

October 29, 2019

1-Hour Pedagogy Workshops

NGSS Fundamental

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, this same workshop has been previously offered at Super SIRC and the SASP Summer Institute.

From Performance Expectations to Models

Kelli Quan, Program Specialist, Elk Grove Unified



"Where do I find a list of models and model statements?" is a question that is often heard after SIRC workshops and summer institutes. This workshop will explore how teachers can generate their own set of big ideas for students to figure out and how to use them when planning instruction. Note: *This workshop is intended for participants that are already familiar with the SASP Framework for Sensemaking (PQM).*

Planetarium Show

Kyle Watters, Sacramento State Astronomy



Come see a show in the Sacramento State Planetarium! You will get to experience a typical planetarium show, which has three distinct components: first, there will be an interactive live tour of the night sky and the solar system by your host; second, we will play a professionally-produced full-dome movie; and third, there will be time for a Q&A session with your host. Come travel across the solar system and throughout the galaxy without leaving the comfort of your reclined planetarium chair!

Elementary Workshops

Learning from Nature: Structure and Function - Animal Body Parts for Survival



Instructors: *Barbara Woods,*

Beginning with observations of a beaver, we'll "learn from nature" how animal body parts are used for survival, see how people use ideas from biomimicry to solve problems, and engineer our own solutions to human problems. Along the way, we'll use freely available colorful student resources, employ ideas from the Biomimicry Institute, make connections to careers and language arts, and weave in an environmental literacy thread. Participants will receive a ready-to-teach Learning Sequence and digital access to all the classroom supporting visuals.

NGSS: 1-LS1-1, K-2ETS1-1, K-2ETS1-2

Slow Down By My School!



Instructors: *Heather Parker, Science TOSA, Yuba City Unified*

Follow along through a sequence of lessons that cover Grade 4 Instructional Segment 1 to see how students can develop a model of energy transfer and use that model to explain why cars should drive

slowly in school zones. You will see how to engage students in many of the Science and Engineering Practices, as well as collaborative conversations and CER's to develop and apply their model.

NGSS: 4-PS3-1, 4-PS3-3

Middle & High School Strands

Letting students steer the ship... but watch out for those rocks!



Instructor: Kelly Kissling, El Camino Fundamental High and Chris Griesemer, SASP

Through exploration of a high school biology unit where we ask students to direct the knowledge-building, we encounter a series of real classroom problems. What do we do if students take us off course? What about the student who offers up a misconception the class seems to embrace? What if we never seem to get where we as teachers know we need to go? Come explore the ways in which we can support student agency while still helping the class to get to the science ideas we need to cover.

California's Energy Future



Instructor: Mike Hotell, West Campus High and Brian Ellis, Vista Del Lago High

Learn how students can evaluate the costs and benefits of energy technologies through games and a simulated public hearing.

NGSS: HS-ESS3-2, HS-ESS3-3, HS-PSS3-2, HS-PSS3-3

Tectonic Plates (Part 1 of 3)



Instructor: Amy Burke, Laguna Creek High School

Analyze and interpret data to make the claim that earth's surface is broken into tectonic plates that move and interact. Construct an explanation of how interactions at these plate boundaries cause natural hazards that influence human activity. *This is the first workshop in a 3-part Earth Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*

NGSS: MS-ESS2-3, HS-ESS2-1, HS-ESS3-1

November 12, 2019

Elementary Workshops

Tracking Pollinators

Instructors: *Lorie Hammond, Peregrine School*

Pollinators all year round! Learn the importance of pollinators for agriculture and nature. Integrate math and science concepts by tracking pollinators in a school garden. Plant a few pollinator plants in almost any environment. Create a "research quilt" to compare the lives of various pollinators and study pollinator life cycles.

NGSS: (Kindergarten-2nd Grade)



Adaptation

Instructors: *Ingrid Salim, SASP Teacher Leader*

Starting with a set of 'discrepant events', participants in this workshop will consider what factors are necessary for survival in ANY habitat, and why some organism traits will help or hinder that survival in specific habitats. They will then develop chart tools for recording data, and for analyzing where organisms could survive and thrive. They will track their thinking in a claim about a specific habitat, so they can ultimately write a scientific argument.

