

SDUHSD Science Newsletter
October 2018
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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.

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Professional Development 2018-2019

Stakeholder Communications

As of October 24th, we have completed our three [NGSS Parent Information Nights](#) at Earl Warren, Pacific Trails, and Oak Crest Middle Schools. Thanks to the science teachers and administrators who volunteered and/or presented at these sessions. High School principals will be sharing information regarding our NGSS transition with families at upcoming principals coffees, and Jenn McCluan and Bryan Marcus continue to update our School Board members with weekly summaries of the transition work and professional development taking place in science around the district.

Project Phenomena Summit

Thank you to the seven SDUHSD science teachers (Krista Baldwin, Ryan Cardenas, Kaiyo Chen, Alexa Henning, Renee Leslie, Michael Rall, and Erica Zug) who collaborated with scientists and local educators to identify phenomena and develop NGSS-aligned resources (including data) for teachers to use in their classrooms. This summit will be replicated in five other regions through the state of California, and the resources developed will be open for any interested teachers to use. Currently, the San Diego resources developed in the summit last week are being finalized and vetted by the scientists, and will be shared through a state network in a format similar to the [#ProjectPhenomena database](#). Jenn will update everyone when this has taken place.

HHMI

Jessica Adams, Brian Bodas, Emily Steward, and Tina Villanueva participated in a two-day HHMI training hosted in our district at Pacific Trails Middle School in mid-October. The lessons shared addressed inheritance and human impact topics. If you have any questions about the [HHMI resources](#), please connect with the biology teacher from your site who attended the training.

Overview of November Science Walks

Our science walks are scheduled for November 6-8; please consult this [spreadsheet](#) (Nov. Sci Walk tab) to determine which day you will visit a middle and high school in our district, as well as which day(s) your school site will host visitors. Thank you to teachers who volunteered their classrooms for visitors, as well as

teachers/admin who volunteered to be chaperones. A detailed email was sent on 10-30-18 to all teachers and administrators regarding the science walks; please refer to it for the day's agenda, what to bring, etc., and let Jenn McCluan know if you have any questions.

NGSS Updates and Resources

[The Wonder of Science](#)

The Wonder of Science website was created in 2017 by Paul Andersen (Bozeman Science). It aggregates all the resources he has developed working with schools implementing the NGSS (Next Generation Science Standards), and includes a Phenomena Database as well as sample performance assessments for each Performance Expectation.

[NGSS Now](#)

In this October edition, NGSS/Achieve share a new set of tools and resources for evaluating assessments for alignment with NGSS, as well as a high school physical science lesson (Physics/Chemistry) that has earned their rating of "high quality".

[Next Gen Navigator](#)

Monthly updates from the National Science Teacher Association.

[Science Assessment Task Screening Tools](#)

These two tools are intended to assist educators in evaluating science assessment tasks to determine whether they are designed for three-dimensional science standards based on the *Framework for K–12 Science Education*, such as the Next Generation Science Standards. The [Science Task Prescreen](#) can be used to conduct a quick review of assessment tasks to identify any "red flags" – challenges commonly found in science assessment tasks – and determine whether a task is worth diving into more deeply. The [Science Task Screener](#) is used to take that deeper dive into evaluating science assessment tasks.

[NGSS@NSTA Classroom Resources](#)

Check out these NGSS@NSTA [Classroom Resources](#) vetted by NSTA teacher educators. This week's focus is life science:

Grades K–2: [The Bug Chicks Mission: Pollination \(Episode 5\)](#)

Grades 3–5: [Weaving the Web](#)

Grades 6–8: [Clip Birds](#)

Grades 9–12: [African Lions: Modeling Populations](#)

[The Science of Chocolate](#)

These resources from [Science Friday](#) and the [Exploratorium](#) explain the science of chocolate and why Halloween candy tastes so good.

Interesting Reads and Resources

[How People Learn Version 2.0](#)

This article summarizes the key findings of the newly released update to *How People Learn*. Thanks to Brinn Belyea for sharing. Key findings include:

- To be effective, teachers must understand how students' prior knowledge, experiences, motivations, interests, and language and cognitive skills interact with those of the teacher's own experiences and culture and the characteristics and culture of the classroom.

- Students should be supported in directing their own learning, via targeted feedback, opportunities to reflect on what they've learned, challenges matched to their abilities, and help in developing meaningful goals.
- Both curricula and instructional strategies should help students connect their academic learning goals to what they learn and do outside of school.
- Teaching not just science or history content, but the specific language and practices of different disciplines, is critical to helping students develop deep understanding of those subjects.

[Science News for Students](#)

An interesting resource including articles, video clips, and questions. Thanks to Cindi Schildhouse for contributing!

[Academic Language Function Toolkit](#)

Developed by Sweetwater Union High School District and shared by Guen Butler, SDUHSD Differentiation ToSA, this toolkit provides resources for developing academic language for all students in all content areas. Talk strategies are categorized, and include sentence frames, strategies, and graphic organizers for a variety of discourse including: seeking information, analyzing, cause and effect, synthesis, etc. Additional strategies are included [here](#).

[Characterizing College Science Assessments: The Three Dimensional Learning Assessment Protocol](#)

Abstract from Michigan State University study: “Many calls to improve science education in college and university settings have focused on improving instructor pedagogy. Meanwhile, science education at the K-12 level is undergoing significant changes as a result of the emphasis on scientific and engineering practices, crosscutting concepts, and disciplinary core ideas. This framework of “three-dimensional learning” is based on the literature about how people learn science and how we can help students put their knowledge to use. Recently, similar changes are underway in higher education by incorporating three-dimensional learning into college science courses. As these transformations move forward, it will become important to assess three-dimensional learning both to align assessments with the learning environment, and to assess the extent of the transformations. In this paper we introduce the Three-Dimensional Learning Assessment Protocol (3D-LAP), which is designed to characterize and support the development of assessment tasks in biology, chemistry, and physics that align with transformation efforts. We describe the development process used by our interdisciplinary team, discuss the validity and reliability of the protocol, and provide evidence that the protocol can distinguish between assessments that have the potential to elicit evidence of three-dimensional learning and those that do not.”

Middle School Science

[BSCS I² \(Identify and Interpret Graphing Analysis Strategies\)](#)

This strategy helps students make sense of graphs by breaking the information presented into smaller parts.

[Newton's Bottle](#)

This lesson uses the phenomena of a bottle and a dollar bill to promote students' exploration of forces. After completing this lesson, students will see how the force of friction affects the motion of objects, and they will get the chance to explore additional examples of Newton's laws of motion.

[Using a systems thinking approach to figure out why a ball drops, bounces, and stops](#)

Teaching systems thinking is challenging due to its complexity and the complexity of the systems to which it is typically applied. By applying systems thinking to simple systems, students and teachers can develop systems thinking habits, which can then be applied to more complex systems. Here, the article's author describe how

students' systems thinking skills are developed as they apply these skills to discover and explain the energy conversions and transfers that take place in simple systems.

[Engineering Prosthetic Hands](#)

The challenge presented in this article is to create a prosthetic prototype using only everyday materials that can be found around the house. Through the creation of these designs, students focused on the structure and function of their own hands.

High School Science

[New High Quality HS Unit Example: How Does a Small Spark Trigger a Huge Explosion?](#)

The Science Peer Review Panel has rated another unit as high quality and posted it online. This is the second unit in the Interactions curriculum by Michigan State University's [CREATE for STEM Institute](#) and the [Concord Consortium](#) to be identified as high quality (see the first unit [here](#)-Why do some clothes stick together when they come out of the dryer?). In this unit, students further develop their model of electrostatic interactions by incorporating the relationship between electric potential energy and electric forces. In particular, the unit focuses on the electrostatic attractions and energy conversions involved in the formation of molecules (chemical reactions). See the unit [here](#), and the full EQulP Rubric review [here](#).

[Know Your Enemy, Know Yourself: Using Precision Medicine to Target Breast Cancer and the Cell Cycle](#)

This case study relates the actual experiences of a woman with breast cancer as she shares her experiences through a series of blog posts at various stages of treatment (diagnosis, mastectomy, chemotherapy, targeted therapy, and maintenance). Students will interpret her actual pathology report and learn that an individual's genetic makeup determines whether certain drugs are metabolized effectively, and how dosing and drug choice may change depending on which metabolizing enzymes are present. In the context of precision medicine, "knowing yourself" is just as important as "knowing your enemy." Students conclude the activity by interpreting graphical data that reveals health disparities in the United States and across the world, and consider causal implications of those disparities. The case is especially suited for introductory biology, but could easily be adapted for a higher-level cell, molecular biology or genetics class. Health sciences courses such as nursing or introductory pharmacology may also find it useful.

[Avoiding Bonding Misconceptions](#)

Bonding is one of the most challenging topics for chemistry students. The so-called 'octet rule' can cause problems. Often teaching and understanding of bonding is based on the notion of atoms 'needing' full outer shells, with the octet rule used as an explanatory principle rather than a rule-of-thumb. This Education in Chemistry article provides some research-supported teaching strategies to use with students related to building a conceptual understanding of bonding grounded in electrostatics. Thanks to Brinn Belyea for sharing!

[We Need to Talk About the Energy in Chemical Bonds](#)

This article addresses a common misconception that energy is stored in chemical bonds and that when you break the bonds, you release energy. Thanks to Brinn Belyea for sharing.

[The Polar Bear of the Salt Marsh?](#)

Polar bears are an iconic symbol of climate change, but regionally relevant examples of susceptible biota are needed to highlight how global forces impact local environments. In this interrupted case study, students follow a young naturalist as she explores why saltmarsh sparrows are increasingly rare in coastal wetlands of the northeastern United States. In small groups, students diagram how sea-level rise may alter saltmarsh sparrow habitat and analyze a graph to determine if there is evidence to support sea-level rise. The social implications of rising sea levels induced by climate change can also be explored with an optional jigsaw activity. Students

who successfully complete this case study will integrate key concepts related to sea level rise, interpret scientific data and draw conclusions about environmental change, and evaluate alternative management decisions. Originally developed for an undergraduate ecology course, the case could easily be adapted by college or high school instructors for an introductory biology or an environmental science course.

Learning Opportunities

[San Diego County Office of Education Professional Development](#)

This SDCOE catalog summarizes a variety of professional learning opportunities for science educators. Sign up for county updates [here](#).

[Fleet Institute's Teachers Eating Pizza](#)

Teachers Eating Pizza is an educator workshop at the Fleet Science Center that occurs on the first Wednesday of each month. Come for the pizza, converse with colleagues, learn curriculum-ready interdisciplinary content related to the month's topic and attend the 7 p.m. The Sky Tonight Astronomer-led planetarium show in the Heikoff Giant Dome Theater. Following the workshop, the San Diego Astronomy Association invites you to view the stars through telescopes on the Prado during their monthly program Stars in the Park. The following topics are emphasized in the workshop and planetarium. The topic of the educator workshop may vary from the planetarium show to be more in line with Next Generation Science Standards.

[Google Science Fair](#)

Submissions open in September 2018 for students between the ages of 13-18. Thanks to Cindi Schildhouse for sharing.

[Fleet Science Science Teacher Learning Opportunities](#)

The Fleet Inquiry Institute is the teacher professional development arm of the Fleet Science Center's Education Department. For additional information about current programs please contact the Fleet Inquiry Institute at (619) 238-1233 x722 or by email.

[Northrop Grumman Foundation Teachers Academy](#)

The [Northrop Grumman Foundation Teachers Academy](#) is beginning its fourth year and is now [accepting applications](#) for the 2018–2019 cohort. The program—designed specifically for middle school teachers (grades 5–8)—was established to help enhance teacher confidence and classroom excellence in science, engineering and technology, while increasing teacher understanding about the skills needed for a scientifically literate workforce. The Academy, which is directed by the [National Science Teachers Association \(NSTA\)](#), will support up to 29 teachers of physical science, engineering, and/or technology located in school districts in select Northrop Grumman communities in the United States, as well as from Australia. The teachers will be immersed throughout the year in a host of blended professional learning opportunities in science, technology, and engineering. The application deadline is November 12, 2018.

[SEAP Apprenticeship Program for Students](#)

The Science and Engineering Apprenticeship Program (SEAP) provides an opportunity for high school students to participate in research at a Department of Navy (DoN) laboratory during the summer.

The goals of SEAP are to encourage participating high school students to pursue science and engineering careers, to further their education via mentoring by laboratory personnel and their participation in research, and to make them aware of DoN research and technology efforts, which can lead to employment within the DoN.

SEAP provided competitive research internships to over 294 high school students this year. Participating students spend eight weeks during the summer doing research at 25 DoN laboratories. For opportunities at the college level check out [NREIP](#). The registration deadline is November 2, 2018.