Welcome to the Secondary Science Professional Development day kicking off the 2014-2015 school year. This is the first dedicated science professional development day to occur in the recent past. We are excited to be hosting this event and would appreciate your feedback on how to improve science-related professional learning for future years.

There are three goals for today:
1. Build awareness of the Next Generation Science Standards (NGSS), with a primary focus on the Science and Engineering Practices
2. Update and enhance science classroom safety protocols and resources
3. Develop relationships with colleagues from your school and other schools within the district

You will be asked to provide feedback at the end of the day and we look forward to hearing if these goals were met.

### Schedule & Registration Information

- **All teachers must attend a Safety workshop as one of their 3 sessions. Failure to do so will require future professional development or online trainings.**
- **Teachers are able to select 2 of the 3 workshops they would like to attend with registration being on a first-come-first-served basis.**
- **Teachers register by placing a sticker for their selected workshop on their schedule. Schedules will be collected at the end of the day.**

#### NGSS Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

<table>
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<tr>
<th>Time</th>
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<td>8:00-8:30</td>
<td>Registration</td>
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<td>8:30-9:25</td>
<td>Welcome &amp; Keynote Address</td>
<td>Little Theater</td>
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<td>9:40-11:10</td>
<td>Workshop Session 1</td>
<td>Various Rooms</td>
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<td>11:10-12:10</td>
<td>Lunch (provided)</td>
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<td>12:20-1:50</td>
<td>Workshop Session 2</td>
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<td>2:00-3:30</td>
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<tr>
<td>3:30-3:35</td>
<td>Evaluation and Sign-Out</td>
<td>Various Rooms &amp; Main Hallway</td>
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Welcome: SFUSD’s Secondary Science Team

Middle School
Casey Passmore passmorec@sfusd.edu
Bonnie Daley daleyb@sfusd.edu

High School
Eric Lewis lewise2@sfusd.edu
Katie Tobin tobink@sfusd.edu
Dawn Rege reged@sfusd.edu

Keynote Address:
The Next Generation Science Standards
Dr. Helen Quinn

Helen Quinn has served as the chair of the National Research Council (NRC) Board on Science Education. In this role, she also chaired the NRC committee that developed the "Framework for K-12 Science Education" on which the Next Generation Science Standards (released in April 2013) is based. In addition, she will be co-chairing the committee charged with developing the next California Science Framework. Dr. Quinn has long been engaged in educational issues in science. In California, she works with elementary and high school teachers to make physics fun and exciting for students.

Helen Quinn went to school in Victoria, Australia and entered college at the University of Melbourne before moving to the USA and transferring to Stanford University. She received her Ph.D. from Stanford in 1967, at a time when less than 2% of physicists were women. She did her postdoctoral work at the DESY (the German Synchrotron Laboratory) in Hamburg, Germany. She next spent seven years at Harvard University before returning to Stanford where she is the Emeritus Professor of Particle Physics and Astrophysics at the SLAC National Accelerator Laboratory.
Session 1 Workshops

⚠️ Science Safety – Session 1
SFUSD Science – Katie Tobin, Eric Lewis and Bonnie Daley, TSAs – Science
Carol Nolan, Safety Expert
Grades: 6-12 Practice(s): -- Location: Little Theater
A new set of safety procedures for California Science classrooms was created by the California Department of Education in 2012. To comply with classroom safety regulations and ensure that our teachers and students are safe, all secondary science teachers need to attend this safety training. This is the first of three offerings of this training on 8/14/14.

Don’t Be Neutral: Charge Up Your Science Lessons with Literacy – Session 1
SFUSD Humanities – Deb Farkas, TSA Content Literacy in Science
Grades: 6-12 Practice(s): 6, 7, 8 Location: Room 210
Teaching literacy is a shared responsibility across content areas as pointed out by the CCSS in Literacy for History/Social Studies, Science and Technical Subjects, the Next Generation Science Standards and A Framework for K-12 Science Education. This workshop will provide participants with some strategies and techniques for explicitly integrating literacy into the science classroom. Strategies for reading, productive dialogue and facilitating writing to sources will be shared.

Getting to Know UCSF SEP’s Resources
UCSF Science & Health Partnership – Jen Kaelin and Lakisha Witzel
Grades: 6-12 Practice(s): 1-8 Location: Room 211
The Science & Health Education Partnership (SEP) at UC San Francisco offers a wealth of resources and programs to support science teaching and learning. Interested in scientist volunteers in your classroom? Want to know more about the Bay Area Science Festival, and how you and your students can be involved in this 10-day celebration of STEM? Looking for engaging, hands-on science lessons? Through SEP’s Resource Center, SFUSD teachers can borrow over 3000 items such as microscopes, stethoscopes, models, posters, lessons in a box, and so much more. This session will detail all of the above plus highlight several middle and high school science lessons available at the Resource Center and their connections to NGSS.