NGSS: 3-LS4-3



Middle & High School Strands

Engineering in Life Science

Instructor: *Ben Fell, Sacramento State Civil Engineering*

An integrated science and engineering activity in life science that develops solutions for nutrient replenishment for farmlands and nitrogen runoff into nearby waterways

NGSS: MS-LS2-5



From Hands-on to 'Fata' in Collisions

Instructor: *Liz Johnson, Cosumnes Oaks High School*

In this workshop, we will explore opportunities for students to develop a model of collisions through hands on qualitative experiments. Then, use "Fata" to derive formulas for conservation of momentum.

NGSS: HS-PS2-2



Oceanic Crustal Age Patterns & Seafloor Spreading (Part 2 of 3)

Instructor: *Amy Burke, Laguna Creek High School*

Use the PQM framework to develop a model that explains crustal age differences and patterns for both oceanic and continental crust. Voyage to the Mid-Ocean Ridge to make observations and evaluate evidence of oceanic crustal age patterns to develop a model of seafloor spreading. *This is the second workshop in a 3-part Earth Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*

NGSS: MS-ESS2-3, HS-ESS1-5



December 10, 2019

Elementary Workshops

Save the Salmon!



Instructors: *Corinne Lardy and Eric Claravall, Sacramento State College of Education*

What makes salmon such amazing parents? How are humans impacting salmon populations and what can we do to help? In this workshop we'll investigate the life cycle of salmon, how humans impact the lives of salmon, and design solutions. We'll also use a strategy to incorporate layers of text to support science learning.

NGSS: 1-LS1-2, 1-LS3-1, K-2-ETS1-1

Aquaponics & Interdependent Relationships in Ecosystems



Instructors: *Jenna Porter, Sacramento State College of Education*

Participants will engage in activities to build understanding of what is needed to sustain life on Earth, then explore aquaponics as a system for protecting Earth's resources and environment

NGSS: 5-ESS2-2, 5-ESS3-1, 5-LS2-1

Middle & High School Strands

Making Sense of Strange Sex



Instructor: *Dillon Brantley, Cosumnes Oaks High School*

Participants will be exposed to interesting phenomena that do not seem to fit in their previous natural selection model. As a result, participants will need to extend their natural selection model by creating a new one - a model for sexual selection, in which traits that do not necessarily increase survival can still increase an organism's biological fitness. Participants will create this model with their initial thoughts about phenomena from species across the world, revise them based on what information they are shown that may contradict or support their model ideas, and then use their model to explain a novel scenario from a real species.

NGSS: HS-LS4-2, HS-LS4-4, HS-LS4-5, MS-LS4-4

Do You Have Proof of That?



Instructor: *Minh Vu and Katheryn Rein El Camino Fundamental High School*

In this session we will explore how students come to believe that there are different attractions between molecular and ionic particles and develop a model of the strength of these attractions. You will get to play with student developed experiments and explore our data collection techniques that allow students to come to an acceptance of invisible electrostatic forces.

NGSS: HS-PS1-3

Using Crustal Rock Ages to Create Models (Part 3 of 3)



Instructor: *Amy Burke, Laguna Creek High School*

Evaluate evidence of crustal rock ages and density to develop a model of subduction and the cycling of matter by thermal convection. This workshop will include two separate lab activities. *This is the third workshop in a 3-part Earth Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*

NGSS: MS-ESS2-1; HS-ESS-1-5; HS-ESS2-1; HS-ESS-2-3

January 28, 2020

1-Hour Pedagogy Workshops

Developing and Using Models in NGSS



Rich Hedman, Sacramento Area Science Project (SASP)

Having students develop models is one of the most effective ways to help them think like scientists. But what exactly does NGSS mean by a “model”? This workshop will show how modeling can give students deeper understanding of science concepts and strengthen their critical thinking skills.

Adapting and Modifying Investigations for Sensemaking



Kelli Quan, Program Specialist, Elk Grove Unified

How can we adapt labs and activities for use in a sensemaking classroom? Rather than starting from scratch, explore ways to modify classic investigations to create meaningful and powerful sensemaking opportunities for your students that align to the science practices of the NGSS.

Crafting Tasks that Elicit Student Thinking



Arthur Beauchamp, SASP

Explore techniques designed to get students to better communicate their understanding of science in dialogue and writing.

