

SDUHSD Science Newsletter
Summer 2016
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Cindi and Jenn will be using these updates as a communication tool each month. The newsletter archive is hosted [here](#). Please e-mail jennifer.mccluan@sduhsd.net should you notice any colleagues not receiving it.

2016-2017 Professional Development

2016-2017 District Science Goals

Science Department Chairs meet with Mike Grove on May 19, 2016. Collectively, the group developed these district-wide goals for science for the 2016-2017 school year (shared at our August 25th Inservice).

Overview

Please plan on attending 5 total professional development sessions for 2016-2017. In addition to our August Inservice, please plan on attending the January Inservice, and the remaining three will be grade level/discipline specific (2 in the fall and 1 in the spring). All will take place at the district office board room from 8:00 am - 2:30 pm. During our first few sessions, we will be working on our goal of articulating course content, and it is important that teachers attend the same grade level/discipline throughout the entire school year. Because we are unable to overlap with other disciplines (ie. Math, ELA, Social Science) and must avoid scheduling PD on Mondays, Fridays, or Late Start Days, we are very limited in terms of available dates and locations. We recognize that missing time with your students is difficult, and appreciate your advance planning so that you are able to attend your chosen grade level/discipline PD Days.

Sub Requests

If you have not already done so, please request a substitute as soon as possible for your chosen grade level/discipline professional development days. Subs may be requested up to 350 days before an absence. Once you select "School Business" as your reason, please put "Achievement Support-District" as the "Approval Comment". Lunch will be on your own, and Cindi and I will contact you through e-mail in advance of the PD days with each each sessions' specific start and end times.

Science Professional Development Dates 2016-2017

Description	Location	7th grade	8th Grade	Biology	Chem & Phy
August Inservice	EW	8-25-16			
1st Set of Fall PD	DO Board Room	9-20-16	9-22-16	9-27-16	9-29-16
2nd Set of Fall PD	DO Board Room	11-1-16	11-2-16	11-3-16	11-8-16
January Inservice	TBD	1-31-17			
Spring PD	DO Board Room	2-28-17	3-2-17	3-14-17	3-16-17

Articulation with Feeder Elementary District

Mike Grove continues to work with leadership in our surrounding feeder elementary districts around vertical articulation for NGSS. Jenn McCluan will provide updates as these meetings occur this fall and spring.

Assessment Resources

[SDUHSD Assessment Resources](#)

Jenn has received increased requests for information related to assessment in our NGSS transition. While the resources below have been featured in previous science newsletters, she thought it would be helpful to highlight the more significant ones here. These and additional NGSS assessment resources can be found on our district science resource page [here](#). Guen Butler has created an excellent Formative Assessment resource page for our district [here](#).

[California State Board of Education Approves NGSS Assessment Plan](#)

This California Science Teachers Association article summarizes the NGSS Assessment Plan approved by the California State Board of Education on March 9, 2016. Key highlights include a state assessment timeline, grade levels in which the summative assessment will be given, and a design summary of what the assessment will look like.

[Sample Assessment Performance Tasks](#)

California and its partner, Achieve, Inc., a collaborator in developing the NGSS, are part of the Next Generation Science Assessment (NGSA) Collaborative—a project to develop, test, and analyze sets of technology-supported diagnostic classroom assessments for middle school physical science. The NGSA Collaborative project addresses core ideas in physical science by integrating middle school chemistry content of structure and properties of matter, chemical reactions, and energy with two science practices—constructing explanations and developing and using models. More information about the project, sample tasks, and classroom resources can be found on the [NGSA Web site](#). Here is a [direct link to sample performance tasks at the Next Generation Science Assessment Portal](#).

[High School Item Cluster Prototype](#)

The above prototype was shared at a San Diego County Office of Education meeting in January 2016. While the above are prototypes and the eventual assessment CA chooses could look quite different, our SDCOE Science Coordinator John Spiegel indicated that they are powerful examples of what three dimensional assessments could look like, and what our students need to be able to do with their scientific knowledge in the NGSS classroom. You can read more about the Council of Chief State School Officers [here](#), and their Science Assessment Item Collaborative Framework [here](#). A middle school prototype is not yet available, but a 5th grade assessment prototype can be accessed [here](#).

