

Engaging Students in Chemistry Outside the Classroom: A Look at ChemClub (Chem)

Karen M. Kaleuati (*hschemclubs@acs.org*) and **Marta Gmurczyk** (*m_gmurczyk@acs.org*), American Chemical Society, Washington, D.C.

ChemClub provides high school students with a unique opportunity to experience chemistry beyond the classroom. Join us to learn about this free program and how to start your own chemistry club with free resources from the American Chemical Society.

Introducing the ChemMatters Compilation Project (Chem)

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

Steven Long (*slong@rps.k12.ar.us*), Rogers High School, Rogers, Ark.

Are you looking for free, high-quality, engaging reading materials and activities to integrate reading and chemistry? Come learn about this new resource from the American Chemical Society! Join us as we present the new *ChemMatters* compilation project, including past articles from *ChemMatters* with inquiry-based lesson plans correlated with the *Common Core State Standards, ELA* as well as the *Next Generation Science Standards*.

SESSION 8

Basic Polymer Science for the High School Classroom (Chem)

High School MHB-1B, Convention Center

Debbie Goodwin (*nywin@hotmail.com*), Chillicothe High School, Chillicothe, Mo.

Andrew Nydam (*andrewnydam@hotmail.com*), Polymer Ambassador, Olympia, Wash.

Simple demonstrations, labs, and activities bring polymers into your curriculum and make them relevant. Concepts include formation, classification, structure, and properties. Handouts!

SESSION 9

An Unbalanced Approach to Photosynthesis (Bio)

Middle Level–High School MHB-1C, Convention Center

Carol A. Robertson (*crobertson@fulton58.org*), Fulton High School, Fulton, Mo.

Discover what students think about photosynthesis and help them to overcome misconceptions while leaving a lasting legacy in the process.

SESSION 10

CSI Web Adventures (Bio)

Middle Level–High School MHB-1D, Convention Center

Yvonne Klisch (*yvonne.klisch@rice.edu*), Rice University, Houston, Tex.

Lynn Lauterbach (*lynnlauterbach@gmail.com*), Loveland, Colo.

Add some excitement to your classroom by using these free online resources to engage your students in accurate, up-to-date forensic science and to encourage STEM careers.

SESSION 11

Engaging Students, Developing Science Knowledge and Conceptual Understanding, and Teaching Science Literacy Skills with Quality Nonfiction Science Books (Gen)

General MHB-1F, Convention Center

Donna L. Knoell (*dknoell@sbcglobal.net*), Educational Consultant, Shawnee Mission, Kans.

Discover the advantages of using science trade books to build science knowledge, to teach science literacy skills, and to provide a platform for investigations. Emphasis will be placed on literacy strategies that help students read science text and communicate what they have learned. Outstanding science trade books will be showcased. Handouts!

SESSION 12**Forest Kindergartens: Creating a Lifelong Love of Science (Env)***(Preschool)**MHB-2A, Convention Center*

Erin K. Kenny (*cedarsongnatureschool@yahoo.com*), Cedarson Nature School, Vashon, Wash.

The Forest Kindergarten early childhood education model is distinguished by total nature immersion, inquiry-based teaching style, and flow learning. The outdoor setting leads young children to learning through a direct hands-on experience of their environment. Not only are these children well versed in basic natural science principles, but the teaching style also leads to greater problem-solving and advanced critical-thinking skills while setting up a lifelong love of science.

SESSION 13**Using Physics to Raise Hell (Earth)***(Middle Level–College)**MHB-2C, Convention Center*

David L. Esker (*david_esker@ymail.com*), Pikes Peak Community College, Colorado Springs, Colo.

I'll share a summary of evidence supporting the various hypotheses on what mechanism heats the interior of Earth and the other planets and moons of our solar system.

SESSION 14**Can a Shoebox Fly? (Gen)***(Middle Level–College)**MHB-3A, Convention Center*

Lisa O. Brown (*lobrown@shsu.edu*), Sam Houston State University, Huntsville, Tex.

Come hear about the NASA Digital Learning Network's program "Can a Shoebox Fly?" By integrating Project Based Learning into the classroom, students' attitudes toward science and engineering are impacted.

SESSION 15**NARST Session: Writing About Socio-Scientific Issues in Middle School to Increase Decision-making Skills (Env)***(Middle Level)**MHB-4A, Convention Center*

Meena M. Balgopal (*meena.balgopal@colostate.edu*), Colorado State University, Fort Collins

We will share various interdisciplinary, standards-based units, respective assessment materials, and accompanying research on student performance on written assessments in middle school classrooms.

**SESSION 16****30 Demos in 50 Minutes (Gen)***(Informal Education)**MHB-4B, Convention Center*

Wendy Adams (*wendy.adams@unco.edu*), University of Northern Colorado, Greeley

University of Northern Colorado secondary science teacher candidates will present at least 30 engaging demonstrations and share tips on the setup, materials, and underlying science concepts.

SESSION 17**Problem-Based Learning with Elementary Students (Gen)***(Elementary–Middle Level)**MHB-4E, Convention Center*

Eileen Patrick (*eileen.patrick@adams12.org*), STEM Magnet Lab School, Northglenn, Colo.

Learn to engage your students in authentic PBLs (Problem-Based Learning opportunities). We will share examples as well as challenges and opportunities on this important way to connect students to real-world learning.

SESSION 18**University–School District Partnerships to Address Recruitment of the Next Generation of Science Teachers (Gen)***(General)**MHB-4F, Convention Center*

Rob Reinsvold (*robert.reinsvold@unco.edu*) and **Lori A. Reinsvold** (*lori.reinsvold@unco.edu*), University of Northern Colorado, Greeley

Join us for a discussion on partnerships among universities and school districts that address the need for more science teachers. We'll focus on a successful Colorado partnership.

2:00–3:00 PM Workshops

ACS Middle Level Session: Polarity of the Water Molecule and Its Consequences (Chem)

(Middle Level) 201, Convention Center

James H. Kessler, American Chemical Society, Washington, D.C.

Explore water's characteristic properties and what makes water a polar molecule through hands-on activities and molecular animations from the free completely developed 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans in www.middleschoolchemistry.com.

ACS Session Five: Rates—Concentration and Half-Life (Chem)

(High School) 203, Convention Center

Jerry A. Bell (j_bell@acs.org), American Chemical Society, Washington, D.C.

The rates of chemical reactions cover an enormous range, from almost instantaneous explosions to geological changes that may take millions of years. Half-life is a familiar way to characterize many reactions, including the decay of radioactive nuclei often used as “clocks” to date past events. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

NABT Session: Understanding Enzymes (Bio)

(Middle Level–High School) 205, Convention Center

Mark Little (mark.little@bvsd.org), Broomfield High School, Broomfield, Colo.

Get introduced to enzymes and engage in a hands-on activity to help students understand enzymes and factors that influence rates of reactions.

ASEE Session: Young Rocket Engineers (Gen)

(General) 207, Convention Center

Bernadette Garcia Galvez (bgarcia@colorado.edu), University of Colorado, Boulder

Presider: **Malinda Zarske** (malinda.zarske@colorado.edu), University of Colorado, Boulder

Here's a surefire boost to your science classroom. Join us and learn about the NASA Space Grant Consortia Network and engineer an efficient rocket made with paper and fueled by your own lungs.

NSTA Press® Session: Stop Faking It! Finally Understand LIGHT AND SOUND So You Can Teach It (Phys)

(Elementary–Middle Level) 501, Convention Center

Bill Robertson (wrobert9@ix.netcom.com), Bill Robertson Science, Inc., Woodland Park, Colo.

Join the author of the *Stop Faking It!* books for activities from the *Light* and *Sound* books. We'll cover color addition and subtraction and interference of light and sound waves...and you'll learn how to write secret messages. Whoopee!

NSTA Press® Session: Uncovering Elementary Students' Ideas in Science (Gen)

(Preschool–Elementary) 505, Convention Center

Page Keeley (pagekeeley@gmail.com), 2008–2009 NSTA President, Jefferson, Maine

Discover how formative assessment probes and techniques uncover K–5 students' ideas while fostering language literacy.

Use Service Learning/STEM Projects to Turn Your School into a GreenSchool! (Env)

(Supervision/Administration) 507, Convention Center

James R. McGirt (jmcgirt@plt.org), Project Learning Tree, Washington, D.C.

Learn more about Project Learning Tree's (PLT) GreenSchools! program, a PLT K–12 national model program that connects Project Learning Tree with service learning, STEM, professional development, and environmental action.

Energy in the Physics Classroom (Phys)

(Middle Level–High School) MHB-1E, Convention Center

Jennifer Varrella (info@need.org), The NEED Project, Manassas, Va.

Energy transfer, transformation, and use are governed by the laws of physics. Show your students how physics concepts permeate their world of conspicuous energy consumption. Activities will focus on thermodynamics, nuclear physics (nuclear chemistry), electromagnetism, and electrical circuits.

Use Molecules, Energy Transfer, and Microbes to Promote Inquiry and STEM Bridges (Chem)

(Middle Level–High School) MHB-3C, Convention Center

John W. Fedors (jfedors@wavecable.com), Science Activities, Lincoln, Calif.

Discover readily available materials to stimulate inquiry and bridge science disciplines. Attendees' participation encourages sharing with students and developing your comfort level.

Metadisciplinarity, Science Literacy, and General Education (Gen)

(College/Supervision) MHB-4C, Convention Center

Edward Nuhfer (enuhfer@earthlink.net), Humboldt State University, Arcata, Calif.

Karl Wirth (wirth@macalester.edu), Macalester College, St. Paul, Minn.

This session focuses on designing, implementing, and assessing science literacy in general education curricula.

The Architects Have Started Without Me: What Do I Do Now? (Science Facilities 102) (Gen)

(General) MHB-4D, Convention Center

LaMoine L. Motz (llmotz@comcast.net), 1988–1989 NSTA President, and Science Education/Facilities Specialist, White Lake, Mich.

Is your district designing new science facilities but you're not involved? You need to get involved before it is TOO LATE! In

this advanced course on science facility planning and design (an extension of the Science Facilities 101 session, page 94), the NSTA author team for *NSTA Guide to Planning School Science Facilities*, 2nd edition, will present more detailed information and examples of functional and flexible science facilities for STEM-based science. We'll look at budgeting, working with the architect, space requirements, technology, flexibility, safety, new types of spaces, and special adjacencies. Take home a packet of materials.

National Earth Science Teachers Association Earth Science Share-a-Thon (Earth)

(Elementary–High School) Centennial A–C, Hyatt

Roberta M. Johnson (rmjohnsn@gmail.com), NESTA, Boulder, Colo.

Margaret A. Holzer (mholzer@monmouth.com), Chatham High School, Chatham, N.J.

Karen E. Johnson (karen.johnson@adams12.org), Adams 12 Five Star School District, Northglenn, Colo.

Randy M. Russell (rrussell@ucar.edu), NCAR/UCAR, Boulder, Colo.

Robert T. Sparks (rsparks@noao.edu), National Optical Astronomy Observatory, Tucson, Ariz.

Erin Wood (erin.wood@lasp.colorado.edu), Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder

Join NESTA members and other education specialists as they share their favorite classroom activities. Handouts!



2:00–3:00 PM Exhibitor Workshop

Bringing Technology into Your STEM Classroom (Gen)

(Grades 6–College) 303, Convention Center

Sponsor: It's About Time

Kevin Schroeder, It's About Time, Mount Kisco, N.Y.

Struggling to incorporate meaningful technology into your science classroom? Experience an innovative, fully functioning Android tablet that incorporates probes, apps, activities, and the full Android experience. Explore how to blend meaningful technology into your classroom with *Project-Based Inquiry Science* (PBIS) to create your project-based STEM classroom.

2:00–3:15 PM Exhibitor Workshop

Carolina Investigations™ for AP Biology (Bio)

(Grades 9–12) 104, Convention Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Looking for a seamless transition to the new curriculum? Enrich your students' experience in AP Biology with unique solutions from Carolina. This hands-on workshop introduces you to new resources designed for the revised College Board AP Biology curriculum, while enhancing your ability to introduce inquiry into your classroom.

Chemistry in the Community, 6th Edition—Reinventing Itself (Chem)

(Grades 8–College) 107, Convention Center

Sponsor: American Chemical Society

Michael T. Mury (m_mury@acs.org), American Chemical Society, Washington, D.C.

Think you know ChemCom? Think again. Want your students thinking scientifically and learning how chemistry has an important role in their everyday lives? Learn about the exciting new features in the 6th edition of this engaging and groundbreaking chemistry text. We will perform text activities, share supplemental resources, and give prizes!

There's a New Robot in Class! LEGO® MINDSTORMS® Education EV3 in Your Classroom (Phys)

(Grades 5–9) 109, Convention Center

Sponsor: LEGO Education

Matthew Collier (rainey@legoeducation.us), Science and Math Teacher, Erie, Colo.

Are you already using LEGO MINDSTORMS Education NXT? If so, this hands-on session is for you. Experience the new LEGO MINDSTORMS Education EV3 platform through a sample lesson from the new Design Engineering Projects curriculum. See the robust capabilities and the cross-curricular applications the third generation has to offer.

DNA Replication and Transcription (Bio)

(Grades 5–12) 304, Convention Center

Sponsor: K'NEX Education

Presenter to be announced

No more gumdrops and toothpicks! Use K'NEX® to build and explore functional DNA models that actually stay together. Twist DNA ladders to make a helix, replicate it, and transcribe the model to form mRNA. Color-coded nucleotides enable quick changes of the C, G, A, T, and U bases to produce new sequences. Standards-aligned STEM concepts will be emphasized.

Volcanoes—The Good, the Bad, and the Ugly (Earth)

(Grades 6–12) 402, Convention Center

Sponsor: Simulation Curriculum Corp.

Herb Koller (hkoller@simcur.com), Simulation Curriculum Corp., Minnetonka, Minn.

The destructive potential of volcanoes is well known. Using Simulation Curriculum's *The Layered Earth*, we will investigate these hazards and discover any benefits. The virtual model allows students to simulate volcanic eruptions, examine historic volcanic activities, and learn about the "Ugly" that may be hiding in our own backyard.

Foldables® + Science Standards + Envelopes = A Winning Combination (Gen)

(General) 403/404, Convention Center

Sponsor: Dinah-Might Adventures, LP

Jami Humphrey, Dinah Zike Academy, San Antonio, Tex.

In this fast-paced, interactive workshop, you will cut, fold, and more as you transform basic classroom materials and manila envelopes into Foldables specifically designed to address science curriculum standards. See the possibilities unFOLD before you and leave with ideas ready to use on Monday that are evidence based, kinesthetic, and integrative.

Women in Mining Presents Toothpaste with a Twist (Earth)

(Grades K–8) 405, Convention Center

Sponsor: SME's Minerals Education Coalition

Jackie Dorr (dorr@smenet.org), SME's Minerals Education Coalition, Englewood, Colo.

Products we use daily are made from minerals. In this workshop, we will explore how minerals are used in toothpaste through a fun hands-on activity. Take this lesson to your classroom with a handout listing additional educational resources. Reclamation and plate tectonics will also be addressed. (NGSS: ESS3A Natural Resources)

The Harnessed Atom—New Ideas, Tools, and Resources: Nuclear Science and Energy (Chem)

(Grades 5–9) 406, Convention Center

Sponsor: U.S. Dept. of Energy, Office of Nuclear Energy

Marie Westfall (marie.westfall@orau.org), Oak Ridge Associated Universities, Oak Ridge, Tenn.

Peter Xiques (peter.j.xiques@leidos.com), SAIC, Inc., Oak Ridge, Tenn.

Walk away with free STEM materials on energy sciences

and nuclear energy. Harnessed Atom includes lesson plans, projects, interactive games, hands-on activities, student collaboration, and teacher resources.

