



MAST Conference Preview

November 3 + 4, 2016

SCIENCE IN THE WORLD AROUND US

The Massachusetts 2016 Science, Technology & Engineering (STE) Standards call for an increase in relevance, rigor and coherence within our students' science learning experiences. Developing educators and students that ask questions and explore the intricacies of the Science in the World Around Us nurtures students' sense of wonder while developing critical thinkers and scientifically literate citizens. By diving into about our theme of "Science In the World Around Us", educators can work towards connecting students' observations of real phenomena to the science content, and encouraging students to investigate their continued curiosities of the world.

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CONFERENCE THEMES:

- **Teacher Leaders**
- **Made in MA: Local Connections**
- **Student Misconceptions**
- **Technology & Engineering**
- **Innovative Assessments**

REGISTER NOW!
MassScienceTeach.org

Annual MAST Conference Preview

WHO: “Massachusetts Association of Science Teachers (MAST)- your state chapter of NSTA”

WHAT: The Annual 2016 MAST Conference

WHERE: The Holiday Inn – Boxborough, MA
(242 Adams Place, Boxborough – I495 at Exit 28, free onsite parking)

WHEN: Thursday, November 3, 2016 (7:00 am to 3:45 pm)
Friday, November 4, 2016 (7:00 am to 3:45 pm)

WHY: To fulfill our nonprofit mission: To enhance science teaching and empower teachers of science.

COST: MAST Conference Registration Fees

	Current Member* (MAST)	Non-Member*
1 day	\$80	\$100
2 day	\$130	\$150
	Retired/Student	Non-Member Retired/Student
1 day	\$30	\$40
2 day	\$50	\$60

* **Conference Registration Fees** (includes admission to all workshop sessions and the exhibit hall, a box lunch and continental breakfast each day, and refreshments/snacks in exhibit hall during breaks). Conference Registration Fees do not include a membership fee. Please visit the MAST website to become a member. MAST annual membership dues are still just \$20.

Overnight Accommodations: Guest rooms are available at a special MAST Conference rate of \$112 per night for a single or double room, \$122 for a triple, or \$132 for the quad rate. Rates apply based on the number of adults in each room. All room rates are quoted exclusive of applicable state and local taxes, currently 11.7%. The “cut-off date” for accepting reservations at the special rate is October 14, 2015. Reservation requests received after 5:00 pm local time at the Hotel on the cut-off date will be accepted on a space and rate availability basis. Contact the Holiday Inn – Boxborough to make a reservation by phone at 978-263-8701 or online at www.IHG.com.

EXHIBIT HALL

The commercial and non-profit exhibitors featured in our 13,200 sq. ft Exhibit Hall represent museums, educational product companies, book publishers, local science organizations, and more! Browse the exhibit tables for ideas, discover new products and services, make connections, request additional information, get free samples, and talk with knowledgeable salespeople in a friendly and informative environment. The Exhibit Hall will be open from 7am to 3:45pm each day, and will be the location of our continental breakfast and refreshment breaks.

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THURSDAY, NOVEMBER 3, 2016

7:00-8:00am	Registration/Continental Breakfast
8:00-9:00am	Keynote Speaker, Page Keeley
9:15-10:15am	Session 1
10:15-11:00am	Break/Exhibit Time
11:00-12:00pm	Session 2
12:00-1:00pm	Box Lunch in Courtyard
1:00-2:00pm	Session 3
2:15-3:15pm	Session 4
3:15-3:45pm	Exhibit Time
3:45-4:15pm	MAST Annual Meeting
5:00-6:00pm	Pre - Banquet Reception
6:00-9:00pm	MAST Awards Banquet

FRIDAY, NOVEMBER 4, 2016

7:00-8:00am	Registration/Continental Breakfast
8:00-9:00am	Session 5
9:15-10:15am	Session 6
10:15-11:00am	Break/Exhibits
11:00-12:00pm	Session 7 & Share-a-thon
12:00-1:00pm	Box Lunch in Courtyard
1:00-2:00pm	Session 8
2:15-3:15pm	Session 9
3:15-3:45pm	Exhibit Time

2016 Conference Registration is available on-line at
www.MassScienceTeach.org

*All times, speakers, and presentations subject to changes!
See MAST website for the latest information.*

ONLINE CONFERENCE SCHEDULER

This year, MAST is excited to debut an online, interactive conference schedule. By visiting <https://mast2016conference.sched.org/> you will be able to read about conference sessions and create your own schedule that syncs to your personal calendar! We will also have printed Conference Programs available for all attendees on-site.

RECYCLING INITIATIVE

For the past few years, MAST has been working to be a leader and make the Annual Conference more “green”. A major area of improvement that we have identified and addressed this year is the consumables associated with our boxed lunch. Working with the hotel, we have been able to arrange for MAST’s first “boxless lunch” to eliminate the waste produced by individually packaged boxed lunches. Attendees should expect the same high quality of food service, with less packaging waste. To collect a “boxless lunch” attendees will choose 1 each of an individually wrapped sandwich or salad, a bag of chips, a piece of fruit, a cookie, and a water or soda from a series of platters. We will have recycling bins available for the bottles and can waste. Thank you for partnering with us as we work to be more environmentally friendly!

PROFESSIONAL DEVELOPMENT

Over the course of the 2016 MAST Conference, attendees will be able to choose from over 70 different one-hour workshop sessions! In Friday’s “**Share-a-thon**” sessions educators will share exemplary activities as attendees have the opportunity to visit each table to talk with directly with presenters about their presentation topic. Each day of the MAST conference will commence with nationally recognized, NSTA best selling author and former New England educator **Page Keeley**. Attendees will be provided with PDP certificates at the end of each conference day, and have the option to apply for 1 graduate credit from Framingham State University. Visit www.framingham.edu/MAST for more information.



Welcome!

Massachusetts Association of Science Teachers' (MAST) Annual Fall Conference!

Welcome to the Massachusetts Association of Science Teachers' (MAST) annual fall conference! Our theme for the 2016 MAST conference is **Science In the World Around Us!**

We are excited to kick off our conference by welcoming legendary K-8 science educator, Page Keeley to share a Keynote Address "Uncovering Student Thinking- What Does It Really Mean to Assess and Teach for Conceptual Understanding?" that will challenge us as educators to consider the complexity of teaching students by building from the framework with which they come into our classes. She will be available during Exhibit Time for a book signing on Thursday, and will present another workshop about Formative Assessment Probes on Friday.

This year's great variety of presentations have been selected to provide formal and informal science educators and administrators the opportunity to learn new content, teaching strategies and gain access to quality resources. In light of the recent adoption of the 2016 Massachusetts Science, Technology and Engineering (STE) Standards, we have been working hard to provide sessions led by early adopters who are starting to make changes to their lessons, while also providing updates from MA DESE representatives. Through a partnership with Framingham State University, we are able to offer a graduate credit option for conference attendees who submit their MAST conference schedule along with a 500 word reflection.

Visit framingham.edu/MAST for more information.

This year our packed exhibit hall will open at 7:00am each day for registration. During our specially designated Exhibit Hall times we hope that you are able to connect with the **19 commercial and 29 non-profit organizations** that are exhibiting at this year's conference. These organizations have much to offer Massachusetts educators from products and unique learning experiences to the sharing of ideas and building partnerships.

On Thursday evening, MAST hosts our Annual Awards Banquet. This event honors science educators from all corners of Massachusetts, from diverse backgrounds and experiences in a celebration of the work that they do to motivate, encourage, and inspire their students to develop a love of and curiosity for science. To join us for this ticketed event, please register on the MAST website.

We look forward to another great conference! It is always wonderful to see the excitement of educators as we share ideas, resources, experiences and network with one another. To create your own personal schedule and track your sessions, visit <https://mast2016conferenc.sched.org/> Connect with MAST on Twitter @MAscienceteach and use #MAST16 for conference updates!

Meaghan Cells & Evan Pagliuca
MAST Conference Chairs

MAST Conference Contacts – "It takes a Village."

Conference Chairs: Meaghan Cells & Evan Pagliuca

Registration: Evan Pagliuca [registrar@MassScienceTeach.org]

Hospitality: Marilyn Richardson [hospitality@MassScienceTeach.org]

Treasurer: Caryl Adamowitch [treasurer@MassScienceTeach.org]

Raffles: Johanna Rodrigues [jrodrigues@rcn.com]

Volunteers: Nancy Gifford & Stephanie Pottinger
[ngiffordscience@gmail.com steph.pottinger@gmail.com]

Professional Development:

Kristen MacDonald [PD@MassScienceTeach.org]

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KEYNOTE ADDRESS

Thursday, November 3, 2016

8:00-9:00 am



PAGE KEELEY

NSTA best selling author and former New England educator

Page Keeley is an internationally known leader in science education. She is the developer and primary author of the *Uncovering Student Ideas Series in Science and the Formative Assessment- 75 Practical Strategies Linking Assessment, Instruction, and Learning series* (the “FACTs books”). Her interest in conceptual change and formative assessment began in 1992 after reading the seminal article, *Teaching for Conceptual Change- Confronting Children’s Experience* by Bruce Watson and Dick Konicek. Her assessment probes and FACTs (formative assessment classroom techniques) are widely used by K-12 teachers, university professors, and professional development and science specialists throughout the U.S. and internationally.

Page recently “retired” from the Maine Mathematics and Science Alliance (MMSA) where she had been the Senior Science Program Director since 1996. Today she works as an independent consultant, speaker, and author providing professional development to school districts and organizations in the areas of science and STEM formative assessment, understanding student thinking, teaching science for conceptual understanding, and designing effective instruction.



PAGE KEELEY taught middle and high school science for 15 years, and was an active teacher leader at the state and national level, serving two terms as President of the Maine Science Teachers Association and NSTA District II Director and NSTA Executive Board member. She received the Presidential Award for Excellence in Secondary Science Teaching in 1992, the Milken National Distinguished Educator Award in 1993, and the AT&T Maine Governor’s Fellow in 1994. Since leaving the classroom in 1996, her work in leadership and professional development has been nationally recognized. In 2008 she was elected the 63rd President of the National Science Teachers Association (NSTA).



