

October 16, 2018



Guest Speaker

Volcanoes – Recent Eruptions and Hazards in Hawaii and Guatemala

Brian Hausback, Sacramento State, Geology

Eruptions in Hawaii and Guatemala this summer have posed great threats to local populations. Why do volcanoes erupt and what makes them dangerous? These recent eruptions give us a good opportunity to explore two very different types of volcanic activity. We will take a look at Kilauea and Fuego volcanoes and try to understand why this summer has been so HOT--- Volcanically HOT!!!

Elementary Strands

K-2nd Grade Science:

Matter and Engineering

Instructors: *Sarah Caves and Megan White, Stonegate Elementary*

Explore the properties of matter while problem solving for a mission on Mars! (Presented at Super SIRC – May 2018)

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

3rd-5th Grade Science

Birds of a Feather

Instructors: *Tanya Kumar and Lorie Hammond, Peregrine School*

Discovering our backyard ecosystems piques our curiosity and engages us to extend the familiar into deeper scientific investigations. In this workshop we will develop ideas to enable elementary students to closely observe birds - a common component of their everyday environments - to make inferences and ask questions about their observations, and to relate and extend their observations and inferences to scientific principles of ecology and evolution. The goal of these activities is to foster teachers' and then students' sense of connection with, as well as their understanding of, their natural environment.

NGSS: (3-LS4-3, 4-LS1-1, 5-LS2-1)

Middle & High School Strands

Earth Science:

Determining the "Best" Energy Resource for your Community

Instructor: *Amy Burke, Laguna Creek High School*

Evaluate competing energy resources by taking into consideration a range of constraints, including regional availability, reliability, cost to benefit ratio, aesthetics, and environmental impact. Then use this evidence to construct an explanation for the energy resource you think would be best for your community.

NGSS: HS-ESS3-1; HS-ESS3-2; MS-ESS3-3

Life Science:

Meiosis

Instructor: *Heather Parker, Yuba City Unified School District*

Walk through building a model of gamete formation that can be used to explain why sometimes siblings are so much alike and other times so different. This process will engage students' prior knowledge to build new science ideas through a series of lessons.

Physical Science:

Confused by Forces: Common Misconceptions about Forces & Newton's Laws

Instructor: *Scott Richardson, Davis Senior High*

Why does my stomach feel so funny on a roller coaster? How does a rotating space station simulate gravity? It's all about forces and Newton's Laws of Motion. Students are great at memorizing these laws... but are notoriously bad at understanding and applying them correctly. Learn how to avoid common pitfalls and misconceptions when you teach this topic. Help your students understand what we really mean by a "force" and how we can begin to explain the motion of objects around us by understanding forces.

NGSS: MS-PS2, HS-PS2

November 13, 2018



Guest Speaker

Engaging Students in Our Local Environment: Taking a Closer at the Environmental Principles and Concepts (EP&Cs)

Deb Bruns, Yolo County Office of Education and Karen Swan, CREEC

According to the new science framework, “outdoor and environmental learning experiences are powerful tools for implementing key instructional shifts required by the CA NGSS and California’s Environmental Principles and Concepts (EP&Cs)”. Learn about opportunities and resources to use the local environment – and phenomena unique to the Sacramento region – as a real-world context for your science instruction. Presenters Karen Swan and Deborah Bruns, Co-Coordinator for the Region 3 CREEC (California Regional Environmental Education Community) Network will share examples of how you can integrate the EP&Cs with science and engineering to build your students’ science and environmental literacy.

Elementary Strands

K-2nd Grade Science:

Rollin, Rollin, Rollin, Keep those Marbles Rollin: Implementing Engineering Standards in the K-2 Classroom

Instructor: *Robert Sherriff, Churchill Middle School*

We will experience a Kindergarten activity using a marble run sequence to explore K-PS2-2 “Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull”.

After the activity, in grade level groups K-2, we will review the K-2 engineering standards and discuss the ramifications for each grade level through the lens of a grade level activity PE. Finally we will consider children’s literature that focuses on engineering.

NGSS: K-PS2-2

3rd-5th Grade Science

Clean Your Room! Doing Chores With Newton

Instructor: *Kent Peterson and Lorrie Hammond, Peregrine School*

Most children are expected to help out around the house. The purpose of this workshop is to provide elementary science teachers with ideas for integrating the idea of "doing chores" with Newton's First Law. The workshop will include hands on activities, inquiry-based investigations, and collaboration opportunities that investigate the links between common house hold chores and Newton's First Law, and also ways in which these chores can be done more efficiently and effectively!

NGSS: 3-PS2-1

Middle & High School Strands

Earth Science:

The Upper and Coming Crust

Instructor: *Ingrid Salim, SASP Teacher Leader*

What is the earth made of? How do we know? What did its surface look like a million years ago? What will it look like in another million years? Participants will trace the historical conclusion through evidence that the earth's surface is always changing, model energy flow through the earth's interior by analyzing seismic waves and considering mechanisms for energy transfer. Participants will leave with a lesson sequence for the following NGSS, as well as a engineering challenge mitigating the impact of seismic waves on humans.

NGSS: MS-ESS2-1, MS-ESS2-2, MS-ESS2-3

Life Science:

The Living Earth: A solution to integrating Earth Science standards into high school biology classrooms

Instructor: *Chris Griesemer, UC Davis*

Many high schools around the state have chosen to adopt a three-course model for NGSS alignment that integrates earth science into biology, chemistry and physics courses. We'll explore the integration of earth science into high school biology through a phenomenon that spans more than one discipline and instructional unit and will walk away with a better sense of which DCIs from earth and life sciences are best integrated across a curricular year.

Physical Science:

Physics in the Universe

Instructor: *Mike Hotell, West Campus High and Brian Ellis, Natomas Charter School*

Is your district using an NGSS three-course high school model with earth science integrated into Biology, Chemistry, and Physics? Is your district still deciding what approach to take? We have started down the path of creating and implementing a Physics in the Universe course that is NGSS-aligned and model-focused. You will engage in sample lessons and the presenters will share what they have learned thus far.

NGSS: HS-PS3-1, HS-PS3-2, HS-PS3-3

December 11, 2018



Guest Speaker

Can we Control Mosquito-borne Diseases with Maternally Inherited Bacteria?

Michael Turelli, UC Davis, Evolution and Ecology

Elementary Strands

K-2nd Grade Science:

Patterns of the Sun, Moon, and Stars

Instructor: *Kelli Quan, Elk Grove Unified School District*

Bring the universe and its stars into your classroom by creating a classroom planetarium experience. Have your students observe the motion of the sun, moon, and stars as we fast forward through time. Formulate possible claims that explain our observations and test your ideas with an online simulator.

NGSS: 1-ESS1-1, 1-ESS1-2

3rd-5th Grade Science:

Me and My Shadow

Instructor: *Nancy Ludu and Emily Lambert, Isabelle Jackson Elementary*

In this workshop teachers will learn how to collect data to show patterns in the changes of shadows throughout the day and night, and how to represent those changes graphically.

NGSS: 5-ESS1-2

Middle & High School Strands

Earth Science:

Co-Evolution of Earth's Atmosphere and Life

Instructor: *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. (Presented at Super SIRC May 2018)

NGSS: HS-ESS2-7

Life Science:

Designer Babies and Genetics **UPDATED**

Instructor: *Steven Ramsay, Laguna Creek High School*

Using argumentation to teach different genetic misconceptions such as inheritance of diseases and multiple genes vs one allele. Main part of lesson is a structured debate on the pros and cons of designer babies and using genetic modification to cure diseases. Students will read articles and do research into different types of genetic modification and its possibilities.

NGSS: HS-LS3-1, HS-LS3-2

Physical Science:

Design Your Own Crumple Zones

Instructor: *Ben Fell, Sacramento State University*

Design a solution to minimize whiplash during a car accident. Use smart phones to collect data on a model car's collision against an immovable object.

NGSS: MS-PS2-1, HS-PS2-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, HS-ETS1-2, HS-ETS1-3

January 29, 2019



Guest Speaker

Science for all Students

Kelli Quan, Elk Grove Unified School District

Elementary Strands

K-2nd Grade Science

A K-2 Design Challenge for Examining Human Impact on Ecosystems

Instructor: *Jenna Porter, Sacramento State University*

Engage in an engineering design challenge that addresses the biological impact of climate change on ecosystems. Workshop will emphasize the Crosscutting concept of Structure and Function.

NGSS: K2-ETS1-2, 1-LS1-1, 2-LS2-2

3rd-5th Grade Science

Making Waves

Instructors: *Megan White and Sarah Caves, Stonegate Elementary*

Students will build a model by exploring concepts such as wavelength and amplitude through hands-on data collection. Student generated questions lead to experiments in motion and a practical assessment.

NGSS: 3-5-PS4-1, 3-5-ETS1-1-2-3

Middle & High School Strands

Earth Science:

Ice, Ice, Baby

Instructor: *Deanna Mino, McCaffrey Middle School and Leah Wheeler, Galt Joint Union Elementary*

Students will develop a model in order to explain the drastic decrease of Arctic Sea Ice over the last 40 years. Students will explore how an increase in global temperature has negatively affected Earth's Albedo Effect. Students will also explore how human activity has affected arctic sea ice and will design a solution to lessen a negative human impact.

NGSS: ESS2-4, ESS2-5, ESS3-3, PS3-3

Biology/Life Science

Outbreak! Bark Beetles in our Forests

Instructor: *Corinne Lardy, Sacramento State University*

Bark beetles are attacking forests across the Western United States and Canada, resulting in the death of many trees. Participants will construct an argument based on evidence for the cause of the recent bark beetle outbreak and use a computer model to explore the effect of rising temperatures on the number and intensity of bark beetle outbreaks over time. (Participants are encouraged to bring their laptops.)

NGSS: MS-LS1-5, MS-LS2-4, MS-LS2-5, HS-LS2-1, HS-LS4-5

Physical Science

Chemistry of the Earth Systems: FCUSD's Implementation of NGSS and the CA Framework in the 3-Course Model

Instructor: *Kristy Guarenti, Folsom High School*

Chemistry teachers in FCUSD collaborated on essential standards and sequencing in order to include Earth Science Standards into the Chemistry curriculum. We will share our course sequence, related standards, experiences implementing Chemistry of the Earth System, and a model lesson from the sequence.