Follow the Water (Earth)

(Grades 3–12) 407, Convention Center

Sponsor: Space Foundation

Bryan DeBates (bdebates@spacefoundation.org), **Elias Molen** (emolen@spacefoundation.org), and **Jami Sunkel** (jsunkel@spacefoundation.org), Space Foundation, Colorado Springs, Colo.

Looking at the impacts of waste water in your neighborhood, you will create your own microecosystem and examine where waste water pollutants come from and how they can easily end up in your local water sources.

2:00–3:30 PM Exhibitor Workshop

Physics and Physical Science with Vernier (Phys)

(Grades 7–College) 401, Convention Center

Sponsor: Vernier Software & Technology

Clarence Bakken (info@vernier.com), Retired Educator, Sunnyvale, Calif.

In this hands-on workshop, we will use various digital tools such as probeware to conduct experiments from our popular physics and physical science lab books. Use LabQuest Mini with a computer or LabQuest 2 as a stand-alone device, with a computer, or wirelessly to iPad and BYOD environments.

3:00–4:30 PM Exhibitor Workshop

Engineer the Tools for Inquiry of Candy Food Dyes (Gen)

(Grades 7–College) 302, Convention Center

Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

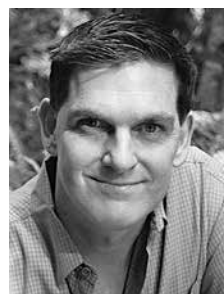
What's in your candy? In this hands-on workshop, extract colorful food dyes from candy, and separate and identify them using a STEM-integrated do-it-yourself electrophoresis box. This inquiry-based activity is a great way to introduce pipetting, electrophoresis, and solution-making skills in addition to chemistry, physics, and engineering concepts.

3:30–4:30 PM Featured Presentation

For the Love of Place: Humanity, Education, and Nature in the 21st Century (Bio)

(General)

103/105, Convention Center



Scott Sampson (scott.sampson@dmns.org), Vice President and Chief Curator, Research and Collections Division, Denver Museum of Nature & Science, Denver, Colo.

@DrScottSampson

Presider: Karen Hays, Local Arrangements Coordinator, NSTA Denver Area Conference, and Denver Museum of Nature & Science, Denver, Colo.

Abundant recent research demonstrates our physical and psychological need for nature... and a growing body of literature documents the power of experiential, place-based learning. Ecological sustainability—humanity living in a mutually enhancing relationship with the rest of nature—may well be impossible unless people care for the places they live, together with the other species that inhabit these places. Yet here in the high-tech 21st century, we've become more alienated from the nonhuman realm than ever before. At this perilous moment in history, how can education help us broker a new human-nature relationship, one that embraces both technology and the natural world? Tapping into the latest research, scientist and science communicator Scott Sampson will address this crisis and describe a possible role for education in reconnecting children with nature.

Scott Sampson is a paleontologist whose research has been devoted primarily to the ecology and evolution of Late Cretaceous dinosaurs. He has conducted fieldwork in a number of countries, including Kenya, Zimbabwe, South Africa, Madagascar, Mexico, the United States, and Canada. His work has recently expanded to include ecopsychology, investigating how humans form emotional attachments with nature.

Currently, Scott serves as vice president of research and collections and chief curator at the Denver Museum of Nature & Science. He was the primary scientific consultant and on-air host of the four-part Discovery Channel series Dinosaur Planet. He is presently serving the same pair of roles for the hit PBS KIDS television series Dinosaur Train, produced by the Jim Henson Company. Author of the general audience book, Dinosaur Odyssey: Fossil Threads in the Web of Life, he is now writing a book about how to foster a connection with nature in children.

In 2012, Scott published an article titled, "The Topophilia Hypothesis," in which he argued that humans possess a genetic bias to form emotional bonds with nearby nature.

3:30–4:30 PM Presentations

SESSION 1

Authors Needed!

(Gen)

(General)

112, Convention Center

Ken Roberts, Assistant Executive Director, Journals, NSTA, Arlington, Va.

Learn how to prepare and submit your manuscript for submission to an NSTA journal. Editors will be on hand to critique your article ideas.

SESSION 2

STEM, Inquiry, and the NGSS: The Making of Effective Science Lessons

(Gen)

(Middle Level–High School)

MHB-1F, Convention Center

Cynthia J. Long (clong@mcrel.org), McREL, Denver, Colo.

Explore how inquiry-based instruction engages students in learning STEM concepts as we weave together effective strategies with the dimensions of the *Next Generation Science Standards*.

SESSION 3

How Do Airplanes Fly, Really?

(Phys)

(High School–College)

MHB-2C, Convention Center

David L. Esker (david_esker@ymail.com), Pikes Peak Community College, Colorado Springs, Colo.

Neither the Wright brothers, nor anyone else, could explain how airplanes fly...until now! This presentation explains how to derive the new science of flight equations.



SESSION 4

Literacy in Science Grades 6–8: Integrating Science Reading Strategies with the Common Core State Standards and the Next Generation Science Standards

(Chem)

(Middle Level)

MHB-3B, Convention Center

Sharon F. Johnson (sharon852@earthlink.net) and **Joanne J. Smith** (jjouardsmith@gmail.com), University of Colorado, Denver

Come learn how to effectively implement reading strategies that strengthen content knowledge and model research-based best practices to improve literacy among middle school students.

SESSION 5

Emergence: A New View of Life's Origin

(Bio)

(Informal Education)

MHB-4B, Convention Center

Deb Novak (deb.novak@state.nm.us), New Mexico Museum of Natural History & Science, Albuquerque

Mollie Parsons (mollie@santafebotanicalgarden.org), Santa Fe Botanical Garden, Santa Fe, N.Mex.

“Which came first—metabolism or genes?” Engage your students in the debate using cutting-edge research, an interactive Tree of Life, and additional web-based resources.

SESSION 6

Square Pegs

(Gen)

(Middle Level–High School)

MHB-4D, Convention Center

Juliana Texley (jtexley@att.net), NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.

They are in every school community—learners with such divergent learning or behavioral styles that they simply can't fit in. They may appear sporadically in your class or go to an alternative center, an evening program, or an off-site institutional setting. Science for All must include the “square pegs,” too.

3:30–4:30 PM Workshops**Digital Media Supporting Science Teaching and Learning (Gen)***(Middle Level–College)* 108/110, Convention Center**Mark D. Greenman**, Boston University, Boston, Mass.

Presider: Harriet T. Page, Marblehead High School, Marblehead, Mass.

Leave with a suite of free high-quality, content-rich, and high-interest digital media resources to engage and prepare your science students.

ACS Middle Level Session: Chemical Change—Breaking and Making Bonds (Chem)*(Middle Level)* 201, Convention Center

James H. Kessler, American Chemical Society, Washington, D.C.

Explore the production of a gas, a precipitate, and changes in temperature through hands-on activities and molecular animations from the free completely developed lesson plans in www.middleschoolchemistry.com.

ACS Session Six: Acid/Base Reactions—Carbon Dioxide (Chem)*(High School)* 203, Convention Center

Jerry A. Bell (j_bell@acs.org), American Chemical Society, Washington, D.C.

Aqueous solutions of carbon dioxide, including your blood and the oceans, are essential to life on Earth. Upsetting the acid/base balance of these important solutions can be a matter of life and death. Bring your USB flash drive and take away the presentation and the activities to use in your classes.

NABT Session: Adding Higher Levels of Inquiry to Cell Respiration (Bio)*(Middle Level–High School)* 205, Convention Center

Mark Little (mark.little@bvsd.org), Broomfield High School, Broomfield, Colo.

Improve student understanding of cellular respiration by incorporating more inquiry into lab investigations. Using technology-based methods, learn how to reach higher levels of inquiry. Discussion includes alternative methods.

ASEE Session: Adventure Engineering (Gen)*(Informal Education)* 207, Convention Center**Mike Mooney**, Colorado School of Mines, Arvada

Presider: Malinda Zarske (malinda.zarske@colorado.edu), University of Colorado, Boulder

Discover adventure-motivated engineering and inquiry-driven, standards-based, hands-on Project Based Learning for elementary, middle, and high school engineering as well as life, Earth, and physical science.

**NSTA Press® Session: Designing Effective Science Instruction for the Next Generation Science Standards (Gen)***(General)* 501, Convention Center

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

Designing Effective Science Instruction is an NSTA book aimed at supporting the quality of science instruction and lessons. Instructional practices are modeled using the *Next Generation Science Standards*. The instructional framework is one that participants can use immediately and on their own.

Energy Is Chemistry (Chem)*(Middle Level–High School)* MHB-1A, Convention Center

Jennifer Varrella (info@need.org), The NEED Project, Manassas, Va.

Nearly 88% of energy used in the United States comes from chemical sources. Lessons in energy sources are enriching for your students and relevant in today's economy. Discover activities that can enhance your lessons in physical properties, thermochemistry, electrochemistry, and organic chemistry.

Inquiry + Technology = Mastery (Chem)*(Middle Level–High School)* MHB-1B, Convention Center

Greg Dodd (gbdodd@gmail.com), George Washington High School, Charleston, W.Va.

In this hands-on workshop, participants will use a temperature probe to investigate the *Next Generation Science Standards* Core Idea—Temperature and Heat. Handouts!

Amazing Things Cells Can Do (Bio)*(Middle Level–High School)* MHB-1D, Convention Center

Louisa Stark (louisa.stark@utah.edu), University of Utah, Salt Lake City

Bring your cell unit alive with a 3-D movie and interactive animations! Online and classroom activities explore organelles, cell communication, size, and scale. Visit learn.genetics.utah.edu for these free activities.

The ABCDs of Modeling: How to Add the Next Generation Science Standards Practice of Modeling to Your Classroom (Gen)

(Middle Level–High School) MHB-1E, Convention Center

Tim Herman (herman@msoe.edu) and **Margaret Franzen** (franzen@msoe.edu), Milwaukee School of Engineering, Milwaukee, Wis.

Join us for hands-on activities that can help you integrate the NGSS practice of modeling into your curriculum.

Science & Children—A Year of Inquiry (Gen)

(Preschool–Elementary) MHB-2A, Convention Center

Linda Froschauer (fro2@me.com), 2006–2007 NSTA President, and Field Editor, *Science & Children*, Westport, Conn. The *Next Generation Science Standards* support inquiry as a teaching strategy. Learn ways to infuse components of inquiry into your curriculum.

Whirling Planets and Stars: Using a Kinesthetic Approach to Understanding the Seasons (Earth)

(Elementary–Middle Level) MHB-2B, Convention Center

Stephanie J. Slater (caperteam@gmail.com), Center for Astronomy & Physics Education Research, University of Wyoming, Laramie

Timothy F. Slater (timslaterwo@gmail.com), University of Wyoming, Laramie


Engage your students in using their bodies to model one of the most challenging ideas in astronomy—the seasons. Join us to find out how.

 **Exploring NASA Engineering Challenges—Something for Everyone! (Gen)**

(Elementary–High School) MHB-3A, Convention Center

Rebecca L. Jaramillo (rebecca.jaramillo@nianet.org), Center for Integrative STEM Education, National Institute of Aerospace, Hampton, Va.

Investigate NASA's newest engineering challenges for students of all ages. Use engineering design to reinforce strong science content. Inspire your students as only NASA can!

 **Place-based Collaborative STEM—Traps, Transects, Tips, Tools (Env)**

(Elementary–High School) MHB-3C, Convention Center

Marcee L. Camenson (mcamenson@fcgov.com) and **Jean Carpenter** (jcarpenter@fcgov.com), City of Fort Collins (Colo.) Dept. of Utilities

President: Chris Kotalik, City of Fort Collins, Colo.

Motivate your students by combining biology, engineering, expertise, and the outdoors with opportunities for student experimental design, data collection, and analysis in their watershed.

ASEE Session: Project Learning Tree—Find STEM from Design to Testing for Desired Properties (Gen)

(General) MHB-4C, Convention Center

Shawna Crocker (scrocker@colostate.edu), Colorado State Forest Service, Golden

President: Malinda Zarske (malinda.zarske@colorado.edu), University of Colorado, Boulder

Take another look at the simple and common practice of making paper and find STEM throughout the procedure—from design to testing for desired properties.

National Earth Science Teachers Association Rock and Colorado ESTA Rock and Mineral Raffle (Earth)

(General) Centennial A–C, Hyatt

Roberta M. Johnson (rmjohnsn@gmail.com), NESTA, Boulder, Colo.

Margaret A. Holzer (mholzer@monmouth.com), Chatham High School, Chatham, N.J.

NESTA offers more than 50 specimens to choose from for a chance to win display-quality specimen of rocks, minerals, fossils, and other Earth science–related materials.

3:30–5:00 PM Workshop**AAPT Session: “I Know What It Is, But How Do I DO It?!” A How-To Workshop on Inquiry Science Instruction (Phys)***(General) 210/212, Convention Center***Heather Waldron** (*heather_waldron@englewood.k12.co.us*), Englewood High School, Englewood, Colo.**Emily J. Quinty** (*emily.quinty@gmail.com*), Mapleton Expeditionary School of the Arts, Thornton, Colo.**Sara E. Severance** (*sarasev14@gmail.com*), Bruce Randolph School, Denver, Colo.

Experience hands-on guided inquiry lessons and debrief with science teachers from the CU-Boulder Streamline to Mastery Program about essential components of inquiry instruction. We'll explore structures, norm, and classroom culture.

4:00–5:15 PM Exhibitor Workshops**Keep Calm and Chemistry On—Successful Lab Activities for the New Chemistry Teacher (Chem)***(Grades 9–12) 104, Convention Center*

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Looking for lab activities that work every time, not just periodically? Explore easy, engaging, safe chemistry activities that are sure to produce a reaction from your students. Whether you're new to chemistry or feeling out of your element, these activities can precipitate excitement in your classroom. Free materials and giveaways!

Exploring Machines*(Grades 4–10) 304, Convention Center*

Sponsor: K'NEX Education

Presenter to be announced

Bring the excitement of hands-on learning to your middle school classroom! Build and investigate simple machine models, take measurements, and gather data to determine work input and output, mechanical advantage, gear ratios, effort and resistance forces, and more. The exercises and explorations illustrate engineering and scientifically rich content through the use of models. Applying understandings of these models to real-world examples of machines leads to a better understanding of design and systems of machines in practical use. Standards-aligned STEM concepts will guide our exploration.



