



# COMMUNITY RESOURCES FOR SCIENCE NEWS

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

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Newsletter, Fall 2016

## Join Us For Festive Party to Celebrate 20 Years of CRS

How do you celebrate 20 years of supporting teachers, inspiring students, and mobilizing scientists and engineers to share their talents? By throwing a party, of course!

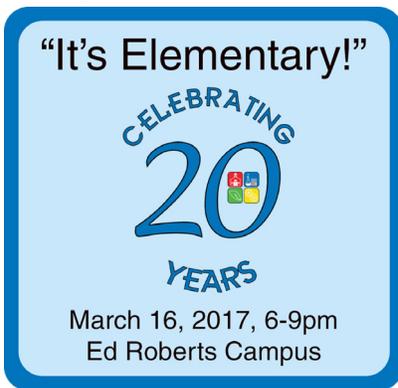
Please save the date and plan to join us for the CRS 20 Year Celebration "It's Elementary!" benefit event on Thursday, March 16, 2017. Contact us if you are interested in being a sponsor; ticket information will be available in January.

The celebration will include science demonstrations and hands-on activities highlighting some of the most popular and engaging lessons from the Bay

Area Scientists in Schools (BASIS) teams. The program will include honoring some of the teachers, volunteers, and partners who have helped make CRS such an impactful and dynamic organization.

Rumor has it there may even be prizes for attendees who sport element-themed attire! Gold and silver might be easy, but what about Xenon? Glowing blue....hmm.

Proceeds from the benefit event will support our ongoing efforts to strengthen science and engineering teaching and learning in local East Bay K-8 classrooms.



## Teachers Explore Science Resources at Lake Merritt

Did you know that Lake Merritt is the oldest wildlife refuge in the United States? This was just one of the many things we learned at the Fall 2016 Field Trip for Teachers. Teachers from Oakland, Berkeley, and West Contra Costa came to Lake Merritt to learn about the lake ecology and the educational offerings available from three lake-side learning centers. Your support of CRS Field Trips for Teachers allows teachers the opportunity to learn more about local educational institutions and have their own learning experiences without their students in tow.

Finally, the Rotary Nature Center, teachers perused the animal specimens, looked into a bee hive, and then went outside for a sunset bird walk to learn more about the birds that call Lake Merritt



*Teachers observe birds at Lake Merritt*

home during their annual migrations. The Rotary Nature Center also offers natural history classes both at the center on Lake Merritt and in school classrooms.

After exploring Lake Merritt on our Field Trip, many of the teachers were eager to share their experiences with their students by signing up for programs at one or all of the organizations we visited. All three of these organizations also offer programs for the general public, so anyone can plan their own field trip to this unique urban wildlife refuge.



*Teachers show their plankton tow*

What's a plankton tow? Our weeknight excursion began at the Lake Merritt Boating Center where teachers became students and dipped nets into the lake to do a plankton tow to discover the critters that live below the surface of the water. The Boating Center offers programs for 4th and 5th grade classes that teach them first-hand about the ecology of the lake. They also take students (and the general public) out on boats to explore the lake.

The next stop on our progressive Field Trip was the Junior Center of Art and Science where teachers toured the Native Americans exhibit hall. JCAS staff shared information about their field-trip programs for students which combine art and science to deepen student learning.

Our next Field Trip for Teachers is scheduled for March 18 at the Chabot Space and Science Center and will include our 3rd annual Science Education Resources Fair, featuring 20+ local organizations highlighting the variety of great programs and resources they offer.

## Updated BASIS Lesson Library Exemplifies New Science Standards

Like a well-loved garden in need of tending, the collection of BASIS lessons developed over the past two decades has grown to number more than 100. While we have been pruning and gradually adapting older lessons to align with the new science standards over the past few years, we began a major re-landscaping of the collection this past summer.

Spanning grades K-8, from life and earth sciences to physical sciences and engineering, the collection of BASIS lessons represents a robust range of interactive science and engineering explorations. That large collection has been revised and curated into a library of engaging lessons (<http://www.crs-science.org/volunteers/lessonlibrary>), which fully align with the Next Generation Science Standards and exemplify what NGSS lessons should look like.

Each BASIS lesson now begins with a relatable real-world phenomenon to ignite student interest and invite student questions. One of these questions is then investigated through an inquiry-based hands-on activity where students make sense of the phenomenon with the guidance of BASIS scientist volunteers.

Student engagement from the hands-on activity is then parlayed into a student-led discussion where results are analyzed and evaluated. For example, students in a 5th grade class would be invited to reflect on their real-world observation of leaves changing color during the fall. Students would then investigate which pigments reside in

leaves through a hands-on chromatography experiment with the guidance of BASIS volunteers. Students would then be prompted to discuss the results from this activity and create linkages to additional student questions such as how reduced chlorophyll may impact tree growth, development, and survival at different times of the year.



*Students explore real-world phenomenon in a BASIS lesson*

Our Program Managers also offered several workshops for our dedicated BASIS volunteers throughout the summer to discuss these new directions in science education. These workshops discussed the promising new opportunities as well as the challenges that go hand-in-hand with the implementation of these changes. To provide greater

context for the impact of BASIS lesson presentations, we introduced volunteers to the three interwoven dimensions of NGSS: The Science and Engineering Practