KEYNOTE: Page Keeley,
Author, Speaker, Science Education Consultant

"Uncovering Student Thinking-What Does it Really Mean to Teach for Conceptual Understanding?"
Four decades ago David Ausubel made the oft-quoted statement: "The most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly." But for four decades, we have been trying to find out what accordingly means! K-12 students (and teachers) hold strongly held ideas about the natural world as they try to make sense of their every day and instructional experiences. Teaching for conceptual understanding involves building a bridge between students' initial common sense ideas and the core scientific ideas in the NGSS we want students to know and be able to use.

WORKSHOP DETAILS:

Get the FACTS- Formative Assessment Classroom Techniques *Page Keeley*	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.	K-8
Expanding the NGSS classroom to the outdoors *Audrey Miguel, St. Rocco School*	Bring the NGSS classroom outside! There is nothing the students enjoy more than going outside for science class. This session will focus on different outside activities that will help both middle school teachers and students work towards meeting the NGSS performance expectations for life sciences. Through simple observations, aerobic activities, and water brigades, students will discover how energy cycles through an ecosystem, how the brain responds to stimuli, and how the different systems of the world interact.	6-8

Building the Skill of Argumentation and Discourse in STEM *Rhys Lutsky Regional Trainer Accelerate Learning/STEMscopes*	Reducing teacher talk and increasing purposeful student talk, sound easy? It is when consensus is the goal and there is something intriguing to talk about! Join us in this session that will model successful implementation of consensus building through discourse and argumentation. These Scientific and Engineering Practices are at the heart of a STEM classroom that meets the needs of diverse learners and creates at student-centered learning environment. When teachers consciously reduce teacher talk and increase the purposeful student talk student achievement gains are noted. Through discourse, argumentation and collaborative activities, students use the authentic practices of scientists and engineers.	K-12
NGSS In The Classroom Made Easy *Jason Goffe, Woonsocket HS* *Rebecca Pinheiro-Schmitt, Woonsocket HS*	We will introduce strategies useful to educators transitioning current non-NGSS versions of their labs to meet the current NGSS approach utilizing the EQuIP rubric. Although the focus is on high school life science, learned strategies can be applied across grades and content areas.	9-12
Using Backwards Design to Plan Instructional Sequences that Prepare Students for NGSS Assessments *Dr. Jay Fogleman, University of RI* *Comfort Ateh, Providence College* *Rudolf Kraus, Rhode Island College* *Daniel Bisaccio, Brown University*	High quality instructional materials will play an important role in the successful integration of the NGSS. The NGSS-aligned classroom assessments tasks available on the Achieve website can serve as a launch point for professional conversations about the opportunities and challenges implementing the new standards present. This workshop, also accepted at this year's NSTA national meeting, will focus on using these assessments to plan everyday instruction. Teachers will have a chance to discuss strategies for incorporating the three dimensions of NGSS into instruction leading up to each assessment activity as well as ideas for post-assessment sense making.	9-12
What do Science and Engineering Practices look like in K-2 classroom? *Kristen Crawford,* *Chatham School District, NJ*	How do I get my kindergarten students to plan and carry out an investigation? What does it look like when second grade students engage in argument from evidence? Come and explore what the Science and Engineering Practices look like in a lower elementary classroom. We will use hands-on activities to guide us through the practices while achieving the performance expectations of the Next Generation Science Standards.	K-2

Place-Based Experiences to Support NGSS *Kelly Shea, GEMS-Net* *Sara Sweetman, GEMS-Net* *Andrea Stein, RWP Zoo*	Come learn how using place-based experiences can extend and enhance your science instruction. Participants will actively engage in a life science lesson that incorporates scientific practices and cross cutting concepts as described in NGSS and take away strategies for successful outdoor learning. Discuss ways to support the rigorous goals of NGSS through collaboration with local community organizations in our state.	K-5
Developing a Blended Science Curriculum *Alison Murray, Central Falls HS*	This presentation will describe the elements involved in writing blended science curricula with the NGSS standards in mind, and possible organization schemes for the materials, both for delivery to students, and collaboration with other teachers teaching the same courses. The emphasis is on applications and resources that are of no cost to the teacher/school. Samples of blended curricula for actual courses will be shown/available.	6-12
Mapping Nest Success in Migratory Birds *Dan Bisaccio, Brown*	Students craft artificial nests and eggs (and you will too!) of migratory birds and investigate the impact of forest fragmentation on nesting success. Locations of the nests are then mapped using GPS (or a low tech model of GPS) and nest disturbance analyzed. Through this hands-on field exercise students learn about global habitat connections and conservation issues for migratory birds. Learn how to visualize nest disturbance data using maps while creating a nest and eggs to take home with you.	6-12
MIT BLOSSOMS Online Video Lessons in Support of NGSS *Richard Larson, Principal Investigator, MIT BLOSSOMS* *Elizabeth Murray, Project Manager, MIT BLOSSOMS*	This workshop will introduce participants to the MIT BLOSSOMS library of over 150 online STEM video lessons and explain how these lessons can best be used in classrooms. Lessons featured at the workshop will demonstrate the incorporation of NGSS in teaching. BLOSSOMS science lessons are designed for high school, but can be adapted for middle school. These lessons have been created by university faculty/students, by high school teachers and by STEM practitioners – both from the United States, and from several countries around the world. High school teachers are encouraged to submit proposals for a BLOSSOMS lesson. Visit us at: http://blossoms.mit.edu/	6-12