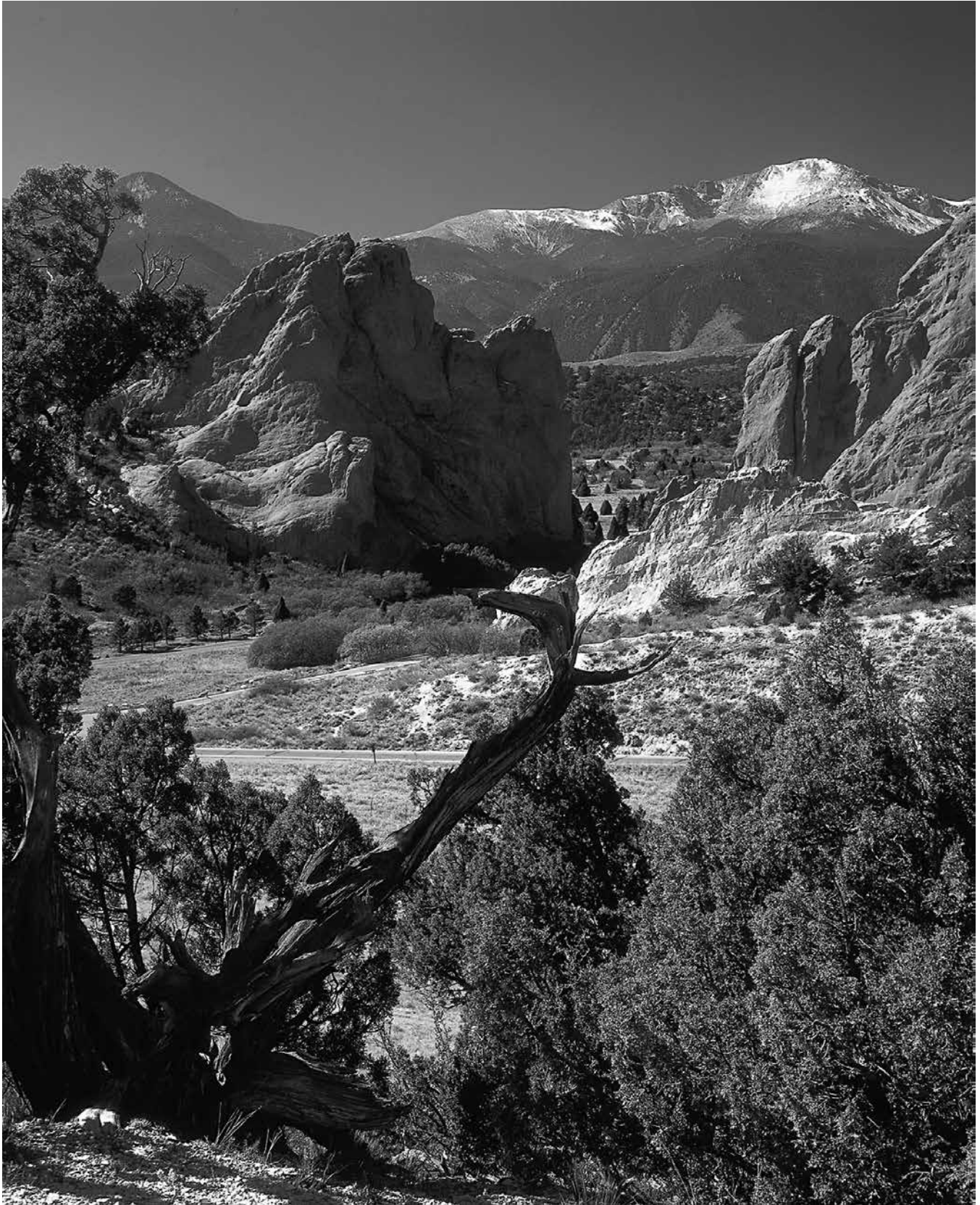


Photo of Garden of the Gods Nature Center.

—Photo courtesy of Ron Ruhoff/VISIT DENVER

8:00–8:30 AM Presentation

SESSION 1

Designing Professional Development That Prepares Teachers for the NGSS (Gen)

(Supervision/Administration) MHB-1F, Convention Center

Daniel M. Alston (dmalsto@clemson.edu), Clemson University, Clemson, S.C.

Design professional development that increases the quality and quantity of inquiry-based instruction and learn about a tool that can assess science educators' inquiry-based instruction.



8:00–9:00 AM Presentations

SESSION 1

Lotions, Potions, and Scrubs: Polymer Science in Cosmetics (Chem)

(Middle Level–High School) MHB-1B, Convention Center

Sherri C. Rukes (lucchem@gmail.com), Libertyville High School, Libertyville, Ill.

Discover how to make various cosmetics as well as the polymer science behind them. Handouts and samples will be provided.

SESSION 2

Teaching Physical Science Using Modeling Instruction (Phys)

(Middle Level–High School) MHB-1E, Convention Center

Earl Legleiter (elegleiter@hotmail.com), Legleiter Science Consulting, Englewood, Colo.

Paul E. Adams (padams@fhsu.edu), Fort Hays State University, Hays, Kans.

Physical science teachers discuss their experiences using modeling instruction in this symposium-style presentation. Modeling instruction is a curriculum design in which students use guided inquiry to construct in-depth science content understanding in a student-centered environment. The institute is supported by an Improving Teacher Quality Partnership grant administered by the Kansas Board of Regents.

SESSION 3

Learn More About Climate—Colorado Climate Education Resources (Env)

(General) MHB-2A, Convention Center

Deb Morrison (2debmorrison@gmail.com), University of Colorado, Boulder

The University of Colorado's Learn More About Climate outreach efforts have compiled resources for educators, including videos, lesson plans, and lists of resource links.

SESSION 4

MY NASA DATA: An Authentic STEM Experience (Earth)

(Elementary–High School) MHB-2B, Convention Center

Preston M. Lewis (preston.lewis@nasa.gov), NASA Langley Research Center, Hampton, Va.

Engage your students in using MY NASA DATA as a visualization tool for NASA Earth Systems satellite data and bring STEM to life!

SESSION 5


Galileo's Square-Cube Law: Explaining How Size Matters (Gen)

(General) MHB-2C, Convention Center

David L. Esker (david_esker@ymail.com), Pikes Peak Community College, Colorado Springs, Colo.

The ratio between area and volume changes with size; so different sized objects have different properties. This presentation addresses the difficulties in explaining this scientific concept.

SESSION 6

 **Connecting Cultures; Exploring Science (Env)**
(General) *MHB-3C, Convention Center*

Rachel Kornhauser (*rachel@gng.org*), Global Nomads Group, New York, N.Y.

Come hear about Global Nomads Group's yearlong collaborative science-based classroom program exploring critical environmental issues via Project Based Learning that includes standards-based curriculum, hands-on collaboration, and virtual exchanges.

SESSION 7


Science Olympiad Coaches Clinic: Astronomy and Reach-for-the-Stars Events (Earth)

(Middle Level–High School/Inf.) *MHB-4B, Convention Center*

Donna L. Young (*donna@aavso.org*), Chandra E/PO Office, SAO/NASA, Bullhead City, Ariz.

Science Olympiad coaches will be provided information on team-building strategies, extensive resources, and content for the 2014 national competition by the National Astronomy Event Supervisor.


8:00–9:00 AM Workshops

 **NSTA Press® Session: Classroom Activities for Stop Faking It! Force and Motion (Phys)**

(Elementary–High School) *201, Convention Center*

Bill Robertson (*wrobert9@ix.netcom.com*), Bill Robertson Science, Inc., Woodland Park, Colo.

In response to teacher demand, there is now a set of classroom activities on Force and Motion to accompany the *Stop Faking It! Force and Motion* book. We incorporate the learning cycle into an easy-to-use, teacher-friendly, research-based curriculum for upper elementary and conceptually based high school curricula that can help your students truly understand force and motion concepts. Join the author for activities from the book. *Lame jokes quite possible.*

 **It's eleSTEMary! STEM Education from Classroom to Community! (Gen)**

(Elementary) *MHB-3A, Convention Center*

Janet Krompfer, High Plains Elementary School, Colorado Springs, Colo.

Sandy Lamb (*slamb@d49.org*), Odyssey Elementary School, Colorado Springs, Colo.

Find out how to set up a STEM Lab, effectively integrate STEM disciplines, and successfully implement STEM Clubs and Family STEM Nights.

Making the Interdisciplinary Connection Between Science, Literacy, and Math (Gen)

(Elementary–Middle Level) *MHB-4D, Convention Center*

Malakia Wright (*malakiaw@gmail.com*), Clayton County Public Schools, Jonesboro, Ga.

Participants will have a common understanding of literacy development and its importance in students' ability to demonstrate proficiency using hands-on activities and technology.

Get Down in the Dirt! (Gen)

(Elementary–Middle Level) *MHB-4E, Convention Center*

Linda R. Perrich (*lperrich@yahoo.com*) and **Lindsey Mieras** (*lmieras@greeleyschools.org*), Dos Rios Elementary School, Evans, Colo.

Presider: Lindsey Mieras

Archaeology enhances student learning through the use of cooperative skills, inquiry, hands-on learning, and community connections. Integrating native gardening as a hands-on approach in social studies and science is possible for anyone. Learn how to connect archaeology to your curriculum within the classroom through self-created dig kits. Walk away feeling confident about starting your own native garden, including archaeology within and beyond the classroom.

 **NSTA Press® Session: Hard-to-Teach Biology Topics (Bio)**

(High School) *203, Convention Center*

Anne Tweed (*atweed@mcREL.org*), 2004–2005 NSTA President, and McREL, Denver, Colo.

Presider: Susan B. Koba, Science Education Consultant, Omaha, Neb.

Peek into the upcoming 2nd edition of *Hard-to-Teach Biology Concepts*, which will help you implement the NGSS using the book's conceptual change model and tools.

Science Education for Global Citizenship: People, Food, Energy and Sustainability (Env)

(Middle Level–High School) *MHB-1A, Convention Center*

Bill Baird (*bairdwe@comcast.net*), Retired Educator, Castle Rock, Colo.


Discover interdisciplinary hands-on activities to prepare all students to think critically and creatively about global challenges to the planet and human well-being.

8:00–9:30 AM Exhibitor Workshop**Worm and Squirm Your Way into Behavior Labs (Bio)**

(Grades 10–College) 302, Convention Center
Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

How do genes influence behavior? Use the model organism *C. elegans* (a nematode) to answer this question in an engaging activity that compares normal and mutant worm behavior. We will explore worm taste preferences in a simple and fast chemotaxis assay, and examine the connection of our worm mutant to human diseases. Come see this great alternative AP fruit fly behavior lab!

8:00–11:00 AM Short Course **ScienceLIVE and BSI: Bringing Lessons Based on Real Science into Your Classroom! (SC-5)**

(General) Granite, Hyatt

Tickets Required; \$30

Peter Erb (erbp@colorado.edu), **Liesl P. Erb** (liesl.erb@colorado.edu), **Tammy A. Maldonado** (tammy.maldonado@colorado.edu), and **Kristin Swihart** (swihart@colorado.edu), University of Colorado, Boulder

For description, see page 37.

8:00–11:30 AM Short Course**Nature to Nanotechnology: Water and Filtration (SC-6)**

(Middle Level–High School) Capitol Ballroom 6, Hyatt
Tickets Required; \$25

Christine Morrow (chrisitne.morrow@colorado.edu) and **Douglas L. Gin** (gin@spot.colorado.edu), University of Colorado, Boulder

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

For description, see page 37.

8:00 AM–5:00 PM Workshop**Teacher Professional Development Workshop: Engaging Your Students in Earth Systems Science and ArcGIS**

Mineral Hall C, Hyatt

The Colorado Geographic Alliance (COGA) and The GLOBE Program invites K–12 teachers to a professional development workshop. Ten spots are reserved for teachers from rural areas of Colorado as part of a National Girls Collaborative Project mini-grant. Teachers will learn how to use and implement COGA resources, ArcGIS, GLOBE resources, activities, protocols, and tools that can help them address NGSS with their students. Upon completion of the training, teachers will be GLOBE trained. This workshop can be used for license renewal; visit www.cde.state.co.us for more information on regarding license renewal.

9:00 AM–12 Noon Exhibits

Exhibit Hall A, Convention Center

Come see the most up-to-date science textbooks, software, equipment, and other teaching materials. Some exhibitors will offer materials for sale.

9:30–10:30 AM Presentations**SESSION 1****Sliding Classrooms**

(Chem)

(General) MHB-1B, Convention Center

Maria G. Thurmond, Peachtree Ridge High School, Suwanee, Ga.

An entire chemistry department used large-scale differentiated instruction based on continued assessment to meet the needs of all students (Gifted, ESOL, general education, special education, and RTI students). As a result, success for all was significantly increased.

CANCELLED

SESSION 2

EXENTHUNCO—What Is That? (Bio)

(Middle Level) *MHB-1C, Convention Center*
Frederick E. Maier (*fredmaier@sbcglobal.net*), Village of Itasca, Ill.

Jack Tison (*globes@comcast.net*), Wheaton (Ill.) Park District
Species populations change over time. This session presents a program taking students on a 125-year journey where some species thrive, and some go extinct.

SESSION 3

What Is Relativity? An Introduction to Einstein's Theories (Phys)

(General) *MHB-1E, Convention Center*

Jeffrey Bennett (*jeff@bigkidscience.com*), Big Kid Science, Boulder, Colo.

Have you ever wondered what Einstein's theory of relativity is all about? Come learn the basic ideas and why everyone should know something about them.

SESSION 4

Nanoscience and Technology: Teaching Emerging Science Content (Gen)

(Middle Level–High School) *MHB-1F, Convention Center*

Cynthia J. Long (*clong@mcrel.org*), McREL, Denver, Colo.
Emphasis will be placed on nanoscience and technology and how you can integrate engaging and relevant content into your classroom in significant ways to help students develop understanding.

SESSION 5

Exploring Earthquakes Using Inquiry and the NGSS (Earth)

(Middle Level–High School) *MHB-2B, Convention Center*

Davida Buehler (*dbuehler@geosociety.org*), The Geological Society of America, Boulder, Colo.

Using several inquiry-based activities, we will explore earthquakes in a way that will allow students to become actively engaged in the learning process. Free resources!

SESSION 6

 **The Amazing Atlatl (Gen)**

(Middle Level–High School) *MHB-3A, Convention Center*

Paul Ermigiotti, Crow Canyon Archaeological Center, Cortez, Colo.

Hunting at a distance separates humans from other predators. The atlatl was used long before the bow. Explore cultural aspects, technology, and the physics behind this ancient tool.

SESSION 7

Problem-Based Learning In and Out (Env)

(General) *MHB-4A, Convention Center*

Jeannine M. Tennant, STEM Magnet Lab School, Northglenn, Colo.

Take standards and look around you...see what problems are in this world that your students can solve! Problem-Based Learning is the way to involve, enhance, and engage you and your students.

SESSION 8

Using Pollen Analysis to Address the NGSS and Literacy (Gen)

(High School) *MHB-4D, Convention Center*

Anthony Bertino (*abertino@nycap.rr.com*) and **Patricia Nolan Bertino** (*nolanp@nycap.rr.com*), Retired Educators, Scotia, N.Y.

Increase student interest in math, science, literacy, and technology...and address the NGSS. Discover how pollen solves crimes and can be collected, stored, stained, examined, and photographed. Free resources!

SESSION 9

Bringing Your Class Alive: Active Learning Strategies for the Science Classroom (Gen)

(Middle Level–College) *MHB-4E, Convention Center*

DJ West (*djwest78@gmail.com*), Schoolcraft College, Livonia, Mich.

Emphasis will be placed on a variety of strategies for making learning active in the science classroom. The intent of the session is to engage students as active partners in the learning process through intentional planning.

9:30–10:30 AM Workshops

**NSTA Press® Session: The Method: An Innovative Way to Teach and Understand Problem Solving (Phys)**

(Middle Level—College) 201, Convention Center

Norman J. LaFave (*nlafave0@yahoo.com*), Klein Forest High School, Houston, Tex.

The Method is a new systematic process for problem solving. Join me as I present the process/motivation so that you can employ it in your classroom.

Enhancing Forest Field Study with Project Learning Tree (Env)

(Middle Level—College) MHB-1A, Convention Center

James R. McGirt (*jmcgirt@plt.org*), Project Learning Tree, Washington, D.C.

Shawna Crocker (*scrocker@colostate.edu*), Colorado State Forest Service, Golden

Find out how to teach about global forests (and the trees in your own backyard) using two new Project Learning Tree (PLT) resources that feature STEM connections. Explore this vital Earth system and take home PLT curriculum materials.

Bitter and Sweet—Human Taste Perception (Bio)

(Middle Level—High School) MHB-1D, Convention Center

Kimberly Nichols (*kanprimate@aol.com*), **Tammy A. Maldonado** (*tammy.maldonado@colorado.edu*), and **Kristin Swihart** (*swihart@colorado.edu*), University of Colorado, Boulder

Use hands-on activities testing our human taste perception and explore how our primate heritage, human evolution, and cultural behaviors shaped this taste perception.

Choose and Use the Best in Children’s Literature (Gen)

(Preschool—Middle Level) MHB-2A, Convention Center

Juliana Texley (*jtexley@att.net*), NSTA President-Elect, and Palm Beach State College, Boca Raton, Fla.

NSTA’s database of 8,000 teacher-generated book reviews includes the best of the best—42 years of Children’s Book Council award winners. Find out why they won and how they can be used in the classroom. This workshop will include active participation in the process of reviewing books, learning to search and select books, and take-home ideas for integration with science, mathematics, and social studies.