[Integrating Science Practices into Assessment Tasks](#)

Developing three-dimensional science assessments is challenging. Most current assessments focus on testing students' knowledge of science facts. Few focus on having students apply their understanding of disciplinary core ideas in the context of engaging in a science or engineering practice. Fewer still make connections to crosscutting concepts. These "task format" tables included in this document are tools to help teachers and district leaders design three-dimensional assessment tasks. Thanks to SDCOE Science Coordinator John Spiegel for sharing!

Curricular/Instructional Resources

[Informal List of NGSS Curricular/Instructional Resources](#)

Please note this is simply an informal list of resources SDUHSD teachers have expressed an interest in and/or are exploring. Jenn McCluan created this document to have a place to keep track of these explorations and for teachers to provide feedback. This document is not official or in any way representative of curricular resources SDUHSD may or may not eventually adopt.

[California Education and the Environment Resources \(EEI\)](#)

The California Education and the Environment (EEI) Curriculum contains a wide array of resources to support your transition to the Next Generation Science Standards (NGSS). EEI uses the environment as an authentic, engaging, and highly effective context in which students can more readily see the relevance of science and engineering to their lives. Although the EEI Curriculum was based on California's 1998 science content standards, it contains diverse instructional resources that, if thoughtfully integrated, can enrich lessons and units of study focused on California's NGSS. California's new Science Curriculum Framework, scheduled to be finalized in November 2016, provides several examples of how the EEI Curriculum can be integrated into NGSS-focused instruction.

[Discovery Channel Racing to Extinction Curriculum](#)

Racing Extinction has teamed with Discovery Education to deliver free standards-based educational resources to inspire students to tackle some of the world's most time sensitive challenges. These standards-aligned, interactive learning tools explore concepts such as climate change and ocean ecosystems- themes from the film- and include exclusive video content. John Spiegel, SDCOE Science Coordinator, indicated that this group might be interested in working with a teacher, school/district to implement their curriculum.

[NGSS@NSTA Hub Classroom Resources](#)

Updated over the summer, this resource center provides vetted, NGSS-aligned lessons to science educators, and is searchable by DCI and grade level.

Focus on the Science and Engineering Practices. This Month's Feature: Modeling

[Models and Modeling: An Introduction](#)

This *Ambitious Science Teaching* article addresses the rationale for including student-created models in science classrooms, as well as strategies and examples as to how modeling can be incorporated in lessons teachers may already do or have in place.

[Separating a Mixture: Students Build Models to Explain Ionic Interactions](#)

From NSTA's Science Teacher: "In this lesson, students explain how ionic substances interact in solutions by developing and revising their own explanatory models. We taught the lesson in a physical science course." The article also includes tips and strategies to support students with scientific modeling.

[Investigating Axial Seamount: Using Student Generated Models to Understand Plate Tectonics](#)

In this *Science Scope* NSTA article, the main goal of this unit was to engage students in the practice of modeling to construct a valid scientific explanation of the existence of Axial Seamount through the theory of plate tectonics. This lesson addresses NGSS Performance Expectation MS-ESS2-2 (Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.). This PE is included in the 7th grade integrated model (in Instructional Segment 4 of the CA Science Framework draft).

[Harvard Graduate School of Education Tips for Teaching Modeling in Science](#)

From their website: "The process of developing and revising models is an integral aspect of science and is an integral part of the Causal Patterns curricula. The term "models" is used to refer to representations of how we think something works or to the mental constructs in our heads. The representations can be drawings, physical models, computer models, etc. Modeling encourages students to actively process concepts, to unpack and reveal their thinking, and to consider how the available evidence fits or not with their ideas. If you would like to explore models further, see "Modeling in Science" within the curriculum "The Nature of Scientific Thinking: Lessons Designed to Develop Understanding of the Nature of Science and Modeling." This was developed in

response to teacher requests for ways to teach modeling and the importance of models in science and learning to their students.”

Check Out These Resources!

[Facebook's California Middle School Science Teachers](#)

Jenn has found this to be a wonderful resource page for sharing lessons, asking questions, assessment updates, etc. Their description: A page for California Middle School science teachers to share ideas, concerns, strategies, etc. This page was started by Jill Grace, the 2013-2015 Middle School Director of the California Science Teachers Association (<http://www.cascience.org/csta/csta.asp>) with the hopes of better representing middle school science teachers from across the state. Please invite other MIDDLE SCHOOL SCIENCE teachers you know to join the group - hopefully we can build an audience from across the state so that more voices can be heard.” You must ask to be a member, but membership is usually granted within 24 hours.

