

Workshop Session #1

W-1: Illuminate Your Classroom Using the National Synchrotron Light Source II (NSLS-II)

MARY KROLL, VICTORIA HERNANDEZ, ROBERT BOLAND, ERIN GARLAND, DAME FORBES, DAN WILLIAMS, ALEIDA PEREZ, & VIVIAN STOJANOFF

A team of educators and BNL scientists describe how teachers can leverage state-of-the-art BNL research facilities to conduct hypothesis-driven research with students, embracing NGSS by challenging students to execute authentic experiments, analyses, and reporting. The NSLS-II is a giant x-ray microscope that uses ultra-bright light to "see" inside materials. Teachers currently working with students at the NSLS-II will describe student experiments and lead breakout groups to brainstorm ideas for incorporating these practices.
Target Audience: HS, College, General Science

W-2: "Escape the Classroom" with BreakoutEDU for Science

NANCY LIN

See what the latest hype in education is all about! This latest approach is used by teachers to turn their classrooms into fun, yet content driven, "Escape Rooms". Using materials from BreakoutEDU, teachers will experience science-based activities firsthand. Teachers will learn how to facilitate the game by having the students work in teams to solve challenging puzzles that will open locked boxes. Games combine kinesthetic learning, spatial reasoning, collaborative teamwork, problem-solving, critical and "outside of the box" thinking into a format kids love.
Target Audience: MS, HS, General Science

W-3: Aligning Elementary Units to the NYSSLS

EMILY KANG

This session will support P-5 teachers in aligning current curriculum units to the NYSSLS. Sample lesson and unit ideas will be shared. Teachers are encouraged to bring their curriculum for practice in aligning.
Target Audience: Elementary, General Science

W-4: Cubelets & The Design Process

AMANDA HORN

The Engineering and Design Process requires students to identify a problem and design a solution for the problem. At the National Synchrotron Light Source II at BNL, engineers use robots to move samples into the beamline without the assistance of humans. In this workshop we will utilize Cubelets, small blocks that can be used to build and design simple robots. Participants will explore the engineering and design process and the NYSSLS while building several different robots to accomplish simple tasks.
Target Audience: Upper Elementary, STEM

W-5: Argument-Driven Inquiry: Promoting Science Proficiency by Transforming HS Lab Activities

VICTOR SAMPSON

This session is an introduction to a new approach to lab instruction called Argument-Driven Inquiry (ADI). ADI is an innovative instructional model that is based on current research about how people learn science and is designed to foster the development of science proficiency. In this session, participants will learn about the stages of the ADI instructional model, how it was designed to address the shortcomings of current laboratory experiences, and how it is aligned with the best practices for teaching science.
Target Audience: HS, General Science, STEM

W-6: Atmosphere, Climate, and Global Warming: Correlation vs Causation

STEPHANIE BRUNETT (LAB-AIDS)

Students look at historical data spanning the past 100 years to try to understand the causes of global warming. They ask questions related to the data to figure out what the evidence indicates and to better understand how human activities relate to global warming. This activity provides an opportunity to assess MS-ESS 2-6 and MS-ESS3-5. Receive a sample set of materials and access to digital resources.
Target Audience: MS, HS, Earth Sciences

W-7: Why Pursue National Board Certification?

KIMBERLY MILTON

Teachers, improve your practice and student achievement, and demonstrate your commitment to excellence by pursuing National Board Certification. Learn about the process and how we, as teachers can elevate our profession through the National Board Certification process.
Target Audience: All Levels, General Science

W-8: Using IQWST Storylines and Driving Question Boards to Motivate Student Learning

HEATHER MILO (ACTIVATE LEARNING)

Science storylines are designed to integrate the 3 dimensions and build on student interest in order to explain phenomena. Learn how the Driving Question Board can be used as a central public artifact on which students' questions and learning experiences all hang together in a coherent storyline. This interactive session uses one such storyline from the middle school curriculum Investigating and Questioning our World through Science and Technology (IQWST®) to demonstrate strategies that can be implemented in any science classroom!
Target Audience: MS, General Science

Workshop Session #2

X-1: 3D Printing: Your Next Tool to Explore Evolution

DAN WILLIAMS

We will look at questions in evolution that can be examined by comparative anatomy with 3D printed fossils and free computer programs using the practices of the New York State Science Learning Standards (NYSSLS). Topics will include where to find authentic .stl files of fossils, model preparation, and 3D printing on a MakerBot printer. We will also discuss inquiry activities using the fossils so that your students can unlock evolutionary mysteries and unleash their scientific curiosity.