February 26, 2019



Guest Speaker

Unfolding the Mysteries of the Universe, One Particle Collision at a Time

Josh Moss, Sacramento State Physics

Since it was switched on in 2007, the Large Hadron Collider (LHC) at CERN has captured the attention of scientists and science enthusiasts around the world, inspiring wild theories about how it would destroy the world in a giant explosion or create massive black holes (that would subsequently destroy the world) and inspiring not so wild predictions about pushing the boundaries of science and pushing innovation of new technologies. The scientific goals of the LHC and the particle detectors observing the collisions are to study the basic, most fundamental constituents of matter and to discover clues about how the particles interact in order to discover insights into the fundamental laws of nature. After over ten years of producing collisions of protons that have been accelerated to nearly the speed of light, what have we learned? What discoveries have been made? We will discuss the current state of particle physics, the methods and technologies that scientists use to create the highest energy collisions produced in a laboratory, and what the results of 10 years of running the LHC means to the world.

Elementary Strands

K-2nd Grade Science

Pinecones, Turtles and Armadillos! Oh my! Using inspiration from nature to solve a human problem

Instructors: *Paula Baucom and Anna Grace, San Juan Unified School District*

What external parts help plants and animals survive? Students will examine how plants and animals protect themselves in nature and then use their knowledge to solve an engineering problem.

NGSS: 1-LS1-1, 1-LS3-1

3rd-5th Grade Science

Playground Forces

Instructor: *Peggy Harte, Gretchen Higgins Elementary*

We will investigate elements of a playground to help construct model statements of the forces at work by engaging in 3D learning as adult learners and processing the lesson elements through the lens of a teacher.

NGSS: 3-PS2-1, 3-PS2-2

Middle & High School Strands

Earth Science

Continental Drift - The Story Behind the Theory

Instructor: *Lisa Hegdahl, McCaffrey Middle School*

Follow the evidence trail along with German meteorologist and geologist Alfred Wegener, who first formulated the statement of continental drift. Grasp how it is possible for a claim with strong evidence can ultimately be rejected if it does not have compelling reasoning (reasoning that did not surface until after Wegener's death). This instructional segment was created for the CA NGSS Rollout 3.

Life Science

Why are there similarities and differences among organisms?

Instructor: *Kerin Butterfield and Greg Bostock, Sacramento City Unified School District*

In this workshop participants will learn about a series of lessons and then experience a hands-on lesson on embryological development and homologous structures.

NGSS: MS-LS4-1-2-3

Physical Science

Kitchen Music: Exploring the Science of Simple Musical Instruments

Instructor: *Scott Richardson, Davis Senior High*

Kids love to make noise, and it's even more fun when they can make music. This workshop will show how students can begin to understand the physics of musical instruments through a series of hands-on explorations and a study of data patterns. The ideas can be adapted to fit a range of ages from middle school to high school physics.

NGSS: MS-PS4, HS-PS4

March 26, 2019



Guest Speaker

The Engineering Process

Ben Fell, Sacramento State, Civil Engineering

Elementary Strands

K-2nd Grade Science

Sound Off!

Instructor: *Julie Harr, SASP Teacher Leader*

Plan an investigation about sound and use your data to engineer a sound device to solve the problem of communicating over a distance.

NGSS: 1-PS4-1, 1-PS4-4, K-2-ETS1-1

3rd-5th Grade Science

Stars in the Night Sky

Instructor: *Kathy Gill, SASP Teacher Leader*

What causes some stars to appear brighter than others in the night sky? Participants will design and conduct investigations to answer this question. We will use our investigation results to develop and refine an explanation of what we observe.

NGSS: 5-ESS1-1

Middle and High School Strands

Earth Science

Mountain Top Coal Mining

Instructor: *Judi Kusnick, Sacramento Area Science Project (SASP)*

Coal mining has become a major national issue. Use actual biological and geological data to analyze the impacts that mountain top mining has by creating feedbacks in Earth systems. Then plan a mine reclamation plan that mitigates those impacts.

NGSS: HS-ESS2-2, HS-ESS3-4

Biology/Life Science

Matter Cycles in Ecosystems

Instructor: *Libbie Coleman, McClatchy High; Heather Parker, YCUSD; Jennifer Horton, Lincoln High*

Can a species survive on its own without other species? See how students use their understanding of life processes to build a model of matter cycling in a simple but intriguing ecosystem, then use the model to think more deeply about this question. This model provides the foundation for discussions of the importance of biodiversity, and the effects of human activities on ecosystems and their natural cycles.

NGSS: HS-LS2-4, HS-LS2-5

Physical Science

Energy Forms and LOL Diagrams

Instructor: *Jacob Pierce, Sheldon High School*

Attendees will participate in a lesson that introduces potential energy, kinetic energy, and work and provides a strategy of visualizing the transfer of energy through bar graphs known as LOL diagrams.

NGSS: HS-PS3-1