[Facebook's California High School Science Teachers](#)

Jenn has found this to be a wonderful resource page for sharing lessons, asking questions, assessment updates, etc. A page for California High School science teachers to share ideas, concerns, strategies, etc. This page was started by Heather Wygant, of the California Science Teachers Association (<http://www.cascience.org/csta/csta.asp>) with the hopes of better representing high school science teachers from across the state. Please invite other HIGH SCHOOL SCIENCE teachers you know to join the group - hopefully we can build an audience from across the state so that more voices can be heard. You must ask to be a member, but membership is usually granted within 24 hours.

[Crosscutting Concept and Science and Engineering Practices Questions](#)

Pete A'Hearn (Palm Springs Unified School District) has developed these questions to support the explicit use of the NGSS Crosscutting Concepts and Science and Engineering Practices.

[Digital Notebooks](#)

Excerpt from webpage : “This page is intended as a resource for teachers who are interested in going paperless in their classroom and using digital notebooks. Check out these posts to get some ideas for your own classroom, and then please join in the conversation- we need more trailblazer educators to re-invent education in our digital world!” Thanks to Tracy McCabe for sharing!

[Teach Discrepant Events With the 5E Instructional Model](#)

This article is part of a newly created, ongoing NSTA *Science Scope* column series that will focus on the use of discrepant events in the classroom, and provide sample lessons each month.

[Earth Null School](#)

Updated every three hours, this site features a visualization of global weather conditions forecast by supercomputers and data related to air movement, currents, particulates, etc.

[July and August 9 Things to Know About NGSS This Month](#)

You can subscribe to the NGSS mailing list [here](#) to receive e-mail updates.

[I Love A Clean San Diego Environmental Education Resources](#)

I Love A Clean San Diego has partnered with SDG&E to provide FREE environmental education activities to APES students throughout San Diego County. Our newest program explores ocean acidification and its impacts on marine ecosystems. We will identify the chemical processes behind ocean acidification and sources contributing to this issue. Students will also have the opportunity to look at plankton specimens under a

microscope and discuss the impacts that ocean acidification is having on specific plankton, such as coccolithophores and pteropods. Furthermore, there is an optional pre- and post- energy assessment to further enhance the program. In the activities, students measure their carbon emissions and develop an action plan to reduce their own carbon footprint. This activity acts as a great introduction to your section on OA. You choose the date and time, and we come to you! I look forward to hearing from you soon! For more information, contact Grace Matteson, Education Specialist (gmatteson@cleansd.org). Thanks to Brinn Belyea for sharing.

Middle School Science

[EEI Aligned with Integrated 6-8 Model](#)

Cindi Denley Sargent, STEM Professional Development Coordinator at Sutter County Superintendent of Schools, kindly shared this document with Jenn McCluan on the [Facebook CA Middle School Science Teachers](#) page. It articulates how the [CA Education and Environment \(EEI\) curriculum](#) can be used with the Integrated Middle School model, and links to the EEI lessons.

[A Middle School Lake Study: Connecting Disciplines through a Hands-On Experience](#)

5th-8th grade students in a Tennessee school engage in hands-on science at a campus lake in this NSTA Science Scope article where science teachers share how they vertically aligned their science curriculum using this lake investigation. The sixth-grade teacher set a goal for students to understand the effects of erosion and nonpoint sources of pollution, especially sedimentation, on the campus lake.

[Boeing and Teaching Channel Partnership: Project-Based Learning Aligned to NGSS](#)

The Boeing Company and Teaching Channel have been working together since 2014 to create problem-based curricula inspired by the science and engineering innovations at Boeing and informed by globally competitive science, math, and literacy standards. These modules are being released as part of a collection of K-12 education resources under development to celebrate the 100th anniversary of The Boeing Company. Ten pairs of Boeing engineers were matched to ten teachers (grades 4-8) in Puget Sound, WA, and Houston, TX, to create 10 science modules. Each module is designed to be delivered in classrooms over a two-week period. These resources are intended to meet a critical need by teachers for content that integrates engineering design thinking and problem based learning – both of which are more strongly emphasized in globally benchmarked science standards (e.g., Next Generation Science Standards) that are currently being adopted or adapted by districts across the United States.