“Astro”nishing Astronomy: Revealing Black Holes and the Invisible Universe (Earth)

(Middle Level—High School) MHB-2C, Convention Center

Pamela Whiffen (*pwpwr@aol.com*), NASA Educator Ambassador, Phoenix, Ariz.

New cutting-edge technology used in space-based telescopes has begun to reveal the Invisible Universe and all its wonders. Pick up a CD-ROM with NASA cross-disciplinary activities.

**SMILE with Physical Science (Phys)**

(Elementary) MHB-3B, Convention Center

Michelle B. Buchanan (*mbuchanan@ualr.edu*), University of Arkansas at Little Rock

Discover activities for grades 3–6 that address the NGSS. You’ll leave with a SMILE (Science/Math Inquiry Learning Explored) on your face and activities in your bag!

**Smashing Plates: Detecting Crustal Deformation with GPS (Earth)**

(Middle Level—High School) MHB-3C, Convention Center

Shelley E. Olds (*olds@unavco.org*), UNAVCO, Boulder, Colo.

Nancy West (*nancywwest@gmail.com*), Quarter Dome Consulting, LLC, Fort Collins, Colo.

Explore plate tectonics and Earth’s squishing, stretching, and rotating crust using physical models. Graph changes and GPS data to teach your students about potential earthquakes.

Citizen Science: NASA’s Dawn Mission’s Asteroid Mappers (Earth)

(Middle Level—High School/Inf.) MHB-4B, Convention Center

Whitney H. Cobb (*wcobb@mcrel.org*), McREL, Denver, Colo.

NASA’s Dawn Mission’s citizen science project, Asteroid Mappers, invites all of us to contribute to mission science by interpreting cool images from mini-planet Vesta.

Engaging Games to Learn Complex Environmental Science Concepts (Env)

(High School—College) MHB-4C, Convention Center

Kristen R. Dotti (*kristen_dotti@yahoo.com*), Christ School, Arden, N.C.

Playing the role of a coal-fired power plant owner, students learn cap-and-trade principles, sulfur-reduction techniques, cost-cutting measures, and the terminology of the industry.

10:00–11:30 AM Exhibitor Workshop

Discovering DNA (A Middle School Lab Activity) (Bio)

(Grades 6–8)

302, Convention Center

Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

Introduce your students to the exciting world of DNA science with their own DNA! In this hands-on activity, students use real-world laboratory techniques to extract DNA from their own cheek cells and watch it magically come to life as floating white strands. The DNA is then collected and transferred to a very cool crystal clear plastic helix-shaped necklace that can be kept as a lasting science memory for years to come.



11:00 AM–12 Noon Presentations

SESSION 1

(High School)

MHB-1B, Convention Center

Using Stories to Teach Science (Gen)

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

The *Common Core State Standards* recommend teaching literacy across the curriculum. For science teachers, developing scientific literacy and enhancing basic literacy can be accomplished by integrating science stories into instructions, which can stimulate students' interest in the science behind everyday life and increase their scientific knowledge. *ChemMatters*, a magazine for high schoolers by the American Chemical Society, provides many free resources to support scientific literacy and promote inquiry.

SESSION 2



Engaging Children in Scientific Explanation: Connecting Science and Literacy Using a “Question-Claim-Evidence-Reason” Framework (Gen)

(Preschool–Elementary)

MHB-3B, Convention Center

Anicia A. Alvarez (aalvarez@adams.edu), Adams State University, Alamosa, Colo.

Enliven your classroom with lessons conducted with children using the “Question-Claim-Evidence-Reason” framework to explain visual representations data during the exploration and inquiry learning cycle.

SESSION 3



Customizing STEM Instruction (Gen)

(Middle Level–High School)

MHB-3C, Convention Center

Patricia A. Kincaid (kincaidpatty@msn.com), Denver (Colo.) Public Schools

Heather Leary (heather.leary@colorado.edu), University of Colorado, Boulder

STEM educators and students can electronically customize instruction by accessing and integrating global and interactive digital library resources.

SESSION 4

Computer Games, Simulations, and Virtual Labs for STEM Education (Earth)

(Informal Education)

MHB-4B, Convention Center

Randy M. Russell (rrussell@ucar.edu), NCAR/UCAR, Boulder, Colo.

Discussion centers on a broad review of computer games, simulations, and virtual labs for STEM education from many different sources.

11:00 AM–12 Noon Workshops**Technology Makes STEM Instruction a Snap****(Chem)***(Middle Level–High School)* MHB-1A, Convention Center**Greg Dodd** (gbdodd@gmail.com), George Washington High School, Charleston, W.Va.

Join me at this hands-on workshop and learn how the appropriate use of technology in the science classroom can facilitate STEM instruction. Handouts!

Epigenetics—Beyond the Central Dogma**(Bio)***(High School)* MHB-1D, Convention Center**Louisa Stark** (louisa.stark@utah.edu), University of Utah, Salt Lake City

The environment interacts with the epigenome to control gene expression. Interactive activities explore epigenetics and how it confounds conventional notions of inheritance. Visit learn.genetics.utah.edu for these free activities.

Polymers: New Twists on Old Favorites**(Phys)***(Elementary–High School)* MHB-1E, Convention Center**Debbie Goodwin** (nywin@hotmail.com), Chillicothe High School, Chillicothe, Mo.**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. Come participate and pick up complete handouts.

Science, Engineering, and the Common Core State Standards**(Gen)***(High School)* MHB-1F, Convention Center**Jacklyn Bonneau** (bonneau@wpi.edu), Massachusetts Academy of Math & Science at WPI, Worcester

Explore strategies for identifying, implementing, and reinforcing science and engineering practices using technology. Strategies and outcomes use the NGSS and focus on technology, engineering, and mathematics.

Energize the CCSS in Your Classroom!**(Gen)***(Elementary–Middle Level)* MHB-2A, Convention Center**Emily Hawbaker** (ehawbaker@need.org), The NEED Project, Manassas, Va.

Strengthen the use of *Common Core State Standards, Mathematics* in your classroom with these exciting energy activities! The energy-related activities combine nonfiction text and hands-on activities to explore fractions, unit conversions, data analysis, graphing and geometric measurement, engineering and design, and public speaking.

Weather Headlines: A Tool for Science Learning**(Earth)***(Middle Level–High School)* MHB-2B, Convention Center**Lisa Gardiner** (lisagard@ucar.edu) and **Becca Hatheway** (hatheway@ucar.edu), Spark: UCAR Science Education, Boulder, Colo.

News stories about extreme weather provide a forum for learning atmospheric science. Explore activities and resources that allow students to consider weather in new ways.

**Helping Students Teach Old “Dogs” New Tricks in Energy Savings****(Env)***(Middle Level–High School)* MHB-3A, Convention Center**Vernon Kimball** (info@need.org), The NEED Project, Manassas, Va.

On average, energy expenditures are the second largest budget item for school districts across the country. Find out how your students can identify problem areas and be proactive in changing how your school spends its energy budget.

12 Noon–1:00 PM Meeting**CAST Board Meeting**

Quartz, Hyatt

Exhibitors

Some exhibitors have classified their products by grade level and subject area. Subject areas are abbreviated here as follows:

| | |
|----------------------------|----|
| Biology/Life Science | B |
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| Earth/Space Science | EA |
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Building STEM Solutions—dynamic K'NEX models offer hands-on learning opportunities that encourage scientific inquiry, investigation, and experimentation. Teacher's guides, with inquiry-based lessons, challenge students as they build, investigate, problem solve, discuss, and evaluate scientific and design principles in action. Aligned to national STEM standards and *Common Core State Standards, Mathematics*. Attend a K'NEX Education workshop in Room 304.

Kodo Kids #332
 155 Alter St., Unit A PH
 Broomfield, CO 80020 PreK-5
 Phone: 720-340-2704
 E-mail: info@kodokids.com
 Website: www.kodokids.com

Kodo Kids creates experiential learning products for children ages preK–grade 5. Our products are grounded in play and designed for hands-on, in-depth exploration of science and engineering.

LAB-AIDS®, Inc. #733
 17 Colt Court B, C, EA, EN, G, PD
 Ronkonkoma, NY 11779 6-12
 Phone: 800-381-1286
 E-mail: info@lab-aids.com
 Website: www.lab-aids.com

At LAB-AIDS, we are focused on being “A Catalyst for Learning.” For the past 50 years, we have helped science teachers offer a more meaningful hands-on experience in the classroom by providing them with the curriculum, materials, and equipment needed to teach more effectively and have their students truly learn by doing.

LEGO® Education #734
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 Pittsburg, KS 66762 5-9
 Phone: 800-362-4308
 E-mail: LEGOeducation@LEGOeducation.us
 Website: www.LEGOeducation.us

LEGO® Education combines the unique excitement of LEGO® bricks with hands-on classroom solutions for science, technology, engineering, math, and literacy. We focus on providing high-quality education solutions that appeal to a variety of learning styles and for all educational levels. Visit our booth to learn how our products can bring innovation to your classroom.

Lesley University #240
 29 Everett St.
 Cambridge, MA 02138 College
 Phone: 866-531-3167
 E-mail: mmccartl@lesley.edu
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MAST Institute #744
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 501 20th St. EN, PH, PD, T
 Greeley, CO 80639 PreK-12, College
 Phone: 970-351-1280
 E-mail: lori.reinsvold@unco.edu
 Website: mast.unco.edu

The University of Northern Colorado is a leader in mathematics and science education with its MAST Institute (*MAST stands for Mathematics and Science Teaching*). At the booth, you will learn about our undergraduate, masters, and PhD programs in science education, as well as opportunities to collaborate with staff and faculty through professional development.

Exhibitors

McGraw-Hill School Education #533
8787 Orion Place B, C, PH, T
Columbus, OH 43240 PreK–12
Phone: 800-344-7344
E-mail: seg_customerservice@mcgraw-hill.com
Website: www.mheonline.com

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Denver, CO 80237 K–12
Phone: 303-337-0990
E-mail: info@mcrel.org
Website: www.mcrel.org

Mid-continent Research for Education and Learning (McREL) is a nonprofit corporation based in Denver, Colorado. McREL's focus is on research, product development, technical assistance and training for K–12 education improvement, leadership development, standards-based instructional practice, and systemic reform.

Mimio #327
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Cambridge, MA 02141 K–12
Phone: 617-902-2040
E-mail: jeb.hoverter@mimio.com
Website: www.mimio.com

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Mississippi State, MS 39762 5–12
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9–12, College
Website: www.nano-link.com

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Website: www.eNasco.com

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Website: www.nsta.org/membership

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Website: www.nsta.org/conferences

Shell Science Lab Challenge
Booth #643 • E-mail: mwarsame@nsta.org
Website: www.nsta.org/shellsciencelab

Toshiba/NSTA ExploraVision®
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Website: www.exploravision.org

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- The **New Science Teacher Academy** supports second- through fifth-year science teachers during the often challenging initial years by enhancing confidence and teacher content knowledge.

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- **NSTA Press®** publishes 25–30 new books and e-books each year. Browse at the Science Store and connect with authors to have your new book signed. Submit your new book idea to bit.ly/18UHDgG.
- **NGSS @ NSTA.** How can NSTA help you prepare for the *Next Generation Science Standards*? Stop by our booth to hear the latest news about state adoption and check out a sampling of NSTA resources dedicated to helping teachers understand and implement the new standards.

Add Your Voice

- **Science Matters**, our major public awareness campaign about science education and science literacy, is designed to rekindle a national sense of urgency and action among schools and families. Register to receive our monthly e-newsletter.
- **The John Glenn Center for Science Education.** NSTA has embarked on a \$43 million national campaign to make excellence in science teaching and learning a reality for all. The funding will support a series of forward-thinking programs and a state-of-the-art facility designed to promote leadership, learning, and advocacy in science education.

Distinguish Yourself

- Learn about NSTA's 16 awards programs for science teachers, K–College, such as the **Shell Science Lab Challenge**, which provides science laboratory equipment and professional development support to winning teachers from middle schools and high schools with limited resources. Learn how to win a \$20,000 lab makeover support package.

Student Competitions:

- **Toshiba/NSTA ExploraVision®** is a team-based K–12 student competition that awards up to \$240,000 in savings bonds; trips to Washington, D.C.; Toshiba Tablets for teachers; and other great prizes every year.
- **eCYBERMISSION** is an online STEM-related (Science, Technology, Engineering, and Mathematics) competition for students in grades 6–9. Teams compete for state, regional, and national awards, including up to \$8,000 in U.S. Savings Bonds (maturity value).

NSTA National Science Teachers Association

Exhibitors

National Energy Education Development Project (NEED) #929
EN, G, PH, PD
K-12
1840 Wilson Blvd.
Arlington, VA 22201
E-mail: info@need.org
Website: www.need.org

Teach about energy with hands-on activities at all grade levels. NEED is a nonprofit organization dedicated to providing classroom resources and training for educators in the field of energy. Stop by for some free resources and information.

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B, EA, EN, G, T
preK-12
1 Lower Ragsdale Dr., Bldg. 1
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E-mail: schoolcustomerservice@cengage.com
Website: www.ngl.cengage.com

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1840 Wilson Blvd.
Arlington, VA 22201
E-mail: ngss@nsta.org
Website: ngss.nsta.org

How can NSTA help you prepare for the *Next Generation Science Standards*? Stop by our booth to hear the latest news about state adoption and check out a sampling of NSTA resources dedicated to helping teachers understand and implement the new standards.

NOAA Office of Education #542
B, EA, EN, G
3-12, College
1401 Constitution Ave. NW
Washington, DC 20230
Phone: 301-713-1208
E-mail: education@noaa.gov
Website: www.education.noaa.gov

NOAA is a federal science agency providing free information to educators about weather, climate, oceans, coasts, satellite data, solar weather, and fisheries. Everyday, NOAA's science touches the lives of all Americans. In partnership with NSTA, NOAA has developed a suite of products for the science classroom.

NSTA Membership #638
1840 Wilson Blvd.
Arlington, VA 22201
Phone: 703-312-9375
E-mail: tbirts@nsta.org
Website: www.nsta.org/membership

Access high-quality educational materials and professional development opportunities when you're an NSTA member. Pick up a sample journal, your district ribbon, and a lapel pin and meet some of our staff.

NSTA Professional Programs #639
1840 Wilson Blvd.
Arlington, VA 22201
Phone: 703-312-9375
E-mail: dblondonville@nsta.org
Website: www.nsta.org/conferences

The NSTA Professional Development Department supports science educators through a variety of professional opportunities tailored to their specific needs. The Learning Center is NSTA's professional learning portal designed to address your classroom needs and busy schedule. Visit our booth to learn more about the professional learning tools that are available to personalize, manage, and document your learning growth.

NSTA STEM Forum & Expo #228
1840 Wilson Blvd.
Arlington, VA 22201
Website: www.nsta.org/2014stem

Stop by and learn about the exciting program for the NSTA 2014 STEM Forum & Expo—May 14-17, 2014.

Nutrients for Life Foundation #635
B, EA, EN, G
1-12
425 Third St. SW, Suite 950
Washington, DC 20024
Phone: 202-731-4365
E-mail: jburatowski@nutrientsforlife.org
Website: www.nutrientsforlife.org

Nutrients for Life Foundation is a nonprofit education association that provides information and resources to educators and the public about the vital role fertilizers play in feeding our world. The Foundation offers free soil science education materials for elementary, middle school, and high school educators.



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WHY

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WHAT

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WHERE

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HOW



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NSTA National Science Teachers Association

Shell Science Lab Challenge

Exhibitors

Ocean Classrooms #433
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 Boulder, CO 80301 7–12
 Phone: 303-996-7575
 E-mail: info@oceanclassrooms.com
 Website: www.oceanclassrooms.com

Ocean Classrooms is an online educational portal that provides an innovative approach to teaching marine science. Our courses align with the *Common Core State Standards* and include narrated presentations, interactive labs, and teacher resources. Students explore the ocean through our LIVE, underwater, high-definition webcams and data acquisition systems called Blue Eyes™.

