



Community Resources for Science News

Weaving connections among teachers, students & science in the Bay Area

Volume 11, Issue 2

Newsletter, Fall 2013

Welcome to the Classroom, Engineering!

Last month, California officially adopted new science standards, known as the Next Generation Science Standards or NGSS. (To learn more, visit our website, www.crs-science.org and look for the new "Standards" resources under the red "For Educators" section.) These standards emphasize students' active participation in scientific inquiry and engineering design, to better reflect their understanding of these subjects. Engineering joins science as a required component of K-12 learning with the adoption of the NGSS.

What are the similarities and differences between science and engineering? Science, seeks to explain the world around us by asking and investigating questions. Engineering, on the other hand, identifies and attempts to solve human problems. Technology is the result of this process.

Although fundamentally different, the processes of science and engineering are interdependent. Both are creative, iterative, and systematic – and both now have a place in elementary classrooms!

For teachers, this will mean learning new curriculum and teaching strategies to guide students in critical thinking, problem solving, communicating in writing and in discourse, and in supporting claims with evidence. CRS is working with teachers, schools, and



informal education partners to develop new resources and training to help educators as they transition to the new standards.

There are a number of reasons why engineering should be a central component of students' education. Whether they are building a sofa cushion fort or inventing a new game during recess, children are natural engineers. They are constantly innovating solutions to challenges they face. By tapping into their natural interests, hands-on engineering design activities make school exciting and meaningful for young students.

With an increasing demand for skilled engineers in many different fields, schools are looking to ensure students develop literacy in STEM (Science, Technology, Engineering, and Math). Fortunately, engineering is naturally interdisciplinary, making it easy to incorporate science and Common Core Language Arts and Math into almost any engineering lesson. *(Continued on Page 2)*

Above Right: Berkeley 4th and 5th grade science teachers explore Earthquake Engineering, including lessons for constructing and testing structures on a shake table, at a CRS -led professional development session in partnership with the Pacific Earthquake Engineering Research Group.

Left: Oakland teachers explore their skills in designing free-standing towers during a workshop introducing elementary engineering design activities.



Engineering (Continued from page 1)

Finally, engineering helps students develop critical thinking, problem solving, and communication skills – essential “21st Century” skills that will serve students throughout their lifetime, regardless of their career.

CRS has developed an “Introduction to Elementary Engineering” workshop for teachers to begin exploring how to bring engineering design activities into the classroom. This workshop examines connections between science, engineering, the NGSS, and Common Core standards. It provides real world examples of how engineering can be incorporated into classrooms and gives teachers a chance to experience two hands-on engineering lessons that can transition easily from K to 6th grade. We would love to lead this workshop for your staff--contact us if you are interested in jumpstarting engineering at your school!

CRS by the Numbers

At the end of the 2012-13 school year:

1,035 teacher members, working with
over **22,000+** students in
110 schools.

500+ scientist volunteers delivered
456 lesson presentations resulting in
10,250+ students doing hands-on science

Teachers:

Are you a Science Super Star? Go to:
www.crs-science.org/sciencessuperstarprogram
to get your class & school materials!

Failure in Science, Engineering & the Classroom

Failure.

It's not something we often aim to promote in classrooms.

Kids, teachers, schools are continually tested and prodded to succeed at meeting achievement targets. But failure is important to learning. And, with the adoption of new education standards that focus not only on content but also on the practices of science and engineering, failure is being invited into the classroom. And, that's a good thing.

Scientists and engineers learn not only from their experiments and inventions that go as expected, but also – and importantly – from those that go wrong.

The new standards for science and engineering expect students to have opportunities to test ideas and apply knowledge as they conduct investigations to explore a hypothesis or design a structure to withstand a challenge. These experiences will give students the opportunity to fail – and to learn from that failure in ways that will “stick” much more than simply reading the “right” answer in a textbook.

What happens when a student learning about plants sets out to demonstrate an idea about the role of sunlight by conducting an experiment, only to discover the results are very different from what he or she expected?

What happens when a student is given materials and asked to build a structure that can withstand a certain force of wind or shaking, and their first attempt collapses?

With the guidance of confident, well-trained, enthusiastic teachers, this is what will happen: these students will have the opportunity to evaluate their data, discuss their ideas with their classmates, think creatively about new investigations or design modifications they should try next, and present information that includes conclusions that are supported by evidence.

It's an exciting time in education. It's also a challenging time for teachers as they learn about the new standards, the new curriculum that will be adopted over the next few years, and new strategies for teaching skills and practices.

At CRS, we're working to help teachers understand and prepare for the changes, including how to let their students experience, talk about, and learn from investigations and experiments that go awry.

Our amazing BASIS volunteers will continue to serve as powerful partners and role models, bringing their real-life experiences as scientists and engineers into hundreds of classrooms every year. Last year they worked with over 10,000 students!

They'll even share stories about times that their experiments or designs failed, and what they learned as a result. Because out of those failures, come amazing new discoveries and inventions that might otherwise never have even been imagined.

--From the ED

Thank-you to Our Funders and Donors

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Flowerland
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The Treehouse Green Gifts
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Thank You for all that you do for CRS and for Bay Area Science!

