SDUHSD Science Newsletter
September 2019
Cindi Schildhouse (District Science Coordinator)
Jennifer McCluan (Science Teacher on Special Assignment)

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 2019-2020

PD Dates
Fall PD
10/15 AND 12/10 Physics*
10/16 Middle School
10/22 Chemistry*
10/24 Biology

Spring PD
2/20 Physics*
2/27 AND 4/23 Middle School
3/3 AND 5/12 Biology
3/5 AND 5/7 Chemistry*

*Chemistry and Physics may be collapsed into one day to facilitate vertical articulation work between courses.

Science Leaders Network
This quarterly meeting is hosted by SDCOE, and our district team for 2019-2020 includes: Kajyo Chen, Leo Fletex, Ed Gerstin, Jenn McCluan, and Katie Stapko. The goals of this network are to:

- Build district and regional science capacity and support through a collaborative network
- Deepen understanding of NGSS and what is required to effectively implement NGSS
- Identify and share NGSS resources and best practices for implementation
- Develop common messaging and advocacy for science and science support

HHMI Classroom Ethos Workshop
Jennifer Kuo and Jenn McCluan attended the September 16th HHMI training hosted in the Grossmont School District. The focus was Classroom Ethos, and notes/resources are linked above.

Elementary Feeder Vertical Articulation

On October 16th, Oak Crest 7th grade science teachers Christ Faist and Tracy McCabe, and Instructional Specialist Jenn McCluan delivered professional development to 6th grade teachers in the Encinitas Union School District. This session focused on strengthening teachers' capacity with using microscopes in a lesson collaboratively developed by our districts, and built upon the generous microscope donation from Thermo Fisher Scientific Jenn was able to coordinate for our Encinitas colleagues last year. Additionally, 6th grade teachers had the opportunity to construct storylines for their 6th grade science standards, and work collaboratively with our SDUHSD teachers to identify essential knowledge and skills to support students in transitioning between 6th and 7th grade science. We will continue to meet with the Encinitas science planning team to further curriculum building and vertical alignment.

Science Region IX Community of Practice

Mike Rall, Cindi Schildhouse, Bernard Steinberger, and Jenn McCluan attending the Science Region IX Community of Practice, along with 130 other science educators and leaders in San Diego, Imperial, and Orange Counties on September 25-26 in Santa Ana. The focus of this group is to explore and implement equitable teaching strategies from *Ambitious Science Teaching*. Our SDUHSD Community of Practice team will share their learning at school sites and district PD.

Pilot Updates

Middle School Pilots

All SDUHSD Middle School teachers are piloting Lab-Aids, Stanford SCALE, and TCI for the 2019-2020 school year. The Pilot Pacing Guide and Pilot Tracker spreadsheet can be found on our district website, in addition to teacher and student feedback surveys. Should you have any issues with the Lab Aids or TCI online platforms, please report any problems using this online form. All materials and books have been delivered to school sites as of September 27, 2019. Bryan Marcus and Jenn McCluan will be meeting with each middle school science team in the next month to check-in on pilot progress using these questions to guide conversations.

High School Pilots

At least two Biology/Life Science teachers from each high school are participating in either a Biozone or Houghton Mifflin Harcourt (HMH) pilot for the 19-20 school year. The list of participating teachers is included in our Science Pilot Tracker spreadsheet (click on the "HS Science Teachers & Sections" tab). All materials have been delivered to school sites. Should piloting teachers have issues with the online HMH platform, please report any problems using this online form.

NGSS Updates and Resources

San Diego County Office of Education Science News and Updates

Check out the latest science and professional development news from this SDCOE newsletter.

NGSS Now: August 2019

This month's publication includes resources related to equity in science classrooms, as well as resources to support students in making sense of phenomena.

NGSS Now: September 2019

This month features new OpenSciEd curricular resources for middle school that have earned the NGSS Merit Badge as well as a webinar that addresses closing the excellence gap for English Learners and students of color.

HHMI Biointeractives Newsletter

In their September newsletter, HHMI features a new short film on how ecologists are restoring connections with wildlife corridors; an interrupted case study that encourages students to pause, reflect, and make connections between experimental evidence and explaining a phenomenon; and an opportunity to connect with your fellow educators about why you teach.

Medical Biology Course UC Approved

Thank you to Cathy Ramos for authoring this UC application, which was approved for "D" science credit this September.