Sponsored by: MCGRAW HILL EDUCATION



THURSDAY - SESSION 1

9:15 am to 10:15 am

B BIOLOGY

C CHEMISTRY

E EARTH SCIENCE

En ENGINEERING

P PHYSICS

WORKSHOP TOPIC CODES

1. OPTICS WITH LIGHT & COLOR: A Series of EnLIGHTening Experiments

Erik Benton

● Board Room

Finally, a comprehensive kit that takes a STEM approach to teaching about focal length, concave and convex lenses, reflection, refraction, polarization, and color mixing. CPO's Link Learning module does it all. **P**

2. TEACH CELL PROCESSES WITH MIT DNA & PROTEIN MODULES: Middle School Level

Kathleen M. Vandiver

● Cotillion Room

MS students can experience what DNA and protein molecules do inside the cell. Colorful MIT models can twist into a double helix or be worked flat for DNA replication. Simple proteins can be built and folded. **B**

3. AS THE WORM TURNS, SO TURNS THE COMPOST

Ann McGovern

● Deck

Set up a classroom worm bin or outdoor compost bin to teach life science standards on energy & nutrient cycles and ecology through organic recycling. Bring a 14-gallon or larger plastic tote to make your own worm bin; worms provided free! Easy outdoor compost bins (made in MA) available from DEP's Green Team program demonstrated. Great tie-in with school gardening. **E B**

4. DESIGNING A LONG-TERM MONITORING PROJECT WITH STUDENTS: Can They Prove The Seasons Are Changing?

Tarin H. Weiss

● Director

In this workshop, educators are challenged to prove that the season is changing and experience the design and data collection of a long-term monitoring project. Project themes titled "Is it Fall?" and "Has Spring Sprung?" support learners' creativity and content/inquiry learning and uncover existing understandings about environment. All levels welcome. **E**

5. USING STUDENT DRAWINGS FOR ASSESSING UNDERSTANDING OF THE SCIENCE & ENGINEERING PRACTICES

Judy McClure

● Federal

Student drawings are an excellent way to assess student understanding in science. Recently I adapted the "Draw A Scientist Test" and implemented this method in my own elementary science classroom. I will present my findings, teach you how to use this assessment, and leave time for discussion and reflection.

6. YOUNG SCIENTISTS, YOUNG ENGINEERS

Danielle Larkin

● Boxwood

Engineering in elementary school? Can my students do that? Yes! And...they will love it! This workshop will draw upon the newly developed Massachusetts STE standards as well as the embedded practices. It will give you creative ways to teach engineering standards that align with science content all while engaging the elementary school student and not overwhelming the teacher. Science will become your students' favorite part of the school day! **En**

7. A BIRD IN THE HAND: How To Move Away From The Science 'Unit' To Year Long Science Intregrated With ELA & Math

Mairead Curtis

● Fern

This workshop focuses on studying local bird species and insects. The enthusiasm of the students for their daily interactions with local birds and bugs easily spilled over into other parts of our 1st grade curriculum, effortlessly meeting ELA and math standards. Through the students own work, we will show how 1st grade Life science grew from a unit to a year of authentic learning. **B**



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SESSION 2

Thursday | 11 am to 12 pm

B BIOLOGY

C CHEMISTRY

E EARTH SCIENCE

En ENGINEERING

P PHYSICS

WORKSHOP TOPIC CODES

8. TEACHING CHEMISTRY CONCEPTS TO K-8 STUDENTS THROUGH HANDS ON ACTIVITIES

Barbara Ferri

- Board Room

The Essential Elements Program is based on the 5E learning cycle approach to teaching. This cycle allows students to build their own understanding of new concepts from both old ideas and their own experiences. Each part of the cycle describes a phase of learning: engage, explore, explain, elaborate, and evaluate. During an Essential Elements workshop, educators will be lead through a full 5E learning cycle utilizing a lesson from the Activity Guides. Educators then get a chance to collaborate and plan their own 5E lesson from additional Activity Guide lessons. **C**

9. TALKING DRAWINGS: Addressing Student Misconceptions In Life, Earth, & Physical Science

Stephanie Brunnett

- Cotillion

Student misconceptions present a challenge in the science classroom, especially if the teacher or student does not know that they are present. A talking drawing is one strategy that can be used to quickly assess student thinking before instruction and then provide an opportunity for student reflection after. This workshop will showcase several examples of talking drawings found in the SEPUP Issues curriculum presented by Lab-Aids as a way to demonstrate this strategy. Examples from life, physical, and Earth science will be presented. **BCEP**

10. EXPLORING WAVES IN THE NEW MASSACHUSETTS FRAMEWORK

Marilyn Decker

- Deck

One of the changes in the new MA Science and Tech/Eng. framework is an emphasis on waves and their applications in technologies at the elementary and middle school level. Using hands-on materials participants will engage in the science and engineering practices and explore the development of this important disciplinary core idea. **P**