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PhET Interactive Simulations #427
 University of Colorado Boulder B, C, EA,
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 Boulder, CO 80309 K–12, College
 E-mail: phethelp@colorado.edu
 Website: phet.colorado.edu

The PhET Interactive Simulations Project has developed more than 100 free simulations for teaching and learning science and math. Simulations such as the Circuit Construction Kit create interactive, game-like environments that encourage scientist-like exploration. They emphasize the connections to real life, make the invisible visible (e.g., electrons), and include expert visual models.

Pitsco Education #735
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 Phone: 620-231-0000
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Visit Pitsco's booth and discover new and exciting opportunities to teach science, technology, engineering, and mathematics (STEM) concepts. You will find a robust array of hands-on activities and tools, including dragsters, trebuchets, alternative energy structures, robotics, and more popular activities that provide real-world relevance to STEM subjects.

Project Learning Tree #441
 1111 19th St. NW, Suite 780 EN, PD
 Washington, DC 20036 PreK–12
 Phone: 202-463-2475
 E-mail: information@plt.org
 Website: www.plt.org

Project Learning Tree is a nationally award-winning environmental education program designed for preK–12 formal and nonformal educators. The supplementary materials provide hands-on/minds-on multidisciplinary activities.

Sangari Active Science #738
 50 Washington St. G, PD, T
 Norwalk, CT 06854 K–8
 Phone: 917-517-0944
 E-mail: astrizich@sangariglobaled.com
 Website: www.sangariglobaled.com

Sangari Active Science offers a preeminent, investigation-centered K–8 curriculum that has been designed to embody the research-based principles that undergird the NGSS. IQWST, our grades 6–8 program that is now available as an interactive tablet edition, focuses on modeling, explanation, and argumentation—those NGSS practices that are most challenging for middle-schoolers. Both our K–5 and grades 6–8 programs integrate reading, writing, speaking, and listening standards from the *Common Core State Standards*, supporting students as they learn core science ideas and gain lifelong skills.

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 Yulee, FL 32097 G, PH, T
 Phone: 904-225-5558 K-12, College
 E-mails: info@sciencefirst.com; halbrecht@starlab.com
 Websites: www.sciencefirst.com; www.starlab.com

Science First/STARLAB specializes in the design, manufacturing, and marketing of high-quality science educational products and portable planetariums. Our classic and digital STARLAB planetariums create an exciting, immersive, and lasting learning experience.

Science4us #932
 6300 N.E. First Ave. G, T
 Fort Lauderdale, FL 33334 K-2
 Phone: 954-626-3117
 E-mail: info@science4us.com
 Website: www.science4us.com

Science4us is a comprehensive, web-based digital science curriculum for elementary students. It includes all of the components necessary for teachers and parents to provide an exemplary science experience for all learners. The curriculum is standards based.

Shell Science Lab Challenge #643
 1840 Wilson Blvd. B, C
 Arlington, VA 22201 6-8
 Phone: 305-748-1608
 E-mail: mwarsame@nsta.org
 Website: www.nsta.org/shellsciencelab

Are you succeeding in science lab instruction with minimal equipment? The Shell Science

Lab Challenge gives you an opportunity to share your exemplary approach for a chance to win a school science lab makeover support package valued at \$20,000! More than \$93,000 in lab makeover prizes to be awarded this year to 18 schools!

Siemens We Can Change the World Challenge #538
 1 Discovery Place EN, G
 Silver Spring, MD 20910 K-12
 E-mail: wecanchange@discovery.com
 Website: www.wecanchange.com

Are you looking for a cool challenge-based learning project for your students? The *Siemens We Can Change the World Challenge* is the premier national environmental sustainability challenge for grades K-12. Students learn about science and conservation while creating solutions that impact their planet. At stake is more than \$300,000 in prizes. Visit wecanchange.com for more information.

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 Phone: 877-290-8256 1-12, College
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 Website: www.simulationcurriculum.com

Simulation Curriculum is a leading developer of interactive Earth, space, geography, and climate curricula for K-12 and college.

SME's Minerals Education Coalition #432
 12999 E. Adam Aircraft Circle EA
 Englewood, CO 80112 K-12
 Phone: 303-948-4247
 E-mail: grimes@smenet.org
 Website: www.mineralseducationcoalition.org

The Minerals Education Coalition reflects the Society for Mining, Metallurgy, and Exploration's commitment to provide teachers with accurate and timely K-12 curriculum and activities. SME volunteers will distribute mineral samples and posters and be available to discuss the importance of mining and minerals to the public's lives and lifestyles.



Exhibitors

Space Camp® & Aviation Challenge® #239

1 Tranquility Base C, EA, G, PH, PD, T
Huntsville, AL 35805 PreK–12, College
Phone: 256-721-7124

Email: tomw@spacecamp.com

Website: www.spacecamp.com

We will showcase our STEM programs for students and educators.

Space Foundation #435

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Colorado Springs, CO 80907 G, PH, PD, T
Phone: 719-576-8000 PreK–12, College

E-mail: crheinbolt@spacefoundation.org

Website: www.spacefoundation.org

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E-mail: jeff@bigkidscience.com

Website: www.storytimefromspace.com

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STR School & Science #428

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Felton, CA 95018 PreK–12, College

Phone: 877-395-1001

E-mail: sales@strscopes.com

Website: www.schooltr.com

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Phone: 617-750-1480

E-mail: cynthia@swiftoptical.com

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Toshiba/NSTA ExploraVision #644

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Phone: 800-Explor9

E-mail: exploravision@nsta.org

Website: www.exploravision.org

The ExploraVision K–12 competition challenges students in the U.S. and Canada to research a technology of interest and explore what that technology could be like 20 years from now. Up to \$240,000 in savings bonds (at maturity) are awarded annually to student winners for the most innovative ideas that combine imagination with the tools of science.

U.S. Department of Energy, #834

Office of Nuclear Energy C, EN, G,
1000 Independence Ave. SW, NE-20 PH, T

Washington, DC 20585 5–9

Phone: 301-903-8858

E-mail: harnessedatom@nuclear.energy.gov

Website: nuclear.energy.gov/ne/services/harnessedatom

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U.S. EPA SunWise Program #829
 E-mail: sunwise@epa.gov EA, EN
 Website: www.epa.gov/sunwise K-8

SunWise is an environmental and health education program that teaches children and their caregivers how to protect themselves from over-exposure to the Sun through the use of classroom, school, and community components.

University of Colorado at Boulder #341
 1560 30th St. B, EN
 Boulder, CO 80302 2-6

We have information about Long Term Ecological Research (LTER) funded through the National Science Foundation from the network office. Children's books about LTER sites are available to look at and for purchase. Stop by to learn more about curriculum developed for grades 2-6.

University of Colorado Boulder #346
Outreach and Engagement B, EA,
 1505 University Ave. EN, G, PD
 Boulder, CO 80309 K-12, College
 Phone: 303-492-4561; 303-492-6892
 E-mails: lmac@colorado.edu; cumuseum@colorado.edu
 Websites: learnmoreaboutclimate.colorado.edu;
cumuseum.colorado.edu

Learn More About Climate (LMAC) translates climate change information into resources for teachers, policy makers, and citizens. Come explore LMAC! The University of Colorado Museum of Natural History provides exhibitions, educational programs, and community outreach. Come meet with us to see and learn about our statewide outreach programs and materials.

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 E-mail: info@vernier.com
 Website: www.vernier.com

Vernier Software & Technology is a leading innovator of scientific data-collection technology. Focused on STEM, Vernier is dedicated to developing creative ways to teach and learn using hands-on science. Vernier creates easy-to-use and affordable science interfaces, sensors, and graphing/analysis software. Vernier's technology-based solutions enhance STEM education, increase learning, and build students' critical thinking skills.

Wavefunction, Inc. #444
 18401 Von Karman Ave., Suite 370 C
 Irvine, CA 92612 9-12, College
 Phone: 949-955-2120
 E-mail: sales@wavefun.com
 Website: www.wavefun.com

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 Salt Lake City, UT 84107 EA, PH
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 E-mail: wgu@wgu.edu
 Website: www.wgu.edu

The Teachers College at Western Governors University offers regionally, nationally, and NCATE-accredited online competency-based master's degree programs in science education with specializations in chemistry, physics, biology, and geosciences. As a student, you'll enjoy modest tuition rates, unbelievable flexibility, and unmatched student support. Scholarships and financial aid are available.



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Biology/Life Science

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| 8:00–9:30 AM | 7–C | 401, Conv. Center | Chemistry and Biology with Vernier (p. 78) |
| 9:30–10:30 AM | M | 201, Conv. Center | ACS Middle Level Session: Changes of State—Evaporation and Condensation (p. 81) |
| 9:30–10:30 AM | H | 203, Conv. Center | ACS Session Two: Entropy—Mixing and Unmixing (p. 81) |
| 9:30–10:30 AM | M–H | MHB-1A, Conv. Center | Fun Science to Stimulate Inquiry Bridges (p. 81) |

Schedule at a Glance Chemistry/Physical Science

| | | | |
|------------------|------|----------------------|--|
| 9:30–10:30 AM | H | MHB-1B, Conv. Center | Write Your Way to Success: Grant-writing Strategies for You and Your Chemistry Students (p. 79) |
| 10:00–11:15 AM | 9–C | 109, Conv. Center | Molecular Modeling and the Revised AP Chemistry Curriculum Framework—Challenges and Opportunities (p. 85) |
| 11:00 AM–12 Noon | M | 201, Conv. Center | ACS Middle Level Session: Density—A Molecular View (p. 87) |
| 11:00 AM–12 Noon | H | 203, Conv. Center | ACS Session Three: Entropy—Energy Transfer (p. 87) |
| 11:00 AM–12 Noon | H | MHB-1A, Conv. Center | Enhancing Chemistry Activities to Develop Science and Engineering Practices (p. 86) |
| 11:00 AM–12 Noon | M–H | MHB-1B, Conv. Center | Chemical Nomenclature Rummy: Naming Compounds and Ion Combination Rules (p. 88) |
| 12:30–1:30 PM | M | 201, Conv. Center | ACS Middle Level Session: The Periodic Table, Energy Levels, and Bonding (p. 92) |
| 12:30–1:30 PM | H | 203, Conv. Center | ACS Session Four: Electromagnetic Radiation Energy (p. 92) |
| 12:30–1:30 PM | 9–C | 303, Conv. Center | Active Chemistry—Ahead of Its Time in Capturing the Essence of the NGSS and STEM (p. 94) |
| 12:30–1:30 PM | S | 507, Conv. Center | Using Modeling Activities in the High School Chemistry Class (p. 91) |
| 12:30–1:30 PM | M–H | MHB-1A, Conv. Center | Bringing Renewable Energies Back to the Classroom (p. 93) |
| 12:30–1:30 PM | H | MHB-1B, Conv. Center | Corrosion Is Everywhere—Use It to Make Chemistry Relevant and Fun (p. 91) |
| 12:30–1:30 PM | H–C | MHB-4C, Conv. Center | Preparing Students for Guided Inquiry in AP Chemistry (p. 94) |
| 2:00–2:30 PM | H/I | MHB-1A, Conv. Center | Engaging Students in Chemistry Outside the Classroom: A Look at ChemClub (p. 96) |
| 2:00–3:00 PM | M | 201, Conv. Center | ACS Middle Level Session: Polarity of the Water Molecule and Its Consequences (p. 98) |
| 2:00–3:00 PM | H | 203, Conv. Center | ACS Session Five: Rates—Concentration and Half-Life (p. 98) |
| 2:00–3:00 PM | H | MHB-1B, Conv. Center | Basic Polymer Science for the High School Classroom (p. 96) |
| 2:00–3:00 PM | M–H | MHB-3C, Conv. Center | Use Molecules, Energy Transfer, and Microbes to Promote inquiry and STEM Bridges (p. 99) |
| 2:00–3:15 PM | 8–C | 107, Conv. Center | <i>Chemistry in the Community</i> , 6th Edition—Reinventing Itself (p. 100) |
| 2:00–3:15 PM | 5–9 | 406, Conv. Center | The Harnessed Atom—New Ideas, Tools, and Resources: Nuclear Science and Energy (p. 100) |
| 2:30–3:00 PM | H | MHB-1A, Conv. Center | Introducing the <i>ChemMatters</i> Compilation Project (p. 96) |
| 3:30–4:30 PM | M | 201, Conv. Center | ACS Middle Level Session: Chemical Change—Breaking and Making Bonds (p. 103) |
| 3:30–4:30 PM | H | 203, Conv. Center | ACS Session Six: Acid/Base Reactions—Carbon Dioxide (p. 103) |
| 3:30–4:30 PM | M–H | MHB-1A, Conv. Center | Energy Is Chemistry (p. 103) |
| 3:30–4:30 PM | M–H | MHB-1B, Conv. Center | Inquiry + Technology = Mastery (p. 103) |
| 3:30–4:30 PM | M | MHB-3B, Conv. Center | Literacy in Science Grades 6–8: Integrating Science Reading Strategies with the <i>Common Core State Standards</i> and the <i>Next Generation Science Standards</i> (p. 102) |
| 4:00–5:15 PM | 9–12 | 104, Conv. Center | Keep Calm and Chemistry On—Successful Lab Activities for the New Chemistry Teacher (p. 105) |

Saturday

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|------------------|-----|----------------------|---|
| 8:00–9:00 AM | M–H | MHB-1B, Conv. Center | Lotions, Potions, and Scrubs: Polymer Science in Cosmetics (p. 107) |
| 9:30–10:30 AM | G | MHB-1B, Conv. Center | Sliding Classrooms (p. 109) |
| 11:00–11:30 AM | H | MHB-1B, Conv. Center | Stoichiometry with Rufus (p. 112) |
| 11:00 AM–12 Noon | M–H | MHB-1A, Conv. Center | Technology Makes STEM Instruction a Snap (p. 113) |

Earth/Space Science

Thursday

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|--------------|-------|----------------------|--|
| 8:00–9:00 AM | H–C/I | MHB-1C, Conv. Center | Crosscutting Concepts: Ice Core Records—From Volcanoes to Supernovas (p. 46) |
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Schedule at a Glance Earth/Space Science

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| 8:00–9:00 AM | G | MHB-2B, Conv. Center | Using Data in the Earth Science Classroom: Resources and Approaches Toward Digging into the Data (p. 46) |
| 8:00–9:00 AM | G | MHB-2C, Conv. Center | Ten Things Everyone Should Know About the Atmosphere (p. 48) |
| 8:00–9:00 AM | G | MHB-3A, Conv. Center | Teaching Computational Thinking: Examples from Weather and Climate Modeling (p. 48) |
| 8:00–9:00 AM | P–M/1 | MHB-4B, Conv. Center | Story Time from Space—Integrating STEM and Literacy (p. 46) |
| 10:00–11:15 AM | 6–12 | 402, Conv. Center | Comets—Beauties or Beasts? (p. 53) |
| 12:30–1:00 PM | 5–8 | Booth #739, Exhibit Hall | A Change of Seasons (p. 54) |
| 12:30–1:30 PM | G | MHB-2B, Conv. Center | In a New Light: The Color of Weather and Climate (p. 56) |
| 12:30–1:30 PM | E–M | MHB-3B, Conv. Center | S’COOL: Making Cloud Observations from the Playground (p. 55) |
| 12:30–1:45 PM | 9–12 | 102, Conv. Center | Using Climate Proxies to Learn About Earth’s Climate History (p. 57) |
| 12:30–1:45 PM | 5–12 | 407, Conv. Center | You Drink What on the International Space Station?!? (p. 58) |
| 2:00–3:00 PM | M | MHB-2B, Conv. Center | Statistics in the Middle School Science Classroom: Going Beyond the Mean (p. 60) |
| 2:00–3:00 PM | G | MHB-4A, Conv. Center | NSTA Press® Session: Uncovering Students’ Ideas About Stars and the Universe (p. 62) |
| 2:00–3:00 PM | C | MHB-4C, Conv. Center | Improving Effective Online Geoscience Instruction at Two-Year and Four-Year Colleges and Universities (p. 60) |
| 2:15–3:30 PM | 5–8 | 303, Conv. Center | Asteroid! Will Earth Be Hit Again? (p. 64) |
| 2:15–3:30 PM | 6–12 | 402, Conv. Center | Stars—From Cradle to Grave (p. 64) |
| 3:30–4:30 PM | G | 103/105, Conv. Center | IPCC Fifth Assessment Report—A Teaching Perspective (p. 65) |
| 3:30–4:30 PM | G | MHB-2C, Conv. Center | Teaching Climate and Energy: Classroom Resources to Support Your Teaching (p. 66) |
| 3:30–4:30 PM | H–C | MHB-4C, Conv. Center | Ice Core Records: Earth Systems, Volcanoes, Solar Proton Events, and Supernovas (p. 67) |
| 4:00–5:15 PM | 4–12 | 302, Conv. Center | Solving the Mystery of STEM Using Forensic Science (p. 69) |
| 4:00–5:15 PM | 5–8 | 303, Conv. Center | Evidence for Plate Movement (p. 69) |
| 5:00–6:00 PM | H–C | MHB-4C, Conv. Center | Spectroscopy: Stairway to the Stars (p. 71) |