Where is the Geologic Justice in my Community?
National Park Service – Roxi Farwell, Lynn Fonfa and Nancy Caplan
Grades: 6-12 Practice(s): 6, 7, 8 Location: Room 214
Join National Park Service Education Specialists Roxi Farwell and Lynn Fonfa in a session linking social justice and geology. We will use a variety of teaching techniques and tools to analyze the 1906 and 1989 earthquake events, resource extraction examples, and climate change challenges through the lens of social/environmental justice.

The NGSS – Crosscutting Concepts
SFUSD Science – Leah Plack and Kim Campisano, TSAs - Science
Grades: 6-12 Practice(s): Location: Room 221
The NGSS have three dimensions, the Science and Engineering Practices, the Crosscutting Concepts and the Disciplinary Core Ideas. In this workshop explore the NGSS Crosscutting Concepts through a series of hands-on and interactive activities. Engage in productive dialogue around these big ideas as a way to make connections in science and to your classroom practice.
**Light Detectives: Analyzing & Interpreting Data**
UC Berkeley, Multiverse – Bryan Mendez & Laura Peticolas

*Grades: 8-12  Practice(s): 4, 5 & 6  Location: Room 212*

Analyzing and interpreting real scientific data can be a powerful way to engage high school students in science. In Light Detectives, students download and analyze digital image data from NASA's Wide-field Infrared Survey Explorer and the Hubble Space Telescope to identify two classes of astronomical objects. We will lead teachers through an abbreviated version of the Light Detectives activities and discuss how the lesson can address specifically the science practices identified in the NGSS/NRC Framework "Analyzing and Interpreting Data." Though not required, in order to maximize your workshop experience it would be beneficial if you can bring a personal laptop computer to this session.

**Sex, Drugs and Middle School, Oh My!**
SFUSD School Health Programs - Donna Blanchard

*Grades: 6-8  Practice(s): 8  Location: Room 220*

What do you know about MS students and sex? What are the questions they have? What do they need to know? How and when do you present on sexuality and substance use prevention to middle school students? Are you prepared to deliver the correct information along with best practices? In this workshop MS science teachers will receive information and resources to enhance their skills in teaching youth about substance abuse prevention and comprehensive sexuality. Current data about substance use and sexuality trends in SFUSD will be reviewed. Participants will gain skills to provide substance use prevention and puberty/sexual health education inclusive of all MS students. A plan to practice the strategies shared at the workshop will be developed.

**Media Literacy in the Science Classroom**
KQED – Andrea Aust and Almetria Vaba

*Grades: 6-12  Practice(s): 2 & 4  Location: Room 222*

Explore free, online multimedia resources from KQED and PBS to engage students in science. Participants in this session will learn strategies for effectively using media with students to promote inquiry. Short videos will be screened that highlight the following scientific and engineering practices: developing and using models, and analyzing and interpreting data.

**Session 2 Workshops**

⚠️ **Science Safety – Session 2**
SFUSD Science – Katie Tobin, Eric Lewis and Bonnie Daley, TSAs – Science
Carol Nolan, Safety Expert

*Grades: 6-12  Practice(s): --  Location: Little Theater*

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**Finding Fossils**
UC Museum of Paleontology – Jessica Bean

*Grades: 6-8 with easy modifications for 9-12  Practice(s): 1, 8  Location: Room 212*

Have you ever wanted to dig up dinosaur fossils? Or be a science detective and reconstruct the past? In this activity, students will be taken on an imaginary fossil hunt to make observations, formulate hypotheses, gather evidence, reconstruct organisms, and revise hypotheses.
Don’t Be Neutral: Charge Up Your Science Lessons with Literacy – Session 2
SFUSD Humanities – Deb Farkas, TSA – Content Literacy in Science
Grades: 6-12  Practice(s): 6, 7, 8  Location: Room 210
Teaching literacy is a shared responsibility across content areas as pointed out by the CCSS in Literacy for History/Social Studies, Science and Technical Subjects, the Next Generation Science Standards and A Framework for K-12 Science Education. This workshop will provide participants with some strategies and techniques for explicitly integrating literacy into the science classroom. Strategies for reading, productive dialogue and facilitating writing to sources will be shared.

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Space Science Engineers: Constructing Explanations and Designing Solutions
UC Berkeley, Multiverse – Laura Peticolas & Darlene Yan
Grades: 6-9  Practice(s): 2 & 6  Location: Room 222
When engineers use the practice of designing solutions to engineering challenges, they often rely on having developed and used models of fundamental science concepts involved in the engineering challenge. In Space Science Engineers, students develop and use models of magnetism and magnetic fields and then apply these models to a real-life solar science engineering challenge. We will lead teachers through a 50-minute classroom activity and then discuss how the lesson can address specifically the engineering and science practices identified in the NGSS/NRC Framework "Constructing Explanations and Design Solutions."

Getting to Know the NGSS Middle School Learning Progression
SFUSD Science – Casey Passmore, TSA - Science
Grades: 6-8  Practice(s): --  Location: Room 220
On November 6, 2013 the State Board of Education approved the integrated learning progressions as proposed by the Science Expert Panel (SEP) as California’s preferred model and SFUSD has selected this progression as the model for our NGSS implementation. In this session participants will learn about the rationale behind the integrated learning progression and will have an opportunity to map out the Disciplinary Core Ideas across the grades six, seven and eight.