Target Audience: MS, HS, College, Life Science

X-2: Harnessing the Wind: 21st Century Skills Meets the NGSS

DONNA MIGDOL & KRISTIN STEA

Your students will begin to think like mechanical engineers creating a wind powered device that not only lifts "water" from the ground, but also lights a bulb, to help provide electricity. Designers will also be required to record specifications and constraints. As engineers they will look to nature for solutions and use biomimicry to help them in optimization. Collaboration, creativity, and critical thinking will be highlighted and student centered strategies will engage the learner.

This integrated STEM experience generates unparalleled curiosity as problem solvers meet the challenge.

Target Audience: Upper Elementary, MS, Physics, Engineering, STEM

X-3: NASA Educator Web Resources

STEPHANIE BURNS

Learn about NASA educator resources and access materials created for educators K-12. Many lessons and activities are aligned to the NGSS and differentiation options are available.

Target Audience: All Levels, Earth Sciences

X-4: Greater Student Engagement Using the 7E's

GARY CURTS (ACTIVATE LEARNING)

Let's look at Project-Based Learning through the lens of the recently expanded 5E Learning Cycle to the latest 7E. We will experience a Physics/Physical Science Engineering lab and see how the 7E's facilitates greater student engagement and the opportunity to become much more student-centered.

Central to this idea also is incorporating Jenny Daugherty's work with the NRC on infusing engineering concepts into your existing curricula. We will go through an Engineering/Physics lab and carefully debrief where and how each of the 7E's came into play and how using Jenny's ideas will help with assimilating engineering concepts into your classrooms.

Target Audience: HS, Physical Sciences

X-5: Redesigning Everyday Tools to Meet Special Needs

CARY SNEIDER

The "click pen" is a marvel of simple yet effective engineering. Click once to write, click again for a stain-free shirt. But people with certain disabilities cannot use typical pens. This hands-on workshop will illustrate how re-designing a pen to meet the needs of all students can provide an opportunity to engage in all three dimensions of the NGSS.

Target Audience: MS, HS, Engineering, STEM

X-6: Yo Quiero Phenomenal Hot Sauce

STEPHANIE O'BRIEN, MARTIN PALERMO, JESSICA MINTZ, MICHAEL SHANZER, & KIMBERLY KING

Join us as we take a deeper look into the purposeful integration of the science and engineering practices into everyday instruction. Participants will be immersed in a hands-on phenomena that could be used to address three-dimensional learning in their own classrooms. Time will be taken to reflect on how teachers could begin to or continue to integrate three-dimensional teaching this year and in the future.

Target Audience: HS, Chemistry, General Science

X-7: Structural Biology at BNL

ALEIDA PEREZ

At the National Synchrotron Light Source II (NSLS-II) scientists use X-rays to study the structure of proteins in order to determine their function in biological processes. Through hands-on activities, teachers will be introduced to the field of structural biology and protein structure software analysis. Participants will take away lesson content and activities that can complement classroom content.

Target Audience: HS, Life Science, Chemistry

X-8: Argument-Driven Inquiry: Promoting Science Proficiency by Transforming MS Lab Activities

VICTOR SAMPSON

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Target Audience: MS, Life and Earth Sciences

X-9 & Y-9: Field Trip: Exploring Brookhaven National Lab's Ecology

TIMOTHY GREEN

In this double session, led by BNL's Environmental Compliance Section Manager, participants will tour BNL's vast grounds and be introduced to its ecological management programs such as the prescribed fire program, deer management, and pollinator work. There will also be time for birdwatching. Participants should bring binoculars and be willing to carpool to the various sites. Tour will be canceled in the event of inclement weather.

Target Audience: All Levels, General Science

Workshop Session #3

Y-1: Next Steps with NYSSLS

GLEN COCHRANE

Geared for secondary-level educators with a good understanding of the 3 dimensions of the NYSSLS and are now looking to transition their classrooms. Resources and how to's will include using phenomena and making small shifts. Take a deeper dive into curriculum development using the principles of performance-based tasks and assessments. Use tools to evaluate tasks and lessons as your rubric for curriculum design.

Target Audience: MS, HS, General Science

Y-2: Modeling A Protein Story (MAPS): A Project-based Learning Program

DAN WILLIAMS & ROBERT BOLEN

MAPS Program -Modeling A Protein Story - is a project-based learning program that connects gene and protein sequence and structure-function relationships with physical models. MAPS is a different way to implement NYSSLS modeling into the classroom. Participants will learn how students use the protein data bank to design 3D printed models that demonstrate a specific structure-function relationship of a protein of interest. Participants in the MAPS program are eligible to get a professionally printed 3D model of their designed protein and are encouraged to present their research at local symposium.

Target Audience: HS, Life Science

Y-3: Bus Tour of BNL

BNL STAFF

Participants will tour the National Synchrotron Light Source II and get a close-up look at a beamline used by teachers and their students while learning how they can integrate opportunities into their instruction and curriculum. *Tour subject to change.

Target Audience: HS, General Science

Y-4: Modeling Combustion

MARY PETRANO

Combustion is a major cause of pollution in almost all communities. The burning of fuel in an internal combustion engine produces many pollutants. Through modeling methane combustion with molecular models, students can gather evidence to make a claim for the Law of Conservation of Matter. In addition, students will gain the reasoning on the impact on the environment from the fuels we use daily.

Target Audience: MS, General Science

Y-5: A Basic Approach to a NYSSLS Acid-Base Unit

STEPHANIE O'BRIEN, MARTIN PALERMO, JESSICA MINTZ, MICHAEL SHANZER, & KIMBERLY KING

This workshop will provide an overview of a NYSSLS-aligned and piloted acid base unit. Participants will have the opportunity to follow and participate in an acid base story-line for the purpose of immediate implementation.

Target Audience: HS, Chemistry

Y-6: Make Any Classroom a MakerSpace

CHUCK MCMILLAN (PEARSON)

Makerspaces are everywhere, from television to your public library. You can make your classroom into a makerspace without a lot of equipment or cost. All you need is the right attitude and the willingness to promote innovative thinking in your students. Come try it out for yourself in this fun hands-on workshop where you will go through an activity using the engineering design process.

Target Audience: Elementary, MS, STEM

Y-7: Using Stations to Support Claim, Evidence, & Reasoning (CER)

ASHLEY BLOCH

Stations are a great way to actively engage students and make them true stakeholders in their education.

However, how can we use stations to support the NYSSLS? In this workshop, we will explore how stations can be used to collect evidence and how they can be used to support both Question Formulation Technique and CER. Samples and examples will be shared.

Target Audience: MS, HS, Life & Earth Sciences

Y-8: ADI in Elementary Science: 3D Instruction that Integrates Literacy and Math

VICTOR SAMPSON

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Target Audience: Elementary, General Science

Y-10: Using Phenomenon to Establish Driving Questions

CAROL-ANN WINANS

During this workshop teachers will work together to engage, explore, and explain concepts in Biology. They will share out key findings and practice obtaining, evaluating, and communicating information. This workshop will introduce teachers to the Gather, Reason, Communicate (GRC) lesson design and use it in a way to make real world connections to content at the start of a unit. It will provide teachers, new to the standards, with tools to re-structure units around phenomena in order to increase minds-on learning and meet the SEPs.

Target Audience: MS, HS, General Science