

Implementing the NGSS: Three Dimensional Assessment in the Classroom

Presenter: Peter McLaren, Director - Next Gen Education, LLC

Classroom assessment of student understanding in science is the most powerful means of gaining information of teaching and learning. In a classroom guided by the Next Generation Science Standards students learn at the center of the integration of science and engineering practices, crosscutting concepts, and disciplinary core ideas to explain phenomena and solve problems. This three-dimensional teaching and learning requires not only 3-D instruction but 3-D assessment.

This session is designed to provide science educators and administrators a view into new approaches into assessment of science learning in an NGSS by having participants experience the components of classroom assessment design and implementation. Understandings from the soon-to-be released practitioner-oriented Primer for Classroom-Based Three-Dimensional Science Assessment from the National Research Council as well as other design models will be shared.

Lessons learned: Results of a year-long elementary engineering project

Presenters: Elaine Mangiante, Assistant Professor, Elementary Science and Mathematics Education, Salve Regina University & Elizabeth Carpenter, Student Researcher, Salve Regina University

All third and fourth grade teachers in the Tiverton School District participated in a year-long pilot project to learn about NGSS expectations for engineering design by using Boston Museum of Science Engineering is Elementary units. Subsequently, they participated in a professional learning community to examine student work and generate recommendations for how elementary teachers could integrate engineering in elementary science units. Participants in this workshop will participate in a brief engineering activity as well as learn about the teachers' suggestions of strategies to increase student collaboration, discourse, and writing for their engineering design project.

Blended Science

Presenter: Deb Ramm, Johnston Public Schools Instructional Technology Coordinator

How can teachers best leverage technology to increase the quality of teaching and learning for all students? Blended learning can maximize student voice and choice, provide flexibility for path and pace, and connect students beyond the hours of the school day and the walls of the classroom. Take science to a new level where students can virtually manipulate a variety of resources and materials. Explore platforms and tools to engage and differentiate in your K-8 Science Classroom.

Developing Models to Promote Rigorous Discourse

Presenter: Caroline Stabile & Kelly Shea, Education Specialists/URI GEMS-Net

Come learn strategies to promote collaboration and discourse in the NGSS classroom. Learn how students can develop models that help them construct explanations of observed phenomenon. How can we target rigorous NGSS thinking alongside the development of precise academic language expected by CCSS? Come find out!

Computational Thinking for the NGSS Classroom

Presenters: Howard L. Dooley, Jr, Project Manager, RITES+C, Dr. Jay Fogleman, Associate Professor of Education, URI, Ms. Danika Korpacz, Graduate Assistant, URI, Caroline Roth, Graduate Assistant, URI

Given the tech and computer science initiatives in schools across the state and its inclusion in the NGSS, computational thinking is a critical practice for engaging RI students in science and engineering. The RI Technology Enhanced Sciences and Computing (RITES+C) partnership is engaged in an NSF sponsored project to develop computation-based science investigations (CBSIs) for middle and high school. Participants will have a chance to see how the CBSIs foster three dimensional teaching and learning as they explore existing CBSI investigations. Opportunities for teachers to use CBSIs in their classes or to collaborate to create new CBSIs will be discussed.

Three Dimensional Learning in a Blended Science Classroom

Presenters: Frank Lenox, Physics Teacher East Greenwich High School & Susan Eriksen, Chemistry Teacher, North Kingstown High School

Blended Learning is an educational format that combines online digital resources with traditional classroom practices. Scientific concepts can be introduced, reinforced and differentiated with traditional methods, student-centered, self-paced videos, simulations, and online assessments. A blended classroom allows for more flexibility and freedom so students can do more "Three Dimensional Learning". The goal of this workshop is to provide educators with structures, tools, and strategies that could be used to begin implementing blended learning in a secondary classroom. Blended learning allows for a more seamless integration of engineering practices, cross-cutting concepts, and core ideas.