Interesting Reads and Resources

Measuring Actual Learning vs. Feeling of Learning in Response to Being Actively Engaged in the Classroom

Many of us have had conversations with each other (and parents) about whether or not NGSS will prepare students for success in college. John Spiegel from SDCOE recently shared this study conducted by Harvard University's Department of Physics, Chemistry and Chemical Biology, and School of Engineering and Applied Studies.

Abstract: "We compared students' self-reported perception of learning with their actual learning under controlled conditions in large-enrollment introductory college physics courses taught using 1) active instruction (following best practices in the discipline) and 2) passive instruction (lectures by experienced and highly rated instructors). Both groups received identical class content and hand-outs, students were randomly assigned, and the instructor made no effort to persuade students of the benefit of either method. **Students in active classrooms learned more (as would be expected based on prior research), but their perception of learning, while positive, was lower than that of their peers in passive environments. This suggests that attempts to evaluate instruction based on students' perceptions of learning could inadvertently promote inferior (passive) pedagogical methods.** For instance, a superstar lecturer could create such a positive feeling of learning that students would choose those lectures over active learning. Most importantly, these results suggest that when students experience the increased cognitive effort associated with active learning, they initially take that effort to signify poorer learning. That disconnect may have a detrimental effect on students' motivation, engagement, and ability to self-regulate their own learning. Although students can, on their own, discover the increased value of being actively engaged during a semester-long course, their learning may be impaired during the initial part of the course. We discuss strategies that instructors can use, early in the semester, to improve students' response to being actively engaged in the classroom.

Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom

"Despite active learning being recognized as a superior method of instruction in the classroom, a major recent survey found that most college STEM instructors still choose traditional teaching methods. This article addresses the long-standing question of why students and faculty remain resistant to active learning. Comparing passive lectures with active learning using a randomized experimental approach and identical course materials, we find that students in the active classroom learn more, but they feel like they learn less. We show that this negative correlation is caused in part by the increased cognitive effort required during active learning. Faculty who adopt active learning are encouraged to intervene and address this misperception, and we describe a successful example of such an intervention." Thanks to Brinn Belyea for sharing this article.

The Wonder of Science (Bozeman Science)

We've feature Bozeman Science resources in previously newsletters, but Paul Anderson has really upped his game and created some fantastic resources, assessments, and phenomena on his recently updated website. Thanks to Andrea Lawless for sharing!

Middle School Science

Teaching Natural Selection Ambitiously

This article demonstrates how the Four Core Ambitious Science Teaching Practices were used for a middle school unit on natural selection. These core practices may be applied to any unit, or part of a unit, for actively engaging students in modeling and in creating explanations.

A Particle Model for Density
This article presents a different approach and lesson sequence to help students build a conceptual model of density.

High School Science

Rhabdomyolysis: A Workout Breakdown
This directed case study focuses on exercise-induced rhabdomyolysis (exRML). Students are guided though skeletal muscle cell membrane transport and calcium homeostasis. They are then asked to predict how depletion of ATP at the skeletal muscle cell level could affect cellular membrane transport, skeletal muscle tissue integrity, blood composition, and kidney organ function. This cause-and-effect scenario, which incorporates human physiology at all levels from ion to organ, is presented in the context of the protagonist, "Rachel," who pushes her exercise regime too far and ends up in the hospital with exRML. Students are provided with a variety of clinical data (vital signs, blood values, and plotted data) and are then invited to apply what they have learned to determine how to tailor Rachel's treatment plan. This case was written for a general biology or human physiology course and is designed to be used within one 50-minute block.

Education in Chemistry
In this Royal Society of Chemistry publication, the authors share investigations examining the composition of plastic bags, the importance of allowing students to make mistakes, and the role of pH and solubility in paper conservation.

Learning Opportunities (Students)

Salk/UCSD Partnership: Solving the Climate Crisis
Recent extreme weather events, including a series of destructive hurricanes and a trend toward longer and more devastating wildfire seasons, signal the urgency of the global climate crisis. This exclusive invitation only session will discuss the dangers of man-made climate change and the immediate actions all of us can take to mitigate it. The special guest speaker, who is knowledgable and passionate about this issue, has been at the forefront of the movement to raise awareness through his work with the Intergovernmental Panel on Climate Change and his world-wide educational trainings. The moderator will be fielding questions submitted by the audience as part of this special event.