Friday

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| 8:00–9:00 AM | E | MHB-2A, Conv. Center | Ingredients for Cooking Up Weather in the Primary Classroom! (p. 75) |
| 8:00–9:00 AM | E–H | Centennial A–C, Hyatt | Using Natural Hazards as a Hook in the Earth and Space Science Classroom (p. 75) |
| 9:30–10:30 AM | 9–C | 205, Conv. Center | NABT Session: HHMI’s <i>Changing Planet: Past, Present, Future</i> (p. 83) |
| 9:30–10:30 AM | E–M | MHB-2B, Conv. Center | Max Goes to Space: Science Adventures Read from Orbit (p. 79) |
| 9:30–10:30 AM | M | MHB-2C, Conv. Center | Creating “Deep Time” Diaries (p. 80) |
| 9:30–10:30 AM | I | MHB-4B, Conv. Center | An Inquiry Approach to Teaching the Rock Cycle and Igneous Rocks (p. 80) |
| 9:30–10:30 AM | E–H | Centennial A–C, Hyatt | Effective Approaches for Addressing the <i>Next Generation Science Standards</i> in the Earth and Space Science Classroom (p. 82) |
| 10:00–11:15 AM | 6–12 | 402, Conv. Center | Plate Tectonics: Continents on the Move (p. 85) |
| 11:00 AM–12 Noon | 7–12 | 205, Conv. Center | NABT Session: HHMI’s <i>The Day the Mesozoic Died</i> Classroom Resources (p. 89) |
| 11:00 AM–12 Noon | G | MHB-2B, Conv. Center | Stories from Earth: Teaching About Changing Landscapes Using 25 Years of Satellite Observations (p. 87) |
| 11:00 AM–12 Noon | M–C | MHB-2C, Conv. Center | Fermi Problems with the Fermi Space Telescope (p. 88) |
| 11:00 AM–12 Noon | E–H | Centennial A–C, Hyatt | Effective Strategies for Sharing Climate Change Science and Energy Consumption Implications in the Classroom (p. 89) |
| 11:30 AM–12 Noon | G | MHB-4B, Conv. Center | Participating in the Eclipse Megamovie (p. 87) |
| 12:30–1:30 PM | M–H | MHB-2C, Conv. Center | Seeing the Invisible Universe (p. 93) |
| 12:30–1:30 PM | E–M | MHB-3C, Conv. Center | CESI Session: Get on Board with CESI and NASA’s International Space Station (p. 93) |
| 12:30–1:30 PM | E–H | Centennial A–C, Hyatt | High-Impact Classroom Earth Science in a STEM World (p. 94) |
| 1:00–1:30 PM | 5–12 | Booth #739, Exhibit Hall | Shaping Earth (p. 95) |
| 2:00–3:00 PM | M–C | MHB-2C, Conv. Center | Using Physics to Raise Hell (p. 97) |
| 2:00–3:00 PM | E–H | Centennial A–C, Hyatt | National Earth Science Teachers Association Earth Science Share-a-Thon (p. 99) |
| 2:00–3:15 PM | 6–12 | 402, Conv. Center | Volcanoes—The Good, the Bad, and the Ugly (p. 100) |
| 2:00–3:15 PM | K–8 | 405, Conv. Center | Women in Mining Presents <i>Toothpaste with a Twist</i> (p. 100) |

Schedule at a Glance Earth/Space Science

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|--------------|------|-----------------------|---|
| 2:00–3:15 PM | 3–12 | 407, Conv. Center | Follow the Water (p. 101) |
| 3:30–4:30 PM | E–M | MHB-2B, Conv. Center | Whirling Planets and Stars: Using a Kinesthetic Approach to Understanding the Seasons (p. 104) |
| 3:30–4:30 PM | G | Centennial A–C, Hyatt | National Earth Science Teachers Association Rock and Colorado ESTA Rock and Mineral Raffle (p. 104) |

Saturday

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|------------------|-------|----------------------|---|
| 8:00–9:00 AM | E–H | MHB-2B, Conv. Center | MY NASA DATA: An Authentic STEM Experience (p. 107) |
| 8:00–9:00 AM | M–H/I | MHB-4B, Conv. Center | Science Olympiad Coaches Clinic: Astronomy and Reach-for-the-Stars Events (p. 108) |
| 9:30–10:30 AM | M–H | MHB-2B, Conv. Center | Exploring Earthquakes Using Inquiry and the NGSS (p. 110) |
| 9:30–10:30 AM | M–H | MHB-2C, Conv. Center | “Astro”nishing Astronomy: Revealing Black Holes and the Invisible Universe (p. 111) |
| 9:30–10:30 AM | M–H | MHB-3C, Conv. Center | Smashing Plates: Detecting Crustal Deformation with GPS (p. 111) |
| 9:30–10:30 AM | M–H/I | MHB-4B, Conv. Center | Citizen Science: NASA’s Dawn Mission’s Asteroid Mappers (p. 111) |
| 11:00 AM–12 Noon | M–H | MHB-2B, Conv. Center | Weather Headlines: A Tool for Science Learning (p. 113) |
| 11:00 AM–12 Noon | I | MHB-4B, Conv. Center | Computer Games, Simulations, and Virtual Labs for STEM Education (p. 112) |

Environmental Science

Thursday

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|---------------|-------|-----------------------|---|
| 8:00–9:00 AM | P–M/I | MHB-1D, Conv. Center | Facilitating Early Childhood Education with Project Learning Tree (p. 47) |
| 12:30–1:30 PM | E–H | 111/113, Conv. Center | PolarTREC: Using Arctic and Antarctic Science Resources in Your Classroom (p. 54) |
| 12:30–1:30 PM | M | MHB-3A, Conv. Center | Engineering Solutions: Green Energy and Green Building (p. 56) |
| 12:30–1:30 PM | H–C | MHB-4C, Conv. Center | Helping Students Write Their Own Scientific Experiments for Environmental Science (p. 57) |
| 2:00–3:00 PM | M–H | MHB-1B, Conv. Center | How Do We Know What We Know? Understanding Scientists’ Confidence in Climate Science Data (p. 62) |
| 2:15–3:30 PM | K–12 | 405, Conv. Center | Seven Simple Ways You Can Change the World (and Your Classroom) (p. 64) |
| 3:30–4:30 PM | P–M | MHB-3B, Conv. Center | How Does Your Garden Grow? (p. 66) |
| 5:00–6:00 PM | E–M | MHB-2C, Conv. Center | Exploring an Effective Pathway to Renewable Energy Education (p. 71) |
| 5:00–6:00 PM | I | MHB-4B, Conv. Center | <i>Nuestra Tierra Dinámica</i> (p. 70) |

Friday

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|----------------|------|----------------------|--|
| 8:00–9:00 AM | M | MHB-2C, Conv. Center | Facing the Future: Understanding Sustainability and Global Connections (p. 75) |
| 8:30–9:00 AM | G | MHB-1D, Conv. Center | Light at Night Analyses as Student Research Opportunities (p. 78) |
| 10:00–11:15 AM | 8–12 | 407, Conv. Center | Chemical and Environmental Technology (p. 85) |
| 12:30–1:30 PM | E–M | MHB-2B, Conv. Center | Hands-On Learning with GLOBE (p. 93) |
| 2:00–3:00 PM | S | 507, Conv. Center | Use Service Learning/STEM Projects to Turn Your School into a GreenSchool! (p. 98) |
| 2:00–3:00 PM | P | MHB-2A, Conv. Center | Forest Kindergartens: Creating a Lifelong Love of Science (p. 97) |
| 2:00–3:00 PM | M | MHB-4A, Conv. Center | NARST Session: Writing About Socio-Scientific Issues in Middle School to Increase Decision-making Skills (p. 97) |
| 3:30–4:30 PM | E–H | MHB-3C, Conv. Center | Place-based Collaborative STEM—Traps, Transects, Tips, Tools (p. 104) |

Saturday

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|--------------|-----|----------------------|--|
| 8:00–9:00 AM | M–H | MHB-1A, Conv. Center | Science Education for Global Citizenship: People, Food, Energy and Sustainability (p. 108) |
| 8:00–9:00 AM | G | MHB-2A, Conv. Center | Learn More About Climate—Colorado Climate Education Resources (p. 107) |

Schedule at a Glance Environmental Science

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|------------------|-----|----------------------|---|
| 8:00–9:00 AM | G | MHB-3C, Conv. Center | Connecting Cultures; Exploring Science (p. 108) |
| 9:30–10:30 AM | M–C | MHB-1A, Conv. Center | Enhancing Forest Field Study with Project Learning Tree (p. 111) |
| 9:30–10:30 AM | G | MHB-4A, Conv. Center | Problem-Based Learning In and Out (p. 110) |
| 9:30–10:30 AM | H–C | MHB-4C, Conv. Center | Engaging Games to Learn Complex Environmental Science Concepts (p. 111) |
| 11:00 AM–12 Noon | M–H | MHB-3A, Conv. Center | Helping Students Teach Old “Dogs” New Tricks in Energy Savings (p. 113) |

General Science

Thursday

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|-------------------|-------|-----------------------------|--|
| 8:00–9:00 AM | G | 103/105, Conv. Center | Featured Presentation: Understanding the Vision for Science Education from the NRC <i>Framework</i> and the <i>Next Generation Science Standards</i> (Speaker: Brett Moulding) (p. 45) |
| 8:00–9:00 AM | G | 108/110, Conv. Center | A Journey Through Time: How Participating in Teacher Field Research Programs Improves Science Inquiry in the Classroom (p. 45) |
| 8:00–9:00 AM | G | 111/113, Conv. Center | Science, Pseudoscience, and Science Denial (p. 45) |
| 8:00–9:00 AM | G | 112, Conv. Center | Fifty Years of Field Science (p. 45) |
| 8:00–9:00 AM | G | 201/203, Conv. Center | First-Timer Conference Attendees Orientation—Is This Your First NSTA Conference? (p. 45) |
| 8:00–9:00 AM | E | 501, Conv. Center | NSTA Press® Session: The Authors’ Picks! Teaching Science Through Trade Books (p. 47) |
| 8:00–9:00 AM | M–H/S | 507, Conv. Center | STEM In Action: A Highly Successful High School Model for STEM Education (p. 46) |
| 8:00–9:00 AM | G | MHB-1F, Conv. Center | Create a Unique Science Teacher Observation Form (p. 47) |
| 8:00–9:00 AM | E | MHB-2A, Conv. Center | Math Integration into STEM Inquiries (p. 48) |
| 8:00–9:00 AM | E–M | MHB-3B, Conv. Center | Using Graphs to Organize Data (p. 48) |
| 8:00–9:00 AM | G | MHB-3C, Conv. Center | Teaching Problem-solving Strategies in the Elementary Classroom: Helping Students See the Interconnectedness of Science, Technology, Engineering, and Mathematics (p. 46) |
| 8:00–9:00 AM | M–H | MHB-4D, Conv. Center | Data: It’s Not a Four-Letter Word (p. 48) |
| 8:00–9:00 AM | G | MHB-4E, Conv. Center | Critical Science Pedagogy: Transforming Teaching by Enacting Research on Classroom Equity (p. 46) |
| 8:00–9:00 AM | G | MHB-4F, Conv. Center | Science + Literacy = Student Achievement (p. 46) |
| 8:00–9:15 AM | K–8 | 302, Conv. Center | STEM Projects, Science Fairs, and Student Performances (p. 49) |
| 8:00–9:15 AM | K–6 | 303, Conv. Center | “FOSStering” the <i>Common Core State Standards, ELA: Science-centered Language Development</i> (p. 49) |
| 8:00–9:15 AM | K–6 | 401, Conv. Center | 33 Strategies for Integrating Disciplinary Literacy (p. 49) |
| 9:15–10:30 AM | G | 4 Seasons 3/4, Conv. Center | General Session: Applying Science to Restore Patients (Speaker: Retired Col. Geoffrey Ling) (p. 50) |
| 10:00–11:15 AM | K–8 | 302, Conv. Center | Science, the Literacy Connection, and the <i>Common Core State Standards, ELA</i> (p. 51) |
| 10:00–11:15 AM | K–6 | 303, Conv. Center | Science Practices: What Does Argumentation Look Like in an Elementary Classroom? (p. 51) |
| 10:00–11:15 AM | 2–6 | 401, Conv. Center | Get Results with Science and Literacy Integration: Seeds of Science/Roots of Reading® (p. 52) |
| 11:10 AM–12:10 PM | G | Entrance to Exhibit Hall | Meet the Presidents and Board/Council (p. 54) |
| 12:30–1:30 PM | E | 108/110, Conv. Center | Differentiating K–6 Science Instruction to Enable All Students to Inquire, Explore, Participate, and Achieve Success (p. 54) |
| 12:30–1:30 PM | E–H | 112, Conv. Center | Mud, Cows, Bats, and Insects—Getting the Dirt on STEM Careers (p. 54) |
| 12:30–1:30 PM | E–M | 501, Conv. Center | NSTA Press® Session: Outdoor Science and Bringing It In (p. 56) |
| 12:30–1:30 PM | S | 507, Conv. Center | STEM! How to Create Rigorous, Authentic Learning for All (p. 54) |
| 12:30–1:30 PM | G | MHB-1F, Conv. Center | Science Teaching for English Language Learners: An Elementary School and University Partnership (p. 54) |
| 12:30–1:30 PM | E | MHB-2A, Conv. Center | Using Energy to Support Speaking and Listening Standards (p. 56) |
| 12:30–1:30 PM | P–E | MHB-3C, Conv. Center | STEM Throughout the Curriculum! (p. 56) |