Phenomena that Stimulate the 3-Ds in the NGSS

Presenters: Comfort Ateh, Providence College

Phenomena is at the core of the three dimensions of teaching and learning. Teachers are thus expected to know what a good phenomenon looks like to be effective in planning and teaching a lesson that aligns with the NGSS. This workshop will engage participants in exploring sample phenomena and their characteristics, and in discussing the essence of PHENOMENA in a lesson. Participants will develop skills in identifying and employing phenomena that will enhance students' learning of the disciplinary core ideas through engaging in science and engineering practices and cross-cutting concepts.

Getting Started In The NGSS Elementary Classroom! Discuss, Explore, Share

Presenter: Cathy Jimenez Long, First Grade Teacher, NBCT Early Childhood, Cranston & Lisa Connell Kindergarten Teacher, Cranston

Participants will explore how an NGSS elementary classroom can evolve. They will examine what three dimensional learning might look like and review a strategy to assist them in beginning to create their own NGSS classroom. They are encouraged to bring a standard or lesson that they would like to either expand upon or share. Participants will be encouraged to share ideas and resources. They will engage in discussion with colleagues experiencing similar rewards and challenges and will build on each others' ideas.

Preparing an NGSS Unit-Questions to Consider

Presenter: Susan P. Unger, Feinsein Fellow, Joint Ph.D. in Education Program (URI/RIC) K-8 Science Teacher at St. Peter School, Warwick

As we consider how to implement NGSS in our elementary-level classrooms, the presenter will share a list of questions for current educators to consider before beginning to design a unit of study that is aligned with NGSS. Participants will be encouraged to discuss and possibly revise these questions as a group. All participants will be invited to "try out" the resource with support from others. Finally, all will be given access to the template as a useful tool for designing NGSS-aligned units in their own teaching practices.

Story Maps: Using ArcGIS Online to Enhance an NGSS Curriculum

Presenter: Tiffany Risch, Science Teacher, Coventry High School & Peter Stetson, Science Teacher, Coventry High School

Teaching in an NGSS classroom requires teachers to design enriching lessons connecting the science at hand to various world-wide applications. ArcGIS Online is a free powerful tool that can be used to combine the teaching practices of blended learning, computer modeling and data analysis to student assessment of content using a variety of online methods. This new approach to teaching & assessing student knowledge growth as related to NGSS content will be modeled for participants, with the possibility for personal exploration and practice using this new method. Additional examples of how to use this method in the classroom will also be discussed. As part of the session participants will access their own free online account and discover ways to implement this technology in their own classrooms.

The TIES Program and the NGSS

Presenter: David Upegui, Science Teacher, Central Falls High School

A key component in the NGSS, evolution is the unifying theme of modern biology. Evolutionary theory has: a) withstood, essentially unscathed and broadened, over 150 years of aggressive testing, b) explanatory powers which uniquely provide students with the keys to understanding life, and c) benefits far transcending the biological sciences. The Teacher Institute for Evolutionary Science (TIES) is an entirely teacher-run project to help middle school science teachers feel confident when they teach evolutionary science. TIES stresses NGSS-related, ready-to-go resources. All of the materials and corresponding NGSS standards presented will be available for free download from our website at <https://richarddawkins.net/ties/>

Evaluating Lessons for NGSS Alignment: An Introduction to the NGSS Lesson Screener

Presenters: Dr. Simone Palmer, Science and Technology Specialist, RI Department of Elementary and Secondary Education, Rhochelle Krawetz, Science Dept. Chair, Blackstone Valley Prep Middle School Tom Holstein, Science Teacher, Portsmouth High School, Jonathan Rollins, Science Teacher, Ponaganset Middle School, Dori LaBella, Science Teacher and Dept. Chair, Pilgrim High School

In this workshop, participants will learn how to use the NGSS Lesson Screener tool to evaluate lessons for their alignment to the NGSS. The NGSS Lesson Screener is one of several tools that can be used by educators to inform their lesson planning as well as to guide collaborative discussions with colleagues about three-dimensional learning. Participants will learn about the 6 criteria of the Lesson Screener and then apply them to a lesson. Through the review process and group discussion, they will better understand what specific evidence to look for in lessons so that their students engage in authentic learning experiences that truly integrate the Science and Engineering Practices, Disciplinary Core Ideas and Crosscutting Concepts.