Exploring Evolution
California Academy of Sciences - Sarah Soule
Grades: 6-12  Practice(s): 2, 4 & 8  Location: Room 215
Evolution is happening all around us. Take part in a workshop that brings evolution to life. Workshop participants will engage in hands-on activities that explore genetic variation, natural selection, adaptation, and other topics. Learn ways to make these abstract ideas more concrete for your students, while gaining experience with Scientific Practices such as analyzing and interpreting data, developing and using models, and obtaining, evaluating, and communicating information.
**Why is Pluto Not in the “Planet Club” Any More?**  
**Astronomical Society of the Pacific – Brian Kruse**  
Grades: 6-8  
Practice(s): 1, 2, 7 & 8  
Location: Room 214  
Experience an activity exploring the properties of solar system objects, creating ways to organize them, and discovering the challenges of deciding what to call objects like Pluto. After classifying the objects, groups will describe their strategy, making evidence based arguments for their categories.

**The NGSS – The Science and Engineering Practices**  
**SFUSD Science – Leah Plack & Kim Campisano, TSA - Science**  
Grades: 6-12  
Practice(s): 1-8  
Location: Room 221  
The NGSS have three dimensions, the Science and Engineering Practices, the Crosscutting Concepts and the Disciplinary Core Ideas. In this workshop, explore the NGSS Science and Engineering Practices through a series of hands-on and interactive activities. Receive lesson-planning resources to apply this training to your own classroom.

**Session 3 Workshops**

**Science Safety – Session 3**  
**SFUSD Science – Katie Tobin, Eric Lewis and Bonnie Daley, TSAs – Science**  
Carol Nolan, Safety Expert  
Grades: 6-12  
Practice(s): --  
Location: Little Theater  
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**Don’t Be Neutral: Charge Up Your Science Lessons with Literacy – Session 3**  
**SFUSD Humanities – Deb Farkas, TSA - Content Literacy in Science**  
Grades: 6-12  
Practice(s): 6, 7, 8  
Location: Room 210  
Teaching literacy is a shared responsibility across content areas as pointed out by the *CCSS in Literacy for History/Social Studies, Science and Technical Subjects*, the *Next Generation Science Standards* and *A Framework for K-12 Science Education*. This workshop will provide participants with some strategies and techniques for explicitly integrating literacy into the science classroom. Strategies for reading, productive dialogue and facilitating writing to sources will be shared.

**“How Does it Work?” Understanding Engineering**  
**SF City College – School of Engineering – Keith Mueller**  
Grades: 6-12  
Practice(s): 1-8  
Location: Room 222  
"Engineering is about innovation, but it doesn't need to be a complex and expensive process. Prototyping can now be done at home at the kitchen table. Applied engineering projects take the theoretical knowledge from the classroom and allow the student to own the learning process."

**The Jewels of the Night**  
**Astronomical Society of the Pacific – Brian Kruse**  
Grades: 9-12  
Practice(s): 2 & 5  
Location: Room 214  
Explore the properties of stars and discover an essential tool astronomers use to classify them and chart their life cycle. By plotting the properties of stars and examining the resulting pattern, participants will model the life cycle of stars and learn how to determine their ages.
Dynamic Ocean: Understanding Global Patterns
UC Museum of Paleontology – Jessica Bean
Grades: 6-8 with easy modifications for 9-12 Practice(s): 2, 8 Location: Room 212
The properties of water, such as temperature and salinity, determine biotic and abiotic patterns and processes in the ocean. This activity explores how variation in water density and wind patterns affect marine environments, both locally and globally. We will also investigate the long-term consequences of a warming earth.

Life Science Lessons Developed by Teacher-Scientist Teams
UCSF Science & Health Partnership – Sabine Jeske & Tiffani Quan
Grades: High School Biology Practice(s): 6, 7, 8 Location: Room 211
Through the Pathways program, organized by UCSF's Science & Health Education Partnership (SEP), SFUSD high school teachers and UCSF graduate students developed and piloted hands-on science lessons that are connected to current research developments or make abstract concepts more concrete for students. This session highlights 4 different lessons that were developed by partnership teams, suitable for cell biology, genetics, physiology and evolution units. Teachers will be getting an overview of the lessons, be able to explore the materials first hand and have access to the lesson plans and material kits for future use in their classrooms.

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AP Chemistry Meeting Time
SFUSD AP Chemistry Teachers – Bryan Marten, Lowell High School
Grades: AP Chemistry Teachers  Practice(s): 1-8  Location: Room 219
Begin the school year by collectively planning for your AP Chemistry course. This inner-district working group will review the recently released College Board multiple choice questions to make adjustments to planned curriculum, share planned student laboratory experiences, and discuss new topics in the AP Chemistry curriculum. Resources used to teach new topics in the curriculum will be shared and generated.

Teaching about Your Urban Watershed
SF Public Utilities Commission – Laura Page
Grades: 6-12  Practice(s):  Location: Room 216