11. YES! YOU CAN TAKE THE KIDS OUTSIDE! Making Outside Study Practical In Today's Schools

Jennifer Feller

- Director

This workshop is for teachers and administrators who would like to incorporate the urban, suburban, or rural schoolyard into their science program but need tips on how to overcome the practical hurdles of the modern school system. Specific examples of schoolyard studies that integrate with the Massachusetts Science Standards will be included. **EB**

12. NEXT GENERATION MCAS UPDATE

Katie Bowler

- Seminar

The Department of Elementary and Secondary Education will provide an update on the Next Generation MCAS. The presentation will focus on how the Science and Technology/Engineering assessments will transition to the 2016 standards, and how they will transition, along with ELA and Mathematics, to the Next Generation MCAS

13. SCIENCE/MATH INTEGRATION FOR A SUSTAINABLE PLANET

Beth Nickles

- Colonial Room

Engage in innovative activities that illustrate the science and math behind real-world ecology concepts such as carrying capacity in nature, natural resource use, and how humans are forever changing Earth's landscape, habitats and biodiversity. Presented strategies include creating representational models, cooperative group problem-solving challenges, graphing and analysis, and role-playing simulations. **EB**

14. DEVELOPING A SCALE MODEL OF THE SOLAR SYSTEM

Mia Dubosarsky

- Boxwood

This workshop engages participants in the process of developing a scale model of the solar system for planets' size and distances using everyday objects. The workshop also addresses the importance of scale models in disproving students' misconceptions. **E**

15. STE STANDARDS LESSON PLANNING: Electricity & Magnetism

MAST

- Fern

This session will be an active workshop for educators to engage in collaboration and lesson development with other conference attendees. A MAST Board Member will be facilitating this workshop on the topic of MS Electricity and Magnetism. Please bring a device to this workshopping session!



SESSION 3

Thursday | 1 pm to 2 pm

B BIOLOGY

C CHEMISTRY

E EARTH SCIENCE

En ENGINEERING

P PHYSICS

WORKSHOP TOPIC CODES

16. ENERGY EFFICIENCY: Making A Difference Can Start Early

Cassie Chesson

- Board Room

Young students often ascribe to the misconception that the only thing they can do to impact their energy usage is recycle. Not so! Monitoring & Mentoring is a unit geared for upper elementary and middle school students that allows them to use the school as a laboratory. Come learn how--and utilize tools like a Kill-a-Watt meter, a Flicker Checker, and a light meter. **P E**

17. PLANTING THE SEEDS OF STEAM: Designing Plant Packages With The Consumer in Mind

Katy Hutchinson

- Cotillion

The ease of integrating the STEAM domains will become apparent as participants engage in a hands-on engineering design challenge that authentically requires all five domains for success. Participants will engage in a STEAM challenge as they design and create a package for shipping and selling a plant. **En**

18. ADMIN NETWORKING

Betsey Clifford

- Deck

This session is an opportunity for department chairs, lead teachers, curriculum coordinators, and other administrators to network and discuss relevant topics for working with science educators.

19. CREATING ENGAGING & INSPIRING CLIMATE ACTIVITIES AMONGST THE DOOM & GLOOM

Corrine Steever

- Seminar

Come explore some project-based, hands-on activities created at the New England Aquarium that use biomimicry, coastal engineering, and comics to tell the story of what is happening along with what is currently being done to mitigate the effects of climate change. Participants will take part in hands-on activities, learn about free resources that are available to them, and walk away with an activity write-up that they can use in the classroom. **B**

20. EXPLORING THE SCIENCE & ENGINEERING PRACTICES

Nicole Scola

- Seminar

The science and engineering practices include the skills necessary to engage in scientific inquiry and engineering design. It is necessary to teach these so students develop an understanding and facility with the practices in appropriate contexts. Join us as we dive into exploring the practices and share ideas about how they can be implemented into a classroom. We will also provide updates on the 2016 STE Framework and share resources that can be used as you begin to review and implement changes in your district.

21. CLEANING UP THE CONNECTIONS BETWEEN SCIENCE & LITERACY: Integrating ELA & Science Through Real-World Context

Elissa Jordan

- Federal

This engaging, hands-on session will model how science and ELA instruction is equally enhanced by integration, in addition to fostering community involvement in the elementary classroom. By setting the context for a real-world environmental engineering problem through various media, students will find a meaningful application for both valuable skill sets. **E En**

22. MAKING WAVES

Annie Haven

- Colonial

With new MA science standards, educators must address especially complex physical science concepts. Is there a lesson database to help middle and elementary teachers with the standards related to waves, energy, and information transfer? YES! The Chatham Marconi Maritime Center is here to help with lessons created by a team of engineers and educators. Let us share our lessons with you! **P**



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23. REAL TIME ASSESSMENT OF NGSS SCIENCE PRACTICES

Dr. Janice Gobert
 ● Colonial

BYOD! Using big data analytics, Inq-ITS enables real time assessment of science practices. Explore Inq-ITS: Intelligent Tutoring System. Both student and teacher receive immediate feedback on inquiry science practices in Life, Earth, and Physical Science virtual labs and easily track student growth. (T)

24. ABOUT MAST

Evan Pagliuca
 ● Seminar

Come learn more about the Massachusetts Chapter of the National Science Teachers Association. Massachusetts Association of Science Teachers (MAST) Board Members will be on call to answer questions, share more about how to access resources and events sponsored by MAST as well as share opportunities to get involved!

26. CAPE COD MARITIME MUSEUM'S STEM GAINS STEAM: Connecting Maritime-themed STEAM With Cape Cod's Local & Visiting Students

Deirdre Detjens
 ● Cotillion

Our STEM gains STEAM program emphasizes science, technology, engineering, art and math topics drawn from our own coastal marine environment, enabling students to embrace new knowledge and skills in a way that is relevant to Cape Cod and our local culture. We host students here, and go into local schools. (B)(E)

27. DESIGN A SHADE FOR A LEMONADE STAND

Mia Dubosarsky
 ● Deck

This workshop focuses on the effect of sunlight on the earth surface as well as on people. Participants design a prototype of a shade for a lemonade stand that protects the children as well as the lemonade from the effect of the sunlight (aligned with MA's Kindergarten standards). (E)(En)

28. WGBH WEBINAR

Carolyn Jacobs &
 ● Seminar

Learn more about a partnership between MAST and WGBH to provide a professional development webinar workshop to highlight ways to use engineering within a science classroom.

29. GOT GOOGLE? Integrating Google Tools Into Science Assessments

Tiffany Floria
 ● Federal

Explore Google tools like goobric, doctopus, forms, autocrat & more for streamlining science assessments & reports. Use with Google Classroom or alone. Bring laptop & assignment/rubric or use examples provided. (T)

30. IMPLEMENTING NGSS SCIENTIFIC & ENGINEERING PRACTICES IN THE ELEMENTARY CLASSROOM

Steve Murray
 ● Colonial

We will model activities that show how you and your students will design, gather and communicate ideas and information that integrate Engineering Practices and the Common Core. Handouts will include sample equipment, literacy connections, reading samples and ideas on note-taking from the FOSS NGSS Matter & Motion module. (C)(P)



SESSION 4

Thursday | 2:15 pm to 3:15 pm

(B) BIOLOGY	(C) CHEMISTRY
(E) EARTH SCIENCE	(En) ENGINEERING
(P) PHYSICS	WORKSHOP TOPIC CODES

25. YOUTH AWARDS PROGRAM FOR ENERGY ACHIEVEMENT

Cassie Chesson
 ● Board Room

Run a program in school or after school in which students learn about energy? Would you like to start? Come learn about a program that combines academic competition with recognition to acknowledge students and teachers who achieve excellence in energy education. (P)



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31. NATURAL HAZARDS IN YOUR HOMETOWN!

Amy Fleischer
● Boxwood

We'll show you how we used local primary sources (including interactive mapping tools!) from the Cape Cod Commission and state and town government websites to design an engaging, place-based curriculum for MS-ESS3-2: "Obtain and communicate information on how data from past geologic events are analyzed for patterns and used to forecast the location and likelihood of future catastrophic events" and help you find resources for your community too! **E**

32. STUDENT-BUILT SENSING DEVICES FOR SCIENCE

Sean Reeves
● Fern

Students are more invested in the outcome of an investigation when they make and use their own sensing tools. You will build your own sensing tool and return to school with one circuit and plans for many more. **En**

35. TEACHER LEADERS SHARING THEIR MUSEUM INSTITUTE FOR TEACHING SCIENCE (MITS) LEARNING EXPERIENCES

Rosemary Rak
● Deck

Teacher participants in MITS' courses and workshops often catalyze instructional change in their schools by sharing the content and skills they have learned with their colleagues. Join such teacher leaders to see how they have inspired colleagues to use science and engineering practices, and inquiry-based science instruction, in their teaching.

36. INTRODUCTION TO PERSONAL GENETICS

Lauren Tomaselli
● Director

What are the major ethical and social issues in genetics today, and how can teachers make them relevant to students? We will explore issues including who should have access to genetic information, and how more information impacts individuals, families, and society. Our interactive session covers strategies that encourage discussion. **B**

37. THE LATEST UPDATE ON THE NEXT-GENERATION MCAS PROJECT

Jass Stewart
● Seminar

DESE staff will update participants and solicit feedback on the progress of the next generation MCAS. Learn more about the state's latest recommendations for the next generation assessment.

38. CLASSROOM IN THE CLOUD: Not Necessarily What You Think

Romeo Marquis
● Federal

No matter what online learning system you are using, the effectiveness of your course depends far more on your own instructional design skills than on the tools you select. Come learn the differences between cloud-based and classroom-based courses. Hands on - bring your tablet or laptop!