Think and Tinker with Bats

Presenters: Dr. Hanan Mogawer, Chemistry and Engineering Teacher, Prout School & Mary Grande, MAT Candidate, Brown University, Biology Student Teacher

This presentation will help science teachers to find ways for engineering integration into their lessons. Biology teachers may teach concepts and terms, but they are continuously looking for a way to integrate fun and creative ideas that may involve engineering. For example, students can learn all about the anatomy of bats, but this workshop will transform the traditional lesson about bats into more dynamic and fun lesson. Teachers will participate into multiple activities that follow NGSS, and broaden students' imagination.

Engineering in the Early Years

Presenter: Kelly Shea, Education Specialist, URI GEMS-Net & Stephanie Good, Education Specialist, URI GEMS-Net

This workshop will help teachers find the joy and rigor in engaging students in engineering. Rigorous and developmentally appropriate teaching strategies will be modeled throughout this hands-on workshop allowing participants to experience engineering first hand while gaining pedagogical content knowledge. Using the engineering cycle: defining a problem, planning a solution, building, testing, and redesigning the solutions to the engineering challenge will give teachers a practical and accessible tool to bring back to their classrooms. NGSS science and engineering practices will guide follow-up discussions and reflections.

A Middle School Hydroponics Engineering Project: Development of an Assessment

Presenters: Elaine Silva Mangiante, PhD, Assistant Professor, Elementary Science and Mathematics Education, Salve Regina University, Amy Semerjian, Research Designer and Analyst, Boston College, Colleen Pickering, 7th grade Middle School Teacher, Wickford Middle School, Gabrielle Grilo, Student Researcher, Salve Regina University, & Julia Pfister, Student Researcher, Salve Regina University

The teachers and students in two RI middle schools have participated in an engineering pilot project to design a hydroponics system for the home using wicking and natural sunlight to grow lettuce. In this workshop, participants will experience the NGSS engineering disciplinary core idea of defining and delimiting the problem by researching and conducting an investigation of possible wicks that could be appropriate for a hydroponics system. Participants also will learn about the results of the pilot project to develop a middle school engineering assessment for the hydroponics challenge.

Efficient Classroom Integration of Argumentation and Modeling through Research-Based Pedagogy

Presenters: Susan Meabh Kelly, Vice President, American Association of Physics Teachers -- New England Section; Graduate Student, PhD in STEM Curriculum and Instruction, Texas Tech University

Argumentation and modeling are key components of an NGSS-congruent classroom. Research-based approaches to integrate these aspects can be found in Modeling Instruction (NSF-funded, 1989-2005). In this hands-on session, participants will experience one of the paradigm physical science Modeling Instruction activities. Relevant research that supports this pedagogical approach will be referenced throughout the session. Participants will collaboratively identify how the session activity supports a discourse and modeling-rich NGSS classroom, as well as how each component of STEM is seamlessly and meaningfully represented. Freely available resources for further exploration will be provided.

Sustainability in Action: Bringing STEM to the Classroom by Exploring Innovation

Presenters: Teri Natoli, Lead Teacher Manager, Beyond Benign, Inc. & Mollie Enright Program Manager, Beyond Benign

Steelcase, Inc. is an international office furniture company and leader in sustainable product design. Beyond Benign, Steelcase, and a group of chemistry teachers teamed up to bring three unique case studies to life for the classroom. What if we could grow our own packaging? How have sharks inspired microbe-free surfaces? Can we still create vibrant colors without using harmful chemicals in the process? Learn how these cutting edge technologies serve as tools to incorporate NGSS while capturing the imagination of the next generation of problem solvers.