[Making Science Real: Supporting English Learners in Argumentation and Explanation through Authentic Tasks](#)

In this NSTA Science Scope article, the authors address the issue that “most English learners’ (ELs) instruction in science tends to focus on the use of discrete strategies such as pair/share, videos, graphic organizers, and sentence frames. These strategies tend to be superficially applied to the curriculum, with little attention paid to helping ELs develop the science language skills of argumentation and explanation. In this article, we argue for a more authentic approach to science and academic language instruction, in which ELs use science for purposeful reasons to discuss and learn about a science topic and then apply their science understandings to explain a real-world situation.”

High School Science

[NSTA The Science Teacher](#)

Modeling is a focus for the 2016 summer NSTA Science Teacher Issues. The publication offers several articles per issue for free (Jenn McCluan has a NSTA membership; please e-mail her if there is a free article you find that you would like to read). Some examples are included below.

[Connecting the Visible World with the Invisible: Particulate diagrams deepen student understanding](#)

From the NSTA *Science Teacher*: “Research suggests that connecting the visible (macroscopic) world of chemical phenomena to the invisible (particulate) world of atoms and molecules enhances student understanding in chemistry (Birk and Yeziarski 2006; Gabel, Samuel, and Hunn 1987; Johnstone 1993; Nakhleh 1992). This approach aligns with the science standards (see box, p. 58) and is fundamental to the redesigned AP Chemistry curriculum. However, chemistry is usually taught at the abstract symbolic level, rarely incorporating particulate-level instruction. This article addresses that shortcoming by describing how to use particulate diagrams in a chemistry course.”

[Simulating Life: Computational biomodeling replicates the activities of living organisms](#)

This NSTA Science Teacher article describes hands-on activities that introduce teachers and students to biomodeling, and addresses NGSS Disciplinary Core Idea HS-LS2 Ecosystems: Interactions, Energy, and Dynamics and Performance Expectations: HS-LS2 (Use of mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.), HS-LS2-2 (Use of mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.), and HS-LS2-6 (Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and type of organisms in stable conditions, but changing conditions may result in a new ecosystem.)

[Achieving Liftoff: Using Coherent Storylines to Explain Phenomena](#)

From NSTA's *Science Teacher*: “In this article, we describe our process for developing storyline units to support students' making sense of and explaining a rocket launch.” This lesson addresses NGSS DCIs HS-PS1 Matter and Its Interactions and HS-PS2 Motion and Stability: Forces and Interactions. It also addresses PEs: HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties, HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy, and HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

[Link to Case Studies from National Center for Case Study Teaching in Science](#)

Click the link above to access case studies released during the summer of 2016.

Professional Learning Opportunities

[SDCOE Science News and Updates](#)

The San Diego Office of Education Science Newsletter shares updates, professional learning opportunities, and student opportunities in science and STEM.

[Reuben H. Fleet Science Center Teacher Professional Development](#)

The Fleet Science Center Education Department is offering several professional development opportunities for science teachers this summer and next school year, including an inquiry-based institute based on the Exploratorium model, and several NGSS workshops.

[Review NGSS/Achieve EQUIP Rubric](#)

The goal of the EQUIP Peer Review Panel for Science will be to identify high-quality lessons and units that are designed for the Next Generation Science Standards (NGSS). Building on the work of the EQUIP [peer review panels for mathematics and English Language Arts](#), the science peer reviewers will evaluate lessons and units in their area of expertise and, collectively, will cover grades K-12. Any lessons and units that are determined to be of high quality will be publicly shared via www.nextgenscience.org so that educators and curriculum developers across all states and districts can benefit from these materials. While all interested persons are encouraged to apply, the application process is designed to evaluate applicant's ability to apply the EQUIP Rubric for Science (Version 3.0) and reveal their understanding of [A Framework for K-12 Science Education](#)

and the NGSS. Applicants will be selected based on their ability to make consistent, criterion-based evaluations using the latest version of the EQuIP Rubric for Science.