Planetarium Show



Kyle Watters, Sacramento State Astronomy

Come see a show in the Sacramento State Planetarium! You will get to experience a typical planetarium show, which has three distinct components: first, there will be an interactive live tour of the night sky and the solar system by your host; second, we will play a professionally-produced full-dome movie; and third, there will be time for a Q&A session with your host. Come travel across the solar system and throughout the galaxy without leaving the comfort of your reclined planetarium chair!

Elementary Workshops

Hot, Hot, Hot!



Instructors: *Kelli Quan, Program Specialist, Elk Grove Unified*

Explore the source of much of the Earth's energy and its effects on the surface of our planet. Then, become an engineer and design a structure to minimize the warming of the school playground.

NGSS: K-PS3-1, K-PS3-2, K-2-ETS1-2

Live, Move, or Die: A Salt Marsh Story



Instructors: *Barbara Woods, Galt Joint Union Elementary School District*

Join a virtual paddle-board journey as we try to make sense of two differing phenomena: a student experiment growing plants with salt water, and the observed life in a salt marsh. Experience how third graders can begin to learn how to plan and carry out investigations, use evidence as they explain a phenomena, construct an argument, make a claim about the merit of a solution to a problem when the

environment changes, and compare multiple problem solutions. Participants will receive a ready-to-teach Learning Sequence and digital access to all the classroom supporting visuals.

NGSS: 3-LS3-2, 3-LS4-3, 3-LS4-4, 3-5-ETS1-1, 3-5-ETS1-2

Middle & High School Strands

Moving Molecules and Sea Level Rise



Instructor: *Corinne Lardy, Sacramento State College of Education*

Why are the seas rising? In this workshop, participants will engage in a 3-dimensional lesson within a larger learning segment about climate change. You will develop and use models to explore the concept of thermal expansion of water as you investigate the phenomenon of sea level rise.

NGSS: MS-PS1-4, MS-ESS3-3, MS-ESS3-5

Why is the city called Elk Grove if there are no elk?



Instructor: *Steven Ramsay, Stefan Miele, and Leyna Tran, Laguna Creek High School*

Using Elk as the investigative phenomenon for population dynamics and ecosystem interactions. Includes an investigation of carrying capacity and the different factors that affect carrying capacity at the population and ecosystem level. Ends with an investigation into group behavior.

NGSS: HS-LS2-1, HS-LS2-2, HS-LS2-6

Waves and Light (Part 1 of 3)



Instructor: *Scott Richardson, Davis Senior High*

What exactly is a wave? How do waves behave? Do scientists really believe that light is a wave? This series of three workshops aims to answer those questions and more. Teacher participants will learn how to engage students in exploration, experimentation, and scientific questioning around the phenomena of waves and light. Teachers will (a) develop a deeper understanding of the relevant science, (b) learn how to use a variety of scientific practices from NGSS in the classroom, and (c) see the power of designing lessons around a core science practice: modeling. The first workshop will introduce waves and their behavior; by the third workshop, we will examine evidence to see if light really does act like a wave. *This is the first workshop in a 3-part Physical Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*

February 25, 2020

Elementary Workshops

Exploring Properties

Instructors: *Judi Kusnick, Sacramento Area Science Project*

One of the basics of science is understanding that materials have particular properties that make them useful. In this workshop we will explore the properties of solids and liquids using everyday materials and will conduct an investigation to determine the usefulness of rock and mineral properties for a specific purpose. Teachers will leave with a sample set of rocks and mineral.

NGSS: PS1.A



Native Gardens & Pioneer Life

Instructors: *Lorie Hammond, Peregrine School*

Enhance your science studies by combining them with social studies topics in California state standards, when studying California or American history. Grow a native garden at your school with the help of grants or in a matchbox garden. Study pioneer life through growing traditional vegetables. Learn how the gardens you produce, however small, become natural sources of "phenomena" which enhance science studies, while making social studies real.

