

2019 RISTA Conference Session Descriptions

Keynote Address:

Mapping the Three Dimensions of the NGSS (K-16)

Ted Willard, NSTA Assistant Executive Director of Science Standards

Using the same techniques that were used to develop the AAAS Project 2061 *Atlas of Science Literacy*, I've mapped the elements of the core ideas, practices, crosscutting concepts, connections to nature of science, connections to engineering, and performance expectations described in NGSS and other standards based on the *Framework for K-12 Science Education*. Later this year, NSTA Press will release an atlas containing all 62 maps. These maps show how the elements of the dimensions relate to each other and build on each other. Come learn how the Atlas was developed and how you can use it to support your work in curriculum, instruction, and assessment.

Breakout Workshops:

E, M, and/or H refer to the grade band(s) that the session is developed for.

** after the title indicates that this will be a double session presentation- 2 hour deep-dive*

Session A

Selecting Phenomena to Motivate Student Sensemaking (E, M, H)

Ted Willard, NSTA Assistant Executive Director of Science Standards

The right phenomena are key ingredients in successful three-dimensional teaching and learning. Emphasis will be placed on what makes some phenomena more effective than others and how to use them successfully in the classroom.

Science Curriculum Topic Study (CTS)- A Systematic Approach to Linking Three Dimensional Learning, Research, and Practice (E, M, H)

Page Keeley, Author, Speaker, and Science Education Consultant

Learn how to use a collective set of resources (mostly free, online) and a process to make informed, evidence-based decisions about curriculum, instruction, and assessment, while deepening your content and pedagogical understanding of the topics you teach. This new 2nd edition of the original NSF-funded project features new resources and tools for supporting NGSS and 3-dimensional instruction.

Maps and Apps : Location Resources - free 4 all (M, H)

Peter Stetson, Educational Mapping Service

Using the free ESRI school bundle, K-12 schools can access several websites that allow educators to incorporate the Science of Where into their curriculum. From online mapping to crowdsourced surveys to story maps the possibilities continue to expand. Free access, free training, easy student log on, free data, and a chance for middle and high school students to win \$ by creating a RI based storymap. Over 30 schools and organizations have the Free ESRI school bundle some don't use it, while in some the educator that is the administrator have retired or changed schools. In this session, educators can discover how these resources could be used to enhance the development of 21st century skills: arguing from evidence, analyzing data, and communicating with a purpose.

Supporting Student Question Framing to Promote Success and Consistent, Quick Assessment (M, H)

Dr. Michael Sao Pedro, CTO/Co-Founder, Inq-ITS by Apprendis

In accordance with NGSS educators are seeking to provide performance-based, interactive, rigorous assessments. This session focuses on how educators can frame goals to scaffold for student success! Through the process of framing goals, students receive the scaffolding they need in order to address key content areas, content-specific academic language, and misconceptions. With scaffolding and rubrics, educators can provide consistency in comparison across students' performances.

Goal and hypothesis framing not only enables students to receive the scaffolding they need to address key content areas and misconceptions but also promotes educators to generate rubrics for assessing student performance consistently and rigorously.

The Journey of Elementary Teachers in the Tiverton School District Toward Transforming Science Teaching/Learning through NGSS (E)

Elaine Silva Mangiante, PhD, Associate Professor, Salve Regina University & Hally Azevedo, Grade 2 Teacher, Tiverton & Megan Macfarlane, Grade 3 Teacher, Tiverton & Denise Truver, Grade 3 Teacher, Tiverton

Learn how elementary teachers in one RI school district reshaped their science teaching/learning to align with the Next Generation Science Standards for students to construct a deeper understanding of science concepts and embrace the three dimensions: scientific practices, cross-cutting concepts, and disciplinary core ideas. The teachers transformed their teaching through in-depth, quality professional development, grade-level and vertical-team meetings, peer-to-peer classroom observations, review of student work, and administration support. Participants will experience an NGSS activity, examine student work, view a video of student learning, and receive information on the teachers' shift to three-dimensional science teaching/learning, challenges/successes experienced, and recommendations for other districts.

Opportunities to Teach Computational Thinking in Your Elementary Classroom (E)

Caroline Stabile, Asst Director of GEMS-Net, URI & Sara Sweetman, Asst Professor of Education, URI & Jen Pietros, Middle School Science Teacher, Coventry/ PhD Student, URI

Learn from an NSF study and explore how to incorporate early computing concepts and skills into your science program. Foundations of computer science lie in our abilities to think and approach problems strategically and creatively. In this session you will explore and identify opportunities to engage students in, and make explicit, computational thinking approaches and practices as part of your science instruction. Elementary teachers can't fit one more thing into their school day, but they can take advantage of opportunities to teach smarter!

Session B

Making Subtle Shifts Toward NGSS in High School Science (H)

Jay Fogleman, University of Rhode Island

The Next Generation Science Standards (NGSS) provides an ambitious vision of how all students should learn science. Many high school teachers are faced with the challenge of integrating NGSS ideas into existing courses and curricula. This session will provide suggestions for making small pedagogical shifts to better represent the three NGSS dimensions, and give participants a chance to share how they are addressing the challenge of “less is more,” emphasizing model building, and having students “do” science to build knowledge from empirical evidence.