BASIS Spotlight: Learn about clouds with Megan Vieira

Bay Area Scientists in Schools (BASIS) volunteers kicked off the 2013-14 school year making their first visits in mid-September. One of those groups is comprised of graduate students from the laboratory of Dr. Ronald Cohen, a professor of Chemistry and Earth and Planetary Science at UC Berkeley. Professor Cohen's research uses a chemical perspective to study the effects of human activity on the Earth's atmosphere. Graduate students from this lab worked together to develop a 5th grade BASIS lesson called "Water in Our Atmosphere: Make it Rain!". The group, led by Megan Vieira and Ben Nault, present this lesson as well as a 1st grade lesson about cloud formation in classrooms each month. Megan, has been volunteering with BASIS for over two years, building on her previous teaching experience as an Interpretive Park Ranger, substitute teacher, and volunteer in her children's classrooms. You can read more about Megan and other BASIS volunteers on the CRS website: <http://www.crscience.org/volunteers/volunteerspotlights>



CRS at the Bay Area Science Festival

Join us at the 3rd Annual Bay Area Science Festival (October 24 - November 2).

We will be at the following events:

- October 29, South Berkeley Farmer's Market
- October 30, Albany Farmer's Market
- October 31, North Berkeley Farmer's Market
- November 2, Finale Discovery Day at AT&T Park

Details at www.crscience.org/events/BASF2013



(Festival-goers at AT&T Park stop by the CRS table to test PH with cabbage juice)

Fall Teacher Field Trip at Oakland Museum of CA

Have you ever wanted to take a tour of California, but don't like long drives? On October 11 over 75 CRS members travelled throughout California (Oakland, Sutter Buttes, Mt. Shasta, Yosemite, the Tehachapis, Coachella Valley, and the Cordell Bank) without ever leaving the new Natural History Gallery at the Oakland Museum of California.

CRS combined our Fall Field Trip for Teachers with the Oakland Museum's annual Fall Teacher Feature, for a fabulous evening enjoyed by hundreds of teachers. We appreciate the Oakland Museum and particularly Amy Billstrom and Scott Thiele for partnering with us.

Attendees to the event were able to view all the permanent galleries and the current temporary exhibits: Above and Below: Stories from our Changing Bay (through 2/23/14), Peter Stackpole: Bridging the Bay (through 1/26/14), and The Tree of Life and Death: Dias de los Muertos (through 12/8/13). Educators were treated to wine and food while chatting with informal education providers such as the Marine Science Institute, Aquarium of the Bay, and Angel Island State Park, learning about the variety of teacher and school programs available.



CRS members also gathered in the Learning Center on the lower level by the Natural History Gallery to explore sample engineering activities, win great door prizes, and network with fellow teachers. CRS staff was on hand to answer questions about the Science Super Star Challenge, how to plan successful field trips, and how to tweak existing science lessons to include an engineering and iterative process.

We were also treated to a tour of the new Natural History Gallery, with Scott giving context and answering questions about the content of the gallery and OMCA field trip offerings (left: Scott, pictured furthest right, leading our tour).

New Standards: What do they mean for Environmental Ed Organizations?

In response to needs expressed by informal education partners in environmental education, CRS organized a professional development workshop to introduce the new education standards (Common Core and Next Generation Science standards). In partnership with Chabot Space & Science Center and the Region 4 CREEC Network, CRS facilitated presentations to provide understanding of the new standards, and to highlight ways that environmental education organizations can adapt, refine, and augment their programs to address the standards and continue to be strong partners for teachers and schools.

Presenters, in addition to CRS and Chabot, included the elementary science coordinator for Oakland Unified School District, and the state Environmental Education Initiative standards alignment coordinator from the Sacramento County Office of Education.

The kinds of experiences these programs offer are exactly what teachers and students will be needing -- authentic hands-on, real-world explorations. We're looking forward to continuing to work with other partners to support EE organizations as they make the needed refinements and additions to their field trips, teacher professional development, exhibits, curriculum, and more.

(Above: Environmental Organization staff beginning an activity led by Chabot Space and Science Center)



Donations are used **where the need is greatest** and while needs change from season to season and year to year, please consider the following examples of what donations have funded in the past and *what your donation could do this year*:

\$50 covers funds for one *volunteer trip to a classroom* of 25-30 students, providing resources, like honey, glycerin, test strips, straws, etc. for a hands-on lesson.

\$100 covers the cost of one *volunteer training session* (10 volunteers) or *customized reports* for 10 teachers that impact science learning for 250-300 students.

To make a donation, go online to www.crs-science.org/donate OR mail your check and the form below to: **Community Resources for Science / 1611 San Pablo Ave. Suite 10 B / Berkeley, CA 94702**

\$250 covers the cost of one volunteer team's presentations for an *entire school year* (lesson materials for 125-150 students).

\$500 could fund a *Science Resource Event* for educators at a local science center (provide materials, books to distribute, refreshments).

\$1,000 covers *stipends* for educators to attend workshops.

\$1,500 covers funds for a "Day of Science" event for every 6th grade class at a middle school (about 200 students).

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*Left: Graduate students
from UC Berkeley's
Maimone Chemistry
Lab visit a Berkeley 5th
grade classroom*



"CRS makes teaching science accessible to all teachers and students. I appreciate their amazing support and resources, especially in a time when little resources are available to schools. Thank you!"

—Oakland Unified School District 4th grade teacher