

Super SIRC: Next Generation Science Saturday
May 19, 2018
Workshop Descriptions

1-Hour NGSS Workshops

All 1-hour workshops will be held twice (once in the morning and once in the afternoon) unless otherwise noted

“NGSS Fundamental” (Morning Only)

Rich Hedman, Sacramento Area Science Project (SASP)

During this workshop, you will learn the basic architecture of NGSS (how NGSS is organized around 3-dimensions, connections to Common Core, etc.) and you will be introduced to the instructional shifts necessary for NGSS implementation. This workshop is intended for people **brand new** to NGSS who have never attended Super SIRC before (the same workshop was offered last year).

“Asking Questions and Planning Investigations”

Judi Kusnick, SASP and Laura Shafer, SASP

How can we teach students to ask good scientific questions and plan their own investigations? Teaching this NGSS practice does not mean full-out science fair projects. This session provides strategies for helping students develop their own questions and learn the skills of planning their own investigations within the context of your regular science lessons.

“Taking a Closer Look through the Lenses of the Crosscutting Concepts”

Kelli Quan, Elk Grove Unified

In this workshop, you will explore the seven crosscutting concepts, identify ways they can be integrated throughout science instruction, and examine how they progress through the grade bands.

“Taking NGSS Outside: Environmental Principles and Concepts (EP&C’s)”

Deborah Bruns and Karen Swan, CREEC

The new CA Science Framework calls for the integration of five key Environmental Principles & Concepts to help students learn from and engage with the natural world. Explore the EP&C’s and discover phenomena right outside the classroom door. You’ll also learn about local resources to help your students build environmental literacy.

“Unpacking the Science and Engineering Practices”

Corinne Lardy, Sacramento State

The NGSS Science and Engineering Practices (SEPs) can seem deceptively simple and complicated at the same time. In this workshop we will practice using tools developed through the NSF-funded project, the Next Generation Alliance for Science Educators Toolkit (Next Gen ASET), to unpack and discuss the components of SEPs in the context of a lesson.

Morning Science Workshops

K-2nd Grade Science:

“Modeling’ in NGSS: What It Is & Why It Is Powerful”

Scott Richardson, SASP Teacher Leader

“Modeling” is one of the most effective ways to help students think like a scientist. But what exactly does NGSS mean by a “model”? This workshop will explain what is meant by modeling, and it will show how modeling can give students deeper understanding of science concepts and strengthen their critical thinking skills.

3rd-5th Grade Science:

“Designing Wind-Resistant Structures”

Julie Harr, Churchill Middle School

This workshop will explore hands-on methods of integrating the engineering design process and science into your classroom to design wind resistant structures.

NGSS: 3-ESS3-1, 3-ESS2-1, 3-5-ETS1-2

Earth Science:

“Exploring Causes of Climate Change”

Barb Munn, Sacramento State

There is no doubt that the Earth is following a warming trend, but what is actually causing this rise in temperature? In this session, students first work to understand trends in the historical record of global temperature change, and then explore data to compare potential causes for the warming.

NGSS: MS-ESS3-5, HS-ESS3-5

Middle School Biology/Life Science:

“Body Systems and the Next Generation Science Standards”

Aaron Pecho and Kerin Butterfield, Sacramento City Unified

Join us as we unpack how the NGSS addresses body systems! In this lesson, students engage in verbal argumentation to defend their claims of body system interactions.

NGSS: MS-LS1-3

High School Biology/Life Science:

“Making the Invisible Visible... and Then Dealing with It.”

Jason Fisk,

In this biology workshop we'll learn how to use a Hoffmann apparatus to make sense of the fundamental relationships between matter and energy. Splitting water with electricity (and then reversing the reaction) provides students with an accessible, engaging phenomenon to help them develop model ideas to explain the chemical reactions of living things. We'll also explore how to productively deal with student ideas that may be “wrong” but reasonable, as well as consider how close “good enough” is when it comes to student model ideas. Teachers will leave the workshop with a lesson on chemical reactions and ideas for productively developing student ideas in model-based classrooms.

NGSS: Standards

Physics:

“Radiation: Why does radiation harm humans in some cases and not others?”