P51 Glow Labs: Investigate DNA and other macromolecules through fluorescence (M, H)

Bruce Bryan, MiniPCR

Go beyond paper and candy models when studying DNA structure. Have your students directly investigate how factors like temperature, pH, and genetic sequence affect DNA. Then learn how to use fluorescence to investigate enzyme activity using an inquiry approach. You will directly observe β -galactosidase activity – and watch it glow!

Defining the Future: How Engineering Builds Creative Critical Thinkers in the Classroom* (E, M, H)

Ann Kaiser, ProjectEngin LLC

The world outside our classrooms is changing at an unprecedented rate. Students will need to be agile lifelong learners, able to adapt to new situations and challenges. Engineering Design practices and thinking, as outlined by the NGSS, allow teachers to connect curricular concepts to real-world challenges while fostering the development of creativity, critical thinking, and collaboration. Hands-on activities will help you learn how you can “engineer” solutions to the challenge of providing effective and inclusive 21st century education. Explore several examples of what Engineering looks like in K-12 classrooms and leave with ideas for projects and activities you can use.

OpenSciEd: Middle School Units Developed for NGSS and Free!* (M)

Carolyn Higgins, Teacher, Winman Middle School, Warwick and OpenSciEd Facilitator & Christopher Newlan, Teacher, David Wooster Middle School, Stratford, CT and OpenSciEd Facilitator

OpenSciEd is an open educational resource (OER) being developed by BSCS, Northwestern University, Boston College, and others to meet the needs of NGSS. The first three units of 18 middle school units have been piloted, revised, and released. OpenSciEd units follow a Storyline format where all of the learning is focused on an anchoring phenomenon. By using the Storyline format, the lessons have coherence and make connections to students' interests. This presentation will use a sample anchoring phenomenon activity and model the instructional methods. Participants will also review the released units and see the schedule for the release of the entire OpenSciEd scope and sequence.

Critiquing and Revising Models: A Protocol that Promotes Discourse and Sensemaking* (E, M)

Caroline Stabile, University of Rhode Island/ GEMS-Net & Zachary Orefice, STEM Coach, Captain Isaac Paine School, Foster, & Patricia Lapierre, Teacher in Residence at GEMS-Net

Promote three dimensional learning through student discourse around a phenomenon, specifically using peer feedback and critique strategies that encourage students to develop models, construct explanations, and evaluate information. As students critique the work of peers, they push classmates' thinking and help each other to create more sophisticated consensus and mental models, and support one another in developing a deeper understanding of core ideas that help them explain a variety of phenomena. This workshop will provide participants with a framework to engage students in a productive critique and feedback session.

Session C

Using Local Environmental and Health Data in Your Classroom (M, H)

Rachel Calabro, Rhode Island Department of Health

Science and math topics become much more meaningful when they are taught with local, Rhode Island data and information. In this session, you will learn where to get information and data related to climate change and environmental health to use in your classroom. The Environmental Public Health Tracking Network provides data on the core ideas of air and water quality, rates of disease, community characteristics, and climate change. Using local data tools teaches students how they can use practices of scientific inquiry to apply knowledge of these crosscutting concepts. Environmental health brings together the concept that where we live matters.

Beyond the Novelty: Strategies That Use VR to Target NGSS Practices (E, M)

Christina Broomfield, Classroom Teacher, North Kingstown/ GEMS-Net Teacher Leader & Pat Lapierre, 6th Grade Science Teacher, Burrillville/ GEMS-Net Teacher in Residence

Use VR to broaden the possibilities of asking questions and engaging in productive research using Google Expeditions. Learn how to use VR goggles to explore Google Expeditions using strategies that help students engage with the media as a way to explore places and environments beyond the reach of the classroom. Students learn how to ask new questions to drive their own research. This session is designed for teachers who are ready to move beyond using VR because it's neat and want to build strategies to maximize its educational value to target NGSS practices.

Igniting Student Engagement and Growth Facilitating Three Dimensional Learning and the Investigative Approach (E, M)

Amy Clarke, Kindergarten Teacher, North Kingstown & Sara Brayton, 7th Grade Teacher, North Kingstown

Attend this workshop facilitated by exceptional RI teacher leaders to experience first hand the NGSS three dimensions implemented seamlessly and cohesively, spanning grades K-8, using inquiry-based teaching and learning. All attendees will walk away empowered and informed to blend best practices like note booking and sense making as well as other fundamental elements into your classroom to facilitate students' investigation and innovation of the phenomena in the world around them. Join us to experience investigative learning through the eyes of a student! This workshop is a joint effort between GEMS-Net, North Kingstown Teacher Leaders and FOSS/Delta Education.

**** indicates the workshops from session B that extend into session C as 2-hour, deep dive workshops.***