Schedule at a Glance General Science

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|---------------|-------|-----------------------|---|
| 12:30–1:30 PM | G | MHB-4A, Conv. Center | Uncovering Students' STEM Ideas (p. 57) |
| 12:30–1:30 PM | M–H/I | MHB-4B, Conv. Center | Strengthening Partnerships to Promote Student Success in STEM (p. 55) |
| 12:30–1:30 PM | E–H | MHB-4D, Conv. Center | NOAA in Your Backyard: Professional Development Opportunities and Local Educator Resources (p. 55) |
| 12:30–1:30 PM | G | MHB-4E, Conv. Center | Climate Literacy and Energy Awareness Network (CLEAN): Instructional Resources for Science Educators (p. 55) |
| 12:30–1:30 PM | G | MHB-4F, Conv. Center | Collaborative Structures to Support Scientific Literacy (p. 55) |
| 12:30–1:45 PM | K–6 | 302, Conv. Center | DSM and STEM: Challenges for the Elementary Student (p. 58) |
| 12:30–1:45 PM | 3–6 | 303, Conv. Center | Online Assessment That Informs Instruction (p. 58) |
| 12:30–1:45 PM | K–6 | 401, Conv. Center | 33 Strategies for Integrating Disciplinary Literacy (p. 58) |
| 12:30–1:45 PM | K–5 | 405, Conv. Center | Applying <i>Common Core State Standards, ELA</i> Through Active Science Instruction in the K–5 Classroom (p. 58) |
| 12:30–1:45 PM | 8–C | 406, Conv. Center | Unleashing Your Students' Inner Inventor—Robots, Video Games, and DIY! (p. 58) |
| 2:00–2:30 PM | P–M | MHB-2A, Conv. Center | Using Literacy to Promote the Understanding of Mathematics for PreK–8 Learners (p. 60) |
| 2:00–3:00 PM | G | 103/105, Conv. Center | Featured Presentation: Extreme Lesson Plans, Honey Bee Adventures, and Robots for Everyone—Putting Old-School Passion into Modern Technical Education (Speaker: James McLurkin) (p. 59) |
| 2:00–3:00 PM | G | 108/110, Conv. Center | A Picture Is Worth a Thousand Words: Teaching Scientific Visual Literacy (p. 61) |
| 2:00–3:00 PM | G | 111/113, Conv. Center | Help! I Need to Get Organized! (p. 61) |
| 2:00–3:00 PM | G | 112, Conv. Center | The NSTA Learning Center: Free Professional Development Resources and Opportunities for Educators (p. 59) |
| 2:00–3:00 PM | E–H | 505, Conv. Center | Engaging, Reflecting, Organizing, and Communicating with Interactive Notebooks (p. 61) |
| 2:00–3:00 PM | H/S | 507, Conv. Center | Academic Preparation and Interest Among High School Females for STEM Careers (p. 59) |
| 2:00–3:00 PM | G | MHB-1F, Conv. Center | Building STEM Education with Multinationals (p. 60) |
| 2:00–3:00 PM | G | MHB-4B, Conv. Center | <i>Using Forensics: Wildlife Crime Scene!</i> DNA Fingerprinting Simulation as Evidence in Solving a Wildlife Crime, Part 1 (p. 62) |
| 2:00–3:00 PM | G | MHB-4D, Conv. Center | Building Collaborative Partnerships to Advance K–12 STEM Education (p. 60) |
| 2:00–3:00 PM | G | MHB-4E, Conv. Center | The STEM “Bookends”: Science and Mathematics—Integration Made Easy! (p. 62) |
| 2:00–3:00 PM | G | MHB-4F, Conv. Center | Creative Field Journals (p. 62) |
| 2:00–3:00 PM | E–M | Centennial A–C, Hyatt | CESI Session: Council for Elementary Science International Share-a-Thon (p. 62) |
| 2:30–3:00 PM | E | MHB-2A, Conv. Center | Using Readers Theater to Improve Science and Math Instruction (p. 60) |
| 2:15–3:30 PM | K–8 | 104, Conv. Center | The <i>Next Generation Science Standards</i> Are Here...Now What? Focus and Exploration of Implementation with Integrity K–8 (p. 63) |
| 2:15–3:30 PM | 6–9 | 107, Conv. Center | STEM Where? Integrating STEM into the Science Classroom in Anticipation of the <i>Next Generation Science Standards</i> (p. 63) |
| 2:15–3:30 PM | 6–C | 109, Conv. Center | Create a Digital Wi-Fi Classroom! (p. 63) |
| 2:15–3:30 PM | K–8 | 302, Conv. Center | Teaching Argumentation for Our Next Generation (p. 64) |
| 2:15–3:30 PM | 2–6 | 401, Conv. Center | The Best of Both Worlds: How to Engage Students in NGSS Practices Through Science and Life (p. 64) |
| 2:15–3:30 PM | 8–C | 406, Conv. Center | Unleashing Your Students' Inner Inventor—Robots, Video Games, and DIY! (p. 65) |
| 3:30–4:30 PM | G | 108/110, Conv. Center | Science as a Playground for Literacy! (p. 65) |
| 3:30–4:30 PM | G | 111/113, Conv. Center | Using the 5Es for an Engaging Science Lesson (p. 65) |
| 3:30–4:30 PM | G | 112, Conv. Center | Beyond UFOs: The Search for Extraterrestrial Life and Its Astonishing Implications for Our Future (p. 65) |
| 3:30–4:30 PM | M–H/S | 501, Conv. Center | NSTA Press® Session: <i>Mastery Learning in the Science Classroom</i> (p. 65) |
| 3:30–4:30 PM | G | 502, Conv. Center | Before and After Retirement—Practicalities and Possibilities (p. 66) |
| 3:30–4:30 PM | G | MHB-1F, Conv. Center | STEM Instruction to Increase Content and Language Acquisition: Increasing Achievement for English Language Learners (and Others) (p. 66) |
| 3:30–4:30 PM | H | MHB-4A, Conv. Center | Engineering Your Instruction (p. 66) |
| 3:30–4:30 PM | M–H/I | MHB-4B, Conv. Center | Science Runs Through Archaeology: The Archaeology of Cactus Ruin—A Paper Excavation (p. 66) |

Schedule at a Glance General Science

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|--------------|-------|-----------------------|--|
| 3:30–4:30 PM | G | MHB-4D, Conv. Center | A How-To Workshop on Inquiry Science Instruction: Structures, Norms, and Classroom Culture (p.67) |
| 3:30–4:30 PM | G | MHB-4E, Conv. Center | Infect Your Biology Classroom with Mathematics! (p. 68) |
| 3:30–4:30 PM | G | MHB-4F, Conv. Center | STEM Lesson Study Research Projects (p. 67) |
| 4:00–4:30 PM | M | MHB-3A, Conv. Center | Robotic Rewards: Recruiting Middle School Students for an Award-winning Robotics Team (p. 68) |
| 5:00–5:30 PM | H | MHB-3C, Conv. Center | Assessment in the Modern Science Classroom (p. 70) |
| 5:00–6:00 PM | G | 108/110, Conv. Center | Digital Science Notebooks (p. 69) |
| 5:00–6:00 PM | G | 111/113, Conv. Center | Getting Groovy! Using Lava Lamps to Bring STEM to Life (p. 69) |
| 5:00–6:00 PM | G | 501, Conv. Center | NSTA Press® Session: <i>Exemplary Science: Best Practices in Professional Development</i> (p. 69) |
| 5:00–6:00 PM | M–H | MHB-1F, Conv. Center | Traveling New Instructional Roads Through Technology (p. 70) |
| 5:00–6:00 PM | E | MHB-2A, Conv. Center | Food Safety in Your School Garden (p. 71) |
| 5:00–6:00 PM | E | MHB-3B, Conv. Center | Cutting Across the Curriculum: Examining Lessons That Integrate Science, Literacy, and Mathematics (p. 71) |
| 5:00–6:00 PM | G | MHB-4D, Conv. Center | Putting the “T” in STEM—5E and Technology (p. 70) |
| 5:00–6:00 PM | G | MHB-4E, Conv. Center | The State of STEM Education in Colorado (p. 71) |
| 5:00–6:00 PM | G | MHB-4F, Conv. Center | Online Tools for Blended and Flipped Classrooms (p. 71) |
| 5:30–6:00 PM | M–H/I | MHB-1A, Conv. Center | iScience: The Impact of iPads on Student Achievement and Engagement (p. 69) |
| 5:30–6:00 PM | E | MHB-3C, Conv. Center | Develop Your Own STEM Center in Your Elementary Classroom (p. 70) |

Friday

| | | | |
|---------------|------|-----------------------|---|
| 8:00–8:30 AM | G | MHB-4F, Conv. Center | Streamline to Mastery: A Model for STEM Professional Development (p. 74) |
| 8:00–9:00 AM | M–C | 111/113, Conv. Center | Classroom Management Strategies for the Secondary School Science Class (p. 73) |
| 8:00–9:00 AM | G | 112, Conv. Center | Back to College: Connecting K–5 Teachers and College Professors (p. 73) |
| 8:00–9:00 AM | G | 207, Conv. Center | ASEE Session: <i>TeachEngineering.org</i> : Free Resources for Engineering in K–12 (p. 74) |
| 8:00–9:00 AM | 6–8 | 303, Conv. Center | Merging the Three Dimensions of the <i>Next Generation Science Standards</i> (p. 76) |
| 8:00–9:00 AM | G | 501, Conv. Center | NSTA Press® Session: Special Needs Students in Science (p. 73) |
| 8:00–9:00 AM | G | 503, Conv. Center | Fueling the Future: Energy Interconnections and Sustainable Choices (p. 75) |
| 8:00–9:00 AM | G | 505, Conv. Center | Integrated STEM (p. 75) |
| 8:00–9:00 AM | G | MHB-3C, Conv. Center | What Works in Science Classrooms: Using Visual Tools and Virtual Manipulatives (p. 75) |
| 8:00–9:00 AM | H–C | MHB-4C, Conv. Center | CPR—Revive Writing in the Science Classroom Without Killing Yourself (p. 73) |
| 8:00–9:00 AM | G | MHB-4D, Conv. Center | Let the iPad Tell a Science (Digital) Story! (p. 73) |
| 8:00–9:00 AM | G | MHB-4E, Conv. Center | Great Science Lesson = Presidential Award + \$10,000 (p. 73) |
| 8:00–9:15 AM | 9–12 | 106, Conv. Center | PASCO’s SPARKscience for High School Students—Free Starter Kits for Attendees! (p. 76) |
| 8:00–9:15 AM | 6–8 | 402, Conv. Center | Experience the Power of a Digital Middle School Program (p. 77) |
| 8:00–9:15 AM | 6–8 | 403/404, Conv. Center | Hands-On Integrated Science Activities for Middle School from Flinn Scientific (p. 77) |
| 8:00–9:15 AM | 6–8 | 405, Conv. Center | IQWST Tablet Edition: Blending the Effectiveness of Learning-by-Doing with the Power of Connected Mobile Technology (p. 77) |
| 8:00–9:15 AM | 8–C | 406, Conv. Center | Unleashing Your Students’ Inner Inventor—Robots, Video Games, and DIY! (p. 77) |
| 8:00–9:15 AM | 2–8 | 407, Conv. Center | The STEM Energy Challenge (p. 77) |
| 8:30–9:00 AM | G | MHB-4F, Conv. Center | Partners in Progress: Best Practices for Building Partnerships with STEM-based Groups (p. 74) |
| 9:30–10:30 AM | G | 103/105, Conv. Center | Featured Presentation: Play and Science Running Together (Speaker: Kenneth Wesson) (p. 79) |
| 9:30–10:30 AM | E | 108/110, Conv. Center | Spinning Your Way into STEM (p. 81) |
| 9:30–10:30 AM | M–H | 111/113, Conv. Center | Science at “C” Level: A Creative, Cooperative, Cross-Disciplinary Approach to Critical Thinking (p. 79) |
| 9:30–10:30 AM | E | 207, Conv. Center | ASEE Session: Introducing Engineering to Elementary School Students (p. 81) |
| 9:30–10:30 AM | 9–12 | 303, Conv. Center | Engineering in the <i>Next Generation Science Standards</i> (p. 83) |
| 9:30–10:30 AM | E | 501, Conv. Center | NSTA Press® Session: <i>Picture-Perfect Science Lessons</i> : Using Picture Books to Guide Inquiry (p. 81) |

Schedule at a Glance General Science

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| 9:30–10:30 AM | M | 502, Conv. Center | Experimental Design...Be the Scientist for STEM Connections (p. 79) |
| 9:30–10:30 AM | G | 503, Conv. Center | “Stuff,” STEM, and Sustainability—Examining and Reengineering Systems, Resources, and Consumption (p. 81) |
| 9:30–10:30 AM | G | MHB-1D, Conv. Center | Uncovering Students’ and Teachers’ Ideas in Science (p. 82) |
| 9:30–10:30 AM | E | MHB-2A, Conv. Center | Inspiring Achievement Through Rigorous, Innovative, and Authentic Experiences (p. 82) |
| 9:30–10:30 AM | G | MHB-3C, Conv. Center | A Proposed Integrated STEM Framework (p. 80) |
| 9:30–10:30 AM | G | MHB-4A, Conv. Center | NSELA Session: Tools for Science Leaders, Part 1 (p. 80) |
| 9:30–10:30 AM | E–H | MHB-4D, Conv. Center | Time Will Tell: Using Time-Lapse Photography and Digital Storytelling to Observe Change (p. 80) |
| 9:30–10:30 AM | M–H | MHB-4E, Conv. Center | Scaffolding Science Instruction in the Secondary Classroom (p. 82) |
| 9:30–10:30 AM | G | MHB-4F, Conv. Center | Teaching Science in Literature (p. 80) |
| 9:30–11:30 AM | G | 506, Conv. Center | ESP: Unique Features of Programs That Meet “More Emphasis” Features in the NSES (p. 84) |
| 10:00–11:15 AM | K–8 | 104, Conv. Center | The NGSS...and the CCSS? Reflection and Application of <i>Common Core State Standards</i> , in English Language Arts and Mathematics Integration K–8 (p. 84) |
| 10:00–11:15 AM | K–8 | 106, Conv. Center | PASCO’s SPARKscience for K–8 Students—Free Starter Kits for Attendees! (p. 84) |
| 10:00–11:15 AM | 6–9 | 107, Conv. Center | Student Collaboration in the Science Classroom (p. 84) |
| 10:00–11:15 AM | 1–8 | 403/404, Conv. Center | Cool! Can We Do That Again?! (p. 85) |
| 10:00–11:15 AM | 6–8 | 405, Conv. Center | The NGSS and Science Practices—More Than Photoshopping Models’ Flaws (p. 85) |
| 10:00–11:15 AM | 8–C | 406, Conv. Center | Unleashing Your Students’ Inner Inventor—Robots, Video Games, and DIY! (p. 85) |
| 10:00–11:30 AM | 3–C | 401, Conv. Center | Integrate iPad and BYOD with Vernier Technology (p. 86) |
| 11:00–11:30 AM | E–M | MHB-4B, Conv. Center | Making the Connection Between Formal and Informal Education (p. 87) |
| 11:00 AM–12 Noon | E–M | 108/110, Conv. Center | Integrating Science and Literacy (p. 86) |
| 11:00 AM–12 Noon | E | 111/113, Conv. Center | Creating K–6 Classrooms That Embrace Science Inquiry: Helping Students Think, Apply Problem-solving Skills, and Unleash and Engage Their Curiosities (p. 86) |
| 11:00 AM–12 Noon | G | 112, Conv. Center | Creative Problem Solving with Toshiba/NSTA ExploraVision (p. 86) |
| 11:00 AM–12 Noon | G | 207, Conv. Center | ASEE Session: ASEE’s K–12 Outreach Program, eGFI: Engineering, Go For It and the Marshmallow Challenge (p. 88) |
| 11:00 AM–12 Noon | E | 501, Conv. Center | NSTA Press® Session: Next Time You See a Sunset, a Seashell, a Firefly... (p. 88) |
| 11:00 AM–12 Noon | G | 502, Conv. Center | Magical Illusions for Science—It’s Showtime! (p. 86) |
| 11:00 AM–12 Noon | E | MHB-2A, Conv. Center | STEM Inquiry and Problem-Based Learning (PBL) (p. 87) |
| 11:00 AM–12 Noon | P–E | MHB-3B, Conv. Center | Make-and-Take: Science, Literacy, and Math (p. 88) |
| 11:00 AM–12 Noon | G | MHB-4A, Conv. Center | NSELA Session: Tools for Science Leaders, Part 2 (p. 87) |
| 11:00 AM–12 Noon | M–H | MHB-4D, Conv. Center | Powerful Strategies to Accelerate the Acquisition and Retention of Science Vocabulary (p. 89) |
| 11:00 AM–12 Noon | E–H | MHB-4E, Conv. Center | Science in the Clouds (p. 87) |
| 11:00 AM–12 Noon | G | MHB-4F, Conv. Center | Analyzing Data on Mountain Gorillas’ DNA Fingerprints and Ecosystems (p. 89) |
| 12 Noon–1:15 PM | K–8 | 104, Conv. Center | Bring Visual Science into K–8 Classrooms—It’s a Game Changer! (p. 89) |
| 12 Noon–1:15 PM | 9–12 | 106, Conv. Center | PASCO’s SPARKscience for High School Students—Free Starter Kits for Attendees! (p. 90) |
| 12 Noon–1:30 PM | 3–C | 401, Conv. Center | Integrate iPad and BYOD with Vernier Technology (p. 90) |
| 12:30–1:30 PM | G | 103/105, Conv. Center | Featured Presentation: Engineering Speed: Using NASCAR to Engage Students in Math, Science, and Engineering (Speaker: Diandra L. Leslie-Pelecky) (p. 90) |
| 12:30–1:30 PM | G | 108/110, Conv. Center | Igniting Interest and Engaging Learning with 3-D Graphic Organizers (p. 92) |
| 12:30–1:30 PM | G | 112, Conv. Center | Engineering in the Science Classroom—We Put the “E” in STEM (p. 91) |
| 12:30–1:30 PM | H | 207, Conv. Center | ASEE Session: Challenge Your High School Students: <i>Engineer Your World</i> (p. 93) |
| 12:30–1:30 PM | M–H | 501, Conv. Center | NSTA Press® Session: <i>Rise and Shine: A Practical Guide for the Beginning Science Teacher</i> (p. 91) |
| 12:30–1:30 PM | G | 502, Conv. Center | Dazzling Deceptions: Discrepant Events That Delight and Mystify! (p. 91) |
| 12:30–1:30 PM | G | 503, Conv. Center | Addressing Student Misconceptions (p. 93) |
| 12:30–1:30 PM | G | MHB-1F, Conv. Center | Distance Learning—Making Science Personally Relevant! (p. 91) |
| 12:30–1:30 PM | P–E | MHB-2A, Conv. Center | Let’s Get Physical: Force and Motion (p. 92) |