NGSS: 3rd-5th Grade



Middle & High School Strands

CA Environmental Project Phenomena for Middle School and High School

Instructor: *Lisa Hegdahl, District Curriculum Coach, Galt Elementary School District*

Project Phenomena brought MS and HS classroom teachers together with local Scientists with the goal of building understanding of environmentally-focused phenomena and their role in NGSS aligned science instruction. Experience this NEW NGSS Phenomena resource which includes suggested student activities emphasizing the SEPs, provides grade-level appropriate student explanations that incorporate DCIs and CCCs, and makes explicit connections to the EP&Cs.



Evidence for Climate Change

Instructor: *Kelli Quan, Elk Grove Unified and Arlene Laurison, Sheldon High*

Learn how climate change can be used as the anchoring phenomenon for your Chemistry (or Chemistry in the Earth System) class. Gather data and develop conceptual understanding of chemistry topics to make sense of climate science data. Is climate change real? Analyze the data and make a claim!

NGSS: HS-ESS2-2, HS-ESS3-5, HS-ESS3-6 (based on understanding of chemistry PEs)



Waves and Light (Part 2/3)

Instructor: *Scott Richardson, Davis Senior High*

What exactly is a wave? How do waves behave? Do scientists really believe that light is a wave? This series of three workshops aims to answer those questions and more. Teacher participants will learn how to engage students in exploration, experimentation, and scientific questioning around the phenomena of waves and light. Teachers will (a) develop a deeper understanding of the relevant science, (b) learn how to use a variety of scientific practices from NGSS in the classroom, and (c) see the power of designing lessons around a core science practice: modeling. The first workshop will introduce waves and their behavior; by the third workshop, we will examine evidence to see if light really does act like a wave. *This is the second workshop in a 3-part Physical Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*



March 17, 2020

Elementary Workshops

CA Environmental Project Phenomena for the Elementary Classroom



Instructors: Lisa Hegdahl, District Curriculum Coach, Galt Elementary School District Project

Phenomena brought elementary classroom teachers together with local Scientists with the goal of building understanding of environmentally-focused phenomena and their role in NGSS aligned science instruction. Experience this NEW NGSS Phenomena resource which includes suggested student activities emphasizing the SEPs, provides grade-level appropriate student explanations that incorporate DCIs and CCCs, and makes explicit connections to the EP&Cs.

What's the Matter?



Instructors: Sarah Caves and Megan White, Stonegate Elementary

Explore an introduction to the characteristics of matter through everyday experiences and conceptual model building.

NGSS: 5-PS1-1, 5-PS1-3

Middle & High School Strands

How can we prevent a mudslide from harming people and property?



Instructor: Deanna Mino and Lori Corona, McCaffrey Middle School

Students will *analyze* the relationships between *energy* and *forces* in 3 proposed engineering design solutions for reducing mudslide damage in a hillside road *system* and *construct an argument from evidence* to propose which solution is *optimal*.

NGSS: MS-ESS3-4, MS-PS2-1, MS-PS2-2, MS-PS2-4, PS-PS3-1, MS-PS3-2, MS-ETS1-1-3

Setting the Stage for an NGSS Classroom in 6th Grade through High School



Instructor: Heather Parker, Yuba City Unified; Libbie Coleman, C.K. McClatchy High, and Jennifer Horton, Western Placer Unified

Students are asked to think and act like scientists in an NGSS classroom. This is not only a shift for us as teachers, but for our students. We will go through tips and tricks for setting up a Model Based Reasoning classroom and preparing your students to think and act like scientists. We will focus on preparing students to engage in the Science and Engineering Practices: Asking Questions and Defining Problems, Developing Models, Engaging in Argument from Evidence, and Communicating Information.

Waves and Light (Part 3/3)



Instructor: Scott Richardson, Davis Senior High

What exactly is a wave? How do waves behave? Do scientists really believe that light is a wave? This series of three workshops aims to answer those questions and more. Teacher participants will learn how to engage students in exploration, experimentation, and scientific questioning around the phenomena of waves and light. Teachers will (a) develop a deeper understanding of the relevant science, (b) learn how to use a variety of scientific practices from NGSS in the classroom, and (c) see the power of designing lessons around a core science practice: modeling. The first workshop will introduce waves and their behavior; by the third workshop, we will examine evidence to see if light really does act like a wave. *This is the third workshop in a 3-part Physical Science series. Attendance at all 3 workshops is mandatory and teachers will not be allowed to sign up partway through the series.*