Since today's students are the generation who will inherit these issues, Salk Education Outreach is offering an opportunity to San Diego students to submit questions from their perspective addressing climate issues, challenges, and solutions. Submitted questions will be assessed by a judging committee and the top 4 questions will be submitted to the event moderator. Authors of the winning questions, along with their teachers, will be invited to attend this special event in person. We strongly encourage teachers to have their class members discuss and collaborate on meaningful questions. We can certainly submit questions on behalf of an entire class, although if selected as a winning question, only one class representative will attend the event. Questions must be submitted by **October 18**, winners will be announced by November 8.

STEMsymposium
The second annual "Selfies are Out. Self-Made is In" symposium has as its goal to “bring together consummate female leaders in STEM to share their journeys, challenges, life lessons, and advice for high school students. It's also a great networking opportunity for the students who attend and learn about internships, college pathways, and careers.” The event is scheduled for October 27th (Sunday) from 2:00 - 4:30 pm at the AMN Healthcare Theatre.

Girls Living STEM Award
The STEM Learning Ecosystems Community of Practice is excited to announce the new Girls Living STEM Award, which will honor one young woman in each of the 84 STEM Learning Ecosystems at the STEM Learning Ecosystems Community of Practice Convening Living STEM: Communities At The Heart in Cleveland from October 21 – 23, 2019. The Girl Living STEM recognition is a part of Women Living STEM, an October 21, 2019 event during the convening that will recognize more than 70 Northeast Ohio women who have made measurable impacts in STEM based on their leadership, accomplishments and achievements, impact in the STEM ecosystem, and proven role model for girls and young women interested in STEM.

Toshiba/NSTA ExploraVision Science Competition
The Toshiba/NSTA ExploraVision science competition encourages K-12 students to imagine what technology might be like in the future while experiencing scientific process and discovery in an engaging, hands-on way. Let's empower the next generation of inventors, scientists and leaders. It's not too late to register your teams! Deadline for submissions is February 10. Download our free lesson plans for teachers and register online today!

Learning Opportunities (Teachers)

Salk Institute
Another exciting opportunity that the Salk Education Outreach has for middle and high school science teachers, the 4th Annual **Ellen Potter Research Connections for Teachers Symposium will be held on Saturday, October 5th from 8:30-3:00p at the Salk Institute**. The workshop will include scientific talks from three Salk scientists in a seminar environment, then collaborate with their colleges to apply what they learned to NGSS-aligned lesson plans on the topics of question design and model application and analysis. This year's theme is "Modeling and Scientific Inquiry in the Lab", focusing on developing scientific questions that lead to meaningful answers. To register for the Symposium visit our Eventbrite page here. I have attached the flyer for this year's Symposium, please feel free to share it with your colleagues!

Point Loma Nazarene's Perspectives on Science Series
Connect with educators and scientists at this monthly seminar series for middle and high school science teachers focusing on recent developments in a guest scientist's area of expertise, with particular emphasis on those aspects that are of greatest interest and significance to science teachers. Continuing education credits are available at a reduced rate.

San Diego STEM Ecosystem
San Diego STEM Ecosystem is a great resource to see all of the STEM-related events and learning opportunities taking place in San Diego County. Sign up for their monthly newsletter (scroll to the bottom of their main page) to receive emails each month highlighting high quality STEM events.

California STEAM Symposium
he STEAM Symposium is planning another year of exciting speakers, new ideas and practical strategies to bring the future of science, technology, engineering, art and mathematics into your classroom. Join us on December 9-10, 2019!

Samsung Solve for Tomorrow Contest
The Samsung Solve for Tomorrow contest is designed to spark STEM interest in middle and high school students, and is committed to empowering teachers to further inspire our leaders of tomorrow. Every year, thousands of students participate in the contest to create solutions to problems that they care about most. We encourage you to enter our 10th annual Solve for Tomorrow contest to take part in this STEM movement. The application takes only a few minutes to complete on www.samsung.com/solve. Over $3 million in technology and classroom materials will be awarded to 300 schools across the country (a minimum of 5 schools in every state will be selected). Teachers must apply by October 23rd to participate. Please take a moment to submit an application, or if you already have, spread the word to colleagues for more chances to win.