39. BUILDING A CITY: Interdisciplinary Science In Action

Michael Chapman
● Colonial Room

Can science help build an ideal city and fix potential problems? Learn about one middle school's interdisciplinary project, where students applied scientific knowledge to create energy sources and water treatment plants for their own 'Utopia'. See Minecraft and engineering's unique assessment roles, and best strategies when collaborating across disciplines. **E En P T**



FRIDAY - SESSION 5

8 am to 9 am

B BIOLOGY

C CHEMISTRY

E EARTH SCIENCE

En ENGINEERING

P PHYSICS

WORKSHOP TOPIC CODES

34. PROJECT BASED ASSESSMENT FOR MIDDLE SCHOOL

Barbara Ferri
● Cotillion

Project-based learning engages middle school students, involving them in the process of driving their own learning and self-differentiating the instruction. Projects that have been successfully used in a middle school classroom, that are aligned with the NGSS, will be presented, along with handouts and exemplars of completed projects.



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41. USING A HISTORICAL APPROACH & ATTENTION TO PROPORTIONAL REASONING IN PHYSICAL SCIENCE

Frederick Meshna & Arianna Lambie
● Fern

You will see a developing website (easyaspi.org) designed to facilitate conceptual development in topics covered in 8th grade physical science classes. The emphasis is on the historical background of mathematical concepts with a focus on proportional reasoning, which has been used at the International School of Boston. (C)(P)



SESSION 6

Friday | 9:15 am-10:15 am

B BIOLOGY	C CHEMISTRY
E EARTH SCIENCE	En ENGINEERING
P PHYSICS	WORKSHOP TOPIC CODES

42. WIND ENERGY: It'll Blow Your Mind

Cassie Chesson
● Board Room

What will make the biggest difference in the electrical output of your wind turbine: blade material, blade shape, gear ratio, pitch, number of blades? Come try your hand at our Blade Design Challenge and its corresponding curriculum. It's a hands-on, critical thinking challenge that will have your students working as engineers in a competitive setting! (En)(P)

43. BRIDGING MATH AND SCIENCE WITH DYE STEM ELECTROPHORESIS!

Tamica Stubbs
● Cotillion

Come & learn how to bridge the gap between textbook science and students' lives as you learn how to engineer a gel electrophoresis box and run candy dyes and DNA on a gel to test the efficiency of your design. (B)

44. TEACHING WAVES WITH SEPUP CURRICULUM

Dick Duquin
● Deck

With waves back in focus at the middle school level, it is important to connect this topic to other science instruction. Lab-Aids has been working with SEPUP at UC Berkley to update its curriculum to reflect this need. This workshop will feature demonstrations from the latest SEPUP waves curriculum unit focused around hands-on learning anchored to real world issues. (P)

45. THE SCIENCE CLASSROOM OF THE FUTURE

Christine Casatelli
● Director

NOVA recently premiered School of the Future—a show that introduced viewers to the science of learning and explored the big ideas and best practices that are shaping how we educate children in the 21st century. In this session, we'll explore how to apply these best practices to the STEM classroom.

46. HIT THE GROUND RUNNING

Aaron Osowiecki
● Seminar

Students rarely appreciate the importance of units and measurement. Our students build timing and distance measurement devices to measure their own motion. To compare data students must then convert to standard units. Participants in this workshop will build their own devices and discuss the benefits for students. (P)

47. GET THE FACTS: Formative Assessment Classroom Techniques

Page Keeley
● Federal

Formative assessment probes, along with techniques for using them, help teachers make better instructional decisions. They also support conceptual learning and provide an opportunity for students to use scientific practices. Page will share various FACTs (formative assessment classroom techniques) teachers can use to build a rich repertoire of purposeful "assessment for learning" strategies.

48. CHEMISTRY CONNECTIONS: Inspiring Students With Innovation

Kate Anderson
● Boxwood

Green chemistry provides a framework and lens for learning, teaching and investigating chemistry concepts with a 21st century STEM skill set. Investigate and explore new innovative green chemistry technologies, while teaching key chemistry concepts that will have new meaning and connections for your students. (C)(E)



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**SESSION 7**

Friday | 11am-12 pm

B BIOLOGY**C** CHEMISTRY**E** EARTH SCIENCE**En** ENGINEERING**P** PHYSICS**WORKSHOP TOPIC CODES****50. BUILDING AN ELECTRIC MOTOR THE STEM WAY WITH CPO'S NEW LINK LEARNING MODULE**

Erik Benton

- Board Room

Design and build a unique motor to generate the fastest RPMs, then refine it to spin at a specific rate; a true STEM learning activity. **EnP**

51. USING SCIENCE NOTEBOOKS TO ASSESS PERFORMANCE-BASED SCIENCE

Amy Strong

- Cotillion

Use science notebooks as a tool to assess a performance-based lesson using National Geographic content. Notebook entries will serve as formative and summative assessments by providing documentation of alignment of lesson objectives with students' level of content understanding and ability to put knowledge into practice.

52. "CUTTING THE CARBON" ENVIRONMENTAL ENGINEERING

Karen Mayotte

- Deck

Increasing atmospheric carbon levels and the dysregulation of the carbon cycle is the focus of the "Cutting the Carbon" Environmental Engineering curriculum. Workshop participants will actively learn about hydroponic versus soil-based planting systems, rooftop garden initiatives, ocean acidification research, as well as carbon capture and storage prototypes. **BC E**

53. MYSTERY OF MATTER TEACHER VIDEOS

Stephen Lyons

- Director

Producer Steve Lyons shows a selection of the 32 teacher videos based on The Mystery of Matter: Search for the Elements, the 2015 PBS series about the human story behind the Periodic Table, and explains how they can be used in the classroom to meet the latest science teaching standards. **C**

SHARE-A-THON

- Seminar

54a. TIP & FUN IDEAS FOR HIGH SCHOOL BIOLOGY

Rebecca Pierce & Jen Dube

Two Biology Teachers that have been teaching for 15 + years together will put together some of our favorite fun Biology Class activities, foldables, etc and share with the attendees. **B**

54b. USING RAFT WRITING ASSIGNMENTS IN THE SCIENCE CLASSROOM

Elizabeth Stewart-Miranda

RAFT writing assignments, which are writing assignments that explore the use of Role, Audience, Format, and Topic, encourage budding scientists to develop their writing skills across the curriculum and permit them to explore different ideas that they would not normally have access to through a regular lesson.

54c. PERSONAL GENETICS EDUCATION PROJECT

Lauren Tomaselli

High school students will be the first generation to have unprecedented access to their genetic information. What are the possible benefits and risks of knowing more about your genetic makeup? How can teachers ensure that these topics are relevant and interesting to students? Free curriculum, engaging activities, and discussion strategies. **B**

54d. USING ENVIROTHON EXPERIENCES BEYOND THE CLASSROOM TO ENHANCE SCIENCE LEARNING

Will Snyder

Extracurricular projects, investigations, and competitions can provide high school students and teachers with alternative ways to work together and encounter science in the world, encouraging students to take the lead in their own learning while supporting the classroom science curriculum.

54e. VISCOSITY OF MOTOR OILS

K. Nelson & J. Weintraub

This lesson will demonstrate how to integrate the viscosity of motor oils into student created distance vs time graphs. Paper and pencil or graphing calculators may be employed.

Teachers can perform this activity with their students with simple laboratory equipment. Students will have a hands on laboratory experience that demonstrates the relationships of viscosity of motor oil, SAE standards, uniform motion, and graphing techniques. **CP**

SHARE-A-THON Cont.

54f. OBSERVING HONEYBEES IN A CLASSROOM HIVE

Jacqueline Beaupre

Pollinators have an enormous impact on our local ecosystems and economies! Learn how I set up an observation honeybee hive inside my classroom to allow students to safely observe these amazing animals. I will have an empty example hive and provide information about my experience and set-up process. **E**

54g. INTEGRATING SCIENCE & ENGINEERING PRACTICES

Valerie Finnerty

A major focus of the revised MA Science, Technology, and Engineering Standards is the integration of science and engineering practices into the daily curriculum. How can your tried-and-true activities, labs, and lessons be changed to incorporate these practices? This presentation will provide some easy tips for upgrading science curriculum K-12.

55. ADMIN NETWORKING

Betsey Clifford

- Deck

This session is an opportunity for department chairs, lead teachers, curriculum coordinators, and other administrators to network and discuss relevant topics for working with science educators.

56. DEBUNK THE MYTH WITH MEDIA: PBS LearningMedia

Carolyn Jacobs

- Colonial Room

Challenge students' preconceived notions about how the world works with public media digital resources. Come and see some specific examples of easily accessible and free media resources that combat common misconceptions. There will be ample time to share ideas for overcoming your own students' incorrect ideas.

56. ANIMATE STE STANDARDS WITH FREE ONLINE MODULES: NHL Future Goals Powered By EverFi

Jessica Donovan

- Boxwood

Future Goals - Hockey Scholar is an engaging, online STEM course that brings concepts to life. Attendees will register for a teacher account, create classes for immediate classroom implementation, and walk away with standards-aligned online activities and lesson plans. All resources are free and provided by EverFi and The Bruins.

57. ABOUT MAST

Evan Pagliuca

- Fern

Come learn more about the Massachusetts Chapter of the National Science Teachers Association. Massachusetts Association of Science Teachers (MAST) Board Members will be on call to answer questions, share more about how to access resources and events sponsored by MAST as well as share opportunities to get involved



SESSION 8

Friday | 1 pm - 2 pm



58. WRITING IN SCIENCE TO SUPPORT THINKING AND INQUIRY IN STEM

Margaret Adams

- Board Room

Writing in science is a means to deepen students' understanding of concepts and the science and engineering practices. A variety of options will be shared to show how writing in science can be used to improve student outcomes.

59. PAIRING SCIENTIFIC PRACTICE WITH THE DISCIPLINARY CORE IDEAS

Kathi Brown

- Deck

This workshop will focus on meaningful argumentation and constructing explanations regarding Middle Level core ideas (e.g. particles, density, characteristics of life, formation of the solar system). Participants will engage in design, communication, explanation and argumentation.

Handouts include materials, strategies specific for middle level scientific literacy for the first 25 participants

60. GENETICS & REPRODUCTION

Lauren Tomaselli

- Director

This session addresses how cutting-edge genetic reproductive technologies are being used and related ethical issues. It includes discussion of technologies that can reveal the genetic makeup of fetuses, the gene-editing technique CRISPR, and a technology called pre-implantation genetic diagnosis. Our session covers strategies that encourage discussion and provides curricular materials. **B**

61. KEEPING CLIMATE CHANGE INVESTIGATION LOCAL: How Students Can Learn About The Impacts Of Global Climate Change On Trees In Our Massachusetts' Woods

Pamela Snow

- Cotillion

Learn how teachers in Massachusetts are engaging students in learning about the impact of climate change on our local trees in collaboration with professional scientists. Two teachers who have successfully led projects at their schools, will share how these projects interplay with the schedules and educational goals at their schools. Participants in this workshop will be given information and activity ideas as well as online access to scientific protocols and resources. Get your students doing REAL SCIENCE, led by REAL SCIENTISTS, related to REAL ISSUES, and of course, aligned with state and national Science & Math standards.

62. INTEGRATING GOOGLE CLASSROOM INTO YOUR SCIENCE TEACHING

Justin Glen

- Federal

Participants will learn the basics of Google Classroom and how to integrate it into their everyday science teaching practices. Assign work, create class discussions, and grade students completed assignments from within the easy to use Google Classroom web interface. Use Google Apps and Add-ons, such as Goobric, to simplify tasks. 

63. TEACHING THE TOUGH TOPICS WITH SCIENCE GAMES

Daryl Choa

- Colonial

Explore how educators can incorporate digital games produced by NOVA (the landmark PBS science series) into engaging and effective lessons that tackle topics such as evolution, protein synthesis, astrophysics, and more. 

64. STE STANDARDS LESSON PLANNING: Waves MAST

- Boxwood

This session will be an active workshop for educators to engage in collaboration and lesson development with other conference attendees. A MAST Board Member will be facilitating this workshop on the topic of MS Waves. Please bring a device to this workshopping session!



SESSION 9

Friday | 2:15 pm - 3:15 pm

B BIOLOGY

C CHEMISTRY

E EARTH SCIENCE

En ENGINEERING

P PHYSICS

WORKSHOP TOPIC CODES

65. NATIONAL GEOGRAPHIC EXPLORERS: Applying Innovative Solutions To Global Issue

Amy Strong

- Board Room

Use real-world case studies based on National Geographic Explorers. Get introduced to the Explorers' and learn how they solve the world's problems using innovative, engineering designing solutions.  

66. PBS LEARNINGMEDIA™ SUPPORTS NEW STE STANDARDS

Carolyn Jacobs

- Cotillion

“Curriculum and instruction should instill wonder in students about the world around them through engaging and exciting learning experiences.” See specific examples of public media digital resources that align to the new MA STE standards. Included will be a demonstration of PBS LearningMedia™. 

67. LEARNING TO IMPLEMENT INQUIRY LEVELS IN THE CLASSROOM

Jacey Vaughn

- Deck

In 2014, Ms. Jacey Vaughn received the Elaine Adams Professional Development Award to pursue a new learning opportunity. With the funds, she participated in a weeklong course with the Museum Institute for Teaching Science (MITS). MITS taught Jacey the different levels of inquiry through hands-on activities held at various sites led by key personnel in the local community. In this session, attendees will not only learn about the benefits of a MITS course but also the different inquiry levels and how to implement it into a classroom setting.



Register Now

@ www.MassScienceTeach.org

68. PACE (Pregnancy, Antibodies, Conservation & Enzymes) YOURSELVES!

Tamica Stubbs

- Director

Come and learn how the ELISA test can be used to develop a multiday lesson that connects human immunological responses, cell communication (endocrine responses), and Mendelian Genetics. Also learn how to apply it to animal conservation efforts that balances ecosystems. (B)

69. STEM INTEGRATION PLAN FOR SCHOOLS & DISTRICTS

Mia Dubosarsky

- Seminar

STEM and STEAM integration must start with detailed planning and be supported by the school/district leadership. This presentation will share with participants a process for STEM/STEAM strategic planning developed by the STEM Education Center at WPI and conducted with 20 school and district education leaders with great success.

70. DIFFERENTIATED STUDY GUIDES

Stacy Lynch & Nancy Sage

- Federal

Study guides do not have to be boring! Build a flip book or tri-fold study guide for any subject area, and any grade. These hands-on activities are great for kids at any learning level, from special education to gifted. Learn to use simple materials like manila envelopes and return address envelopes to build a useful resource for any science unit.

71. TEACH CELL PROCESSES WITH MIT DNA & PROTEIN MOLECULES/ HS LEVELS

Kathleen M. Vandiver

- Ivy

Explore how the MIT models can help biology students experience what DNA, RNA and protein molecules do, not just what these molecules look like. Manipulate models to perform DNA replication, mRNA transcription, and translation. Produce amino acid chains and fold them into working protein shapes. AP level shown too. (B)