Schedule at a Glance General Science

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| 12:30–1:30 PM | E | MHB-3B, Conv. Center | Sensational Science: Step-by-Step Strategies Across the Curriculum (p. 92) |
| 12:30–1:30 PM | G | MHB-4A, Conv. Center | NARST Session: Use of Evidence and Standards-based Reflection in Elementary Science Methods (p. 92) |
| 12:30–1:30 PM | I | MHB-4B, Conv. Center | Bringing the Zooniverse into the Classroom (p. 93) |
| 12:30–1:30 PM | G | MHB-4D, Conv. Center | Planning and Designing Safe, Sustainable, and Flexible Facilities for STEM-based Science (Science Facilities 101) (p. 94) |
| 12:30–1:30 PM | G | MHB-4E, Conv. Center | Putting It All Together: Developing Connections Between the CCSS and the NGSS (p. 94) |
| 12:30–1:30 PM | I | MHB-4F, Conv. Center | <i>Using Forensics: Wildlife Crime Scene!</i> Using Forensics to Solve a Wildlife Crime, Part 2 (p. 94) |
| 2:00–3:00 PM | M | 108/110, Conv. Center | Science Plus Literacy—Blended and Seamless (p. 95) |
| 2:00–3:00 PM | M | 111/113, Conv. Center | STEM Projects for the Middle School Classroom (p. 95) |
| 2:00–3:00 PM | G | 112, Conv. Center | I Want to Be a Science Teacher—Now What? (p. 95) |
| 2:00–3:00 PM | G | 207, Conv. Center | ASEE Session: Young Rocket Engineers (p. 98) |
| 2:00–3:00 PM | 6–C | 303, Conv. Center | Bringing Technology into Your STEM Classroom (p. 99) |
| 2:00–3:00 PM | P–E | 505, Conv. Center | NSTA Press® Session: Uncovering Elementary Students Ideas in Science (p. 98) |
| 2:00–3:00 PM | G | 503, Conv. Center | The NSTA Learning Center: A Tool to Develop Preservice Teachers (p. 96) |
| 2:00–3:00 PM | G | 502, Conv. Center | Linking Science Writing and Research Through the DuPont Challenge (p. 96) |
| 2:00–3:00 PM | G | MHB-1F, Conv. Center | Engaging Students, Developing Science Knowledge and Conceptual Understanding, and Teaching Science Literacy Skills with Quality Nonfiction Science Books (p. 96) |
| 2:00–3:00 PM | M–C | MHB-3A, Conv. Center | Can a Shoebox Fly? (p. 97) |
| 2:00–3:00 PM | I | MHB-4B, Conv. Center | 30 Demos in 50 Minutes (p. 97) |
| 2:00–3:00 PM | C/S | MHB-4C, Conv. Center | Metadisciplinarity, Science Literacy, and General Education (p. 99) |
| 2:00–3:00 PM | G | MHB-4D, Conv. Center | The Architects Have Started Without Me: What Do I Do Now? (Science Facilities 102) (p. 99) |
| 2:00–3:00 PM | E–M | MHB-4E, Conv. Center | Problem-Based Learning with Elementary Students (p. 97) |
| 2:00–3:00 PM | G | MHB-4F, Conv. Center | University-School District Partnerships to Address Recruitment of the Next Generation of Science Teachers (p. 97) |
| 2:00–3:15 PM | G | 403/404, Conv. Center | Foldables® + Science Standards + Envelopes = A Winning Combination (p. 100) |
| 3:00–4:30 PM | 7–C | 302, Conv. Center | Engineer the Tools for Inquiry of Candy Food Dyes (p. 101) |
| 3:30–4:30 PM | G | 103/105, Conv. Center | Featured Presentation: For the Love of Place: Humanity, Education, and Nature in the 21st Century (Speaker: Scott Sampson) (p. 101) |
| 3:30–4:30 PM | M–C | 108/110, Conv. Center | Digital Media Supporting Science Teaching and Learning (p. 103) |
| 3:30–4:30 PM | G | 112, Conv. Center | Authors Needed! (p. 102) |
| 3:30–4:30 PM | I | 207, Conv. Center | ASEE Session: Adventure Engineering (p. 103) |
| 3:30–4:30 PM | G | 501, Conv. Center | NSTA Press® Session: Designing Effective Science Instruction for the <i>Next Generation Science Standards</i> (p. 103) |
| 3:30–4:30 PM | M–H | MHB-1E, Conv. Center | The ABCDs of Modeling: How to Add the <i>Next Generation Science Standards</i> Practice of Modeling to Your Classroom (p. 104) |
| 3:30–4:30 PM | M–H | MHB-1F, Conv. Center | STEM, Inquiry, and the NGSS: The Making of Effective Science Lessons (p. 102) |
| 3:30–4:30 PM | P–E | MHB-2A, Conv. Center | <i>Science & Children</i> —A Year of Inquiry (p. 104) |
| 3:30–4:30 PM | E–H | MHB-3A, Conv. Center | Exploring NASA Engineering Challenges—Something for Everyone! (p. 104) |
| 3:30–4:30 PM | G | MHB-4C, Conv. Center | ASEE Session: Project Learning Tree—Find STEM from Design to Testing for Desired Properties (p. 104) |
| 3:30–4:30 PM | M–H | MHB-4D, Conv. Center | Square Pegs (p. 102) |

Saturday

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|--------------|---|----------------------|---|
| 8:00–8:30 AM | S | MHB-1F, Conv. Center | Designing Professional Development That Prepares Teachers for the NGSS (p. 107) |
| 8:00–9:00 AM | G | MHB-2C, Conv. Center | Galileo's Square-Cube Law: Explaining How Size Matters (p. 107) |
| 8:00–9:00 AM | E | MHB-3A, Conv. Center | It's eleSTEMary! STEM Education from Classroom to Community! (p. 108) |

Schedule at a Glance General Science

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|------------------|-----|----------------------|--|
| 8:00–9:00 AM | E–M | MHB-4D, Conv. Center | Making the Interdisciplinary Connection Between Science, Literacy, and Math (p. 108) |
| 8:00–9:00 AM | E–M | MHB-4E, Conv. Center | Get Down in the Dirt! (p. 108) |
| 9:30–10:30 AM | M–H | MHB-1F, Conv. Center | Nanoscience and Technology: Teaching Emerging Science Content (p. 110) |
| 9:30–10:30 AM | P–M | MHB-2A, Conv. Center | Choose and Use the Best in Children’s Literature (p. 111) |
| 9:30–10:30 AM | M–H | MHB-3A, Conv. Center | The Amazing Atlatl (p. 110) |
| 9:30–10:30 AM | H | MHB-4D, Conv. Center | Using Pollen Analysis to Address the NGSS and Literacy (p. 110) |
| 9:30–10:30 AM | M–C | MHB-4E, Conv. Center | Bringing Your Class Alive: Active Learning Strategies for the Science Classroom (p. 110) |
| 11:00 AM–12 Noon | H | MHB-1B, Conv. Center | Using Stories to Teach Science (p. 112) |
| 11:00 AM–12 Noon | H | MHB-1F, Conv. Center | Science, Engineering, and the <i>Common Core State Standards</i> (p. 113) |
| 11:00 AM–12 Noon | E–M | MHB-2A, Conv. Center | Energize the CCSS in Your Classroom! (p. 113) |
| 11:00 AM–12 Noon | P–E | MHB-3B, Conv. Center | Engaging Children in Scientific Explanation: Connecting Science and Literacy Using a “Question-Claim-Evidence-Reason” Framework (p. 112) |
| 11:00 AM–12 Noon | M–H | MHB-3C, Conv. Center | Customizing STEM Instruction (p. 112) |

Physics/Physical Science

Thursday

| | | | |
|------------------|------|----------------------|---|
| 8:00–9:00 AM | H | MHB-1E, Conv. Center | Teaching Online in Real Time (p. 46) |
| 10:00–11:15 AM | 4–10 | 304, Conv. Center | Exploring Machines (p. 52) |
| 11:00 AM–12 Noon | 6–8 | 102, Conv. Center | Hot Bulbs: Investigating Energy Efficiency (p. 53) |
| 12:30–1:30 PM | G | MHB-1E, Conv. Center | Using Kinesthetic Activities to Teach Abstract Concepts (p. 56) |
| 12:30–1:45 PM | 6–12 | 104, Conv. Center | Engineer Excitement in Your Classroom with a Carolina STEM Challenge™ (p. 57) |
| 12:30–1:45 PM | 6–12 | 301, Conv. Center | Motion Comes Alive with CPO’s Velocity Sensor (p. 57) |
| 12:30–1:45 PM | 4–10 | 304, Conv. Center | Forces, Energy, and Motion (p. 58) |
| 2:00–3:00 PM | 6–8 | 102, Conv. Center | Waves, Energy, and Color (p. 63) |
| 2:00–3:00 PM | H | MHB-1E, Conv. Center | PHYSICS FIRST: A Story of Adoption, Implementation, and Evaluation (p. 60) |
| 2:00–3:00 PM | E–M | MHB-3A, Conv. Center | Engineering: Integrate the 3Ds in the NGSS (p. 62) |
| 2:15–3:30 PM | 6–12 | 301, Conv. Center | Wind Turbine and the STEM Approach to Science Concepts (p. 64) |
| 2:15–3:30 PM | 5–10 | 304, Conv. Center | Renewable Energy (p. 64) |
| 3:30–4:30 PM | 6–12 | 102, Conv. Center | Integrate Math Modeling and Problem Solving Through Racing (p. 68) |
| 3:30–4:30 PM | E | MHB-2A, Conv. Center | Amazing Aircraft (p. 67) |
| 4:00–5:15 PM | 6–12 | 301, Conv. Center | Sound and Waves (p. 68) |
| 4:00–5:15 PM | 3–6 | 304, Conv. Center | Introduction to Simple Machines (p. 69) |

Friday

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|------------------|------|-----------------------|--|
| 8:00–9:00 AM | G | 210/212, Conv. Center | AAPT Session: Addressing the NGSS with Classroom Scientific Induction (p. 74) |
| 8:00–9:00 AM | M | MHB-1E, Conv. Center | Seeing the Invisible: Making the Electromagnetic Spectrum Concrete (p. 75) |
| 8:00–9:15 AM | 4–10 | 304, Conv. Center | Forces, Energy, and Motion (p. 77) |
| 9:30–10:30 AM | G | 210/212, Conv. Center | AAPT Session: Energy Conservations and Transformations (p. 81) |
| 9:30–10:30 AM | E–H | 507, Conv. Center | Classroom Activities for <i>Stop Faking It: Energy</i> (p. 81) |
| 10:00–11:15 AM | 5–10 | 304, Conv. Center | Renewable Energy (p. 85) |
| 11:00 AM–12 Noon | G | 210/212, Conv. Center | AAPT Session: E.T. Phone Home (p. 88) |
| 11:00 AM–12 Noon | 9–12 | 303, Conv. Center | Active Physics—Ahead of Its Time in Capturing the Essence of the NGSS and STEM (p. 89) |
| 11:00 AM–12 Noon | M–H | MHB-1E, Conv. Center | NASA Brings You Newton’s Laws of Motion (p. 88) |
| 11:00 AM–12 Noon | M | MHB-3C, Conv. Center | NASA Engineering Activities Under \$1! (p. 88) |
| 12 Noon–1:15 PM | 3–6 | 304, Conv. Center | Introduction to Simple Machines (p. 90) |
| 12:30–1:30 PM | G | 210/212, Conv. Center | AAPT Session: iModel, iCollaborate, and iInvestigate: Using iPads in the Science Classroom (p. 93) |

Schedule at a Glance Physics/Physical Science

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|---------------|------|-----------------------|---|
| 12:30–1:30 PM | G | MHB-1E, Conv. Center | The True Path: Science and Math Integrated Curriculum for Teacher Professional Development (p. 91) |
| 2:00–3:00 PM | G | 210/212, Conv. Center | AAPT Session: The Physics of Karate: Demonstrating Work and Energy with a Varying Force (p. 95) |
| 2:00–3:00 PM | E–M | 501, Conv. Center | NSTA Press® Session: Stop Faking It! Finally Understand LIGHT AND SOUND So You Can Teach It (p. 98) |
| 2:00–3:00 PM | M–H | MHB-1E, Conv. Center | Energy in the Physics Classroom (p. 98) |
| 2:00–3:15 PM | 5–9 | 109, Conv. Center | There's a New Robot in Class! LEGO® MINDSTORMS® Education EV3 in Your Classroom (p. 100) |
| 2:00–3:30 PM | 7–C | 401, Conv. Center | Physics and Physical Science with Vernier (p. 101) |
| 3:30–4:30 PM | H–C | MHB-2C, Conv. Center | How Do Airplanes Fly, Really? (p. 102) |
| 3:30–5:00 PM | G | 210/212, Conv. Center | AAPT Session: "I Know What It Is, But How Do I DO It?!" A How-To Workshop on Inquiry Science Instruction (p. 105) |
| 4:00–5:15 PM | 4–10 | 304, Conv. Center | Exploring Machines (p. 105) |

Saturday

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| 8:00–9:00 AM | E–H | 201, Conv. Center | NSTA Press® Session: Classroom Activities for <i>Stop Faking It! Force and Motion</i> (p. 108) |
| 8:00–9:00 AM | M–H | MHB-1E, Conv. Center | Teaching Physical Science Using Modeling Instruction (p. 107) |
| 9:30–10:30 AM | M–C | 201, Conv. Center | NSTA Press® Session: The Method: An Innovative Way to Teach and Understand Problem Solving (p. 111) |
| 9:30–10:30 AM | G | MHB-1E, Conv. Center | What Is Relativity? An Introduction to Einstein's Theories (p. 110) |
| 9:30–10:30 AM | E | MHB-3B, Conv. Center | SMILE with Physical Science (p. 111) |
| 11:00 AM–12 Noon | E–H | MHB-1E, Conv. Center | Polymers: New Twists on Old Favorites (p. 113) |

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