Using HHMI BioInteractive Resources to Teach Biology Concepts in NGSS Three-Dimensional Style *Valerie May, HHMI Ambassador*	BioInteractive, Howard Hughes Medical Institute's science education division provides free classroom resources that bring important scientific advances to life through fascinating stories of discovery. Engaging short films and classroom activities allow students to explore NGSS core ideas, concepts, and science practices. During the session, classroom-ready resources that accompany the short film *Origin of Species: Lizards in an Evolutionary Tree* will be shared. Through these activities, students will be immersed in the practices of science as they learn about natural selection and speciation. In addition, the activities provide an opportunity to introduce students to data collection and statistics.	9-12
Set, Skim, Dive-in, Collect, and Share: Strategic Research in Science *Susan Sabella, Narragansett* *Kelly Shea, GEMSNet* *Caroline Stabile, GEMSNet* *Sara Sweetman, GEMSNet*	With the release of NGSS and the increased focus on STEM education, K-3 students will have unprecedented access to rich informational text in both print and digital formats. As a result, K-3 teachers will be asked to link these texts to the ELA-CCSS. Set, Skim, Dive-In, Collect, and Share offers a simple, yet effective, strategic reading structure for K-3 students that provides explicit links between the ELA-CCSS and the NGSS Science and Engineering Practices.	K-3
The Lost Dimension? Making the Crosscutting Concepts Explicit in K-5 Classrooms. *Kristen Deschene* *Kerri Luchka* *Western Coventry Elementary*	Participants will join an elementary teacher in her journey towards an NGSS classroom, and understanding three-dimensional learning as well as the importance of explicitly teaching crosscutting concepts in everyday instruction. Strategies around best practices will be shared along with student work that shows three-dimensional learning in action in a 4th grade classroom.	K-5
STEAM in the Middle: A Life Science Enrichment Course *Abby Paon, Coventry Schools* *Ann Kaiser, ProjectEngin*	A life science STEAM course has been introduced at ASFMS. The course highlights biomimicry and nature's engineering ability. Hands-on activities are employed to introduce the Engineering Design Process, scientific concepts, and artistic techniques. The principles of design as a process are highlighted in order to stress the similarities between science, engineering, and design as organized creative endeavors. All activities lead to the capstone challenge of engineering camouflage for wildlife photographers. This session will describe the course, showcase student work, and provide some hands-on experience. Participants will leave with ideas on how to incorporate NGSS Engineering practices into life science courses.	6-8

STEM, Nature's Designs & NGSS in the classroom *Mistral Dodson,* *New England Science & Sailing Foundation*	Get rid of that set of directions, give your students supplies, and guide them to figure it out on their own! Draw, design, build, fail and modify. Learn techniques to connect your students to the environment by building a hands-on, minds-on curriculum that is engaging and captivating. Delve into the field of biomimicry to examine and mimic the aspects of the natural world, with its models, systems, processes and challenge your students to solve human needs. Use these STEM-based examples to strengthen the engineering aspects of the NGSS in your classroom.	K-12
Flipping the NGSS *Betsy Yates-Long,* *Chatham School District, NJ* *Kristen Crawford,* *Chatham School District, NJ*	Flipping the classroom can be an empowering way to incorporate the NGSS standards and practices with existing AP curriculum. It allows for student-driven exploration on concepts and a holistic view of the scientific process. In this presentation, we will investigate how flipping the AP Biology classroom for laboratory Investigations and presentations meet the standards not only for College Board requirements, but also NGSS practices and standards. We will address Engineering and Science Practices, Disciplinary Core Ideas in the Engineering Strand, Crosscutting Concepts, and Life Science content standards. The goal is for instructors to see practical application of the flipped classroom model in meeting these new practices and standards.	9-12
Beyond the Gumdrop Mountain: Using Models in Your Classroom *Lesley Shapiro, Classical HS* *Dr. Rudolf Kraus, RI College*	The NGSS ask students to question, construct models from data, defend their arguments with evidence, and evaluate and communicate information. This session seeks to expand your students' use of models. Instead of assembling traditional representations, your students will see that models are data-driven constructs that explain phenomena and are revised based on evidence. Participants will be able to: • Explain the difference between a model and a representation. • Describe how models are integrated within the NGSS. • Identify a unit where construction of a model would enhance learning. Teachers will leave with classroom-tested lessons involving models in life, physical, and earth/space science.	9-12