Mike Hotell, West Campus High

Experience how to develop a model to explain the mysterious and often misunderstood phenomena of radiation and why it is harmful to humans in some instances but not others. Emphasis is on student engagement and sense-making of phenomena. This model can be used as a jumping off point to several Physical, Life, and Earth Science Performance Expectations.

NGSS: HS-PS1-8, HS-PS4-3, HS-PS4-4

Chemistry:

“Sense-making with the activity series”

Jason Brennan and Arlene Laurison, Sheldon High

Participants will investigate the features of single replacement reactions and the activity series. After developing a model explaining the phenomena, participants will engineer simple batteries to produce optimal voltage.

NGSS: HS-PS1-1, HS-PS1-3, HS-PS3-3, PS 1B, PS-3

Afternoon Science Workshops

K-2nd Grade Science:

“Matter and Engineering”

Sarah Caves and Megan White, Stonegate Elementary

Explore the properties of matter while problem solving for a mission on Mars!

NGSS: 2-PS1-1, 2-PS1-2, K-2-ETS1-1, K-2-ETS1-2

3rd-5th Grade Science:

“Playing with Newton: Experimenting and thinking like a scientist about force and motion”

Marcia Reilly and Lorie Hammond, Peregrine School and Deb Bruns, Yolo County Office of Education

Participating teachers will design the same experiments that kids design, in response to questions such as "Are large objects harder to move than small ones?", "Can you find two different sized balls with the same mass?", and "Can you make a machine which will take a ping pong ball out of a cup?" In this interactive workshop, we will think like scientists exploring Newton's Laws. The final challenge for participants and kids is to design a Rube Goldberg machine. Participants will see student work and be given lesson plans. This workshop is adaptive to lower elementary grade levels as well.

NGSS:

Earth Science:

“Co-Evolution of Earth’s Atmosphere and Life”

Amy Burke, Laguna Creek High School

Through the use of ancient geological evidence, students will be able to construct an argument to communicate that the evolution of earth’s atmosphere was directly impacted by the evolution of photosynthetic life.

NGSS: HS-ESS2-7

Middle School Biology/Life Science:

“Success with Sugars”

Anna Newman, Roseville Joint Union High School District

This session will reveal strategies for leading students through a series of investigations where they *discover* the reactants and products of photosynthesis. Based on the phenomenon of maple sugar, we will investigate how a plant is able to create the sweet sap that is characteristic of sugar maples. Participants will leave with a loose framework of investigations that will provide students multiple opportunities to make meaning from their direct observations and ultimately model the chemical reaction of photosynthesis. During the session, participants will engage in the investigations in order to gather evidence for explaining the cycling of matter into and out of a plant.

NGSS: MS-LS1-6, MS-LS1-7

High School Biology/Life Science:

“So What’s the Answer?”

Chris Griesemer, UC Davis

As teachers, we are used to being the knowledge authority in the classroom. Even in our NGSS sense-making lessons, we generally know where we'd like the classroom to go and what an acceptable final answer is. How can we create a genuine sense-making experience for our students under these conditions? One possible answer is to (at least sometimes) introduce phenomena where we (as humans) don't have a full explanation. Thus we are forced to take the journey into sense-making with our students. We'll explore using a couple of examples: the mystery of seastar wasting disease and the phenomenon of sleep.

NGSS Aligned

Physics:

“CRASH! BANG! POW! Understanding Collisions”

Rich Hedman, Sacramento Area Science Project (SASP)

How can we predict the outcome of collisions? Collision phenomena are examined and data is collected. Participants develop initial models to explain and predict the outcome of collisions. The initial models are tested and refined using physical experiments and computer simulations. Through this process, a model of collisions is developed which achieves the NGSS performance expectation HS-PS2-2.

NGSS: HS-PS2-2

Chemistry:

“Carbon Dioxide and the Souring of Earth’s Oceans”

Ingrid Salim, SASP Teacher Leader

This workshop will explore the causes and consequences of the acidification of earth’s oceans as a consequence of increasing carbon dioxide in the atmosphere. We will focus both on the reactions themselves as well as the scale of change being experienced now. Participants will consider the chemical chain of reactions that is affecting marine life down to the smallest microbes. Lessons and handouts for a lesson sequence will be provided, and all materials will be digitally available.

NGSS: MS-PS1-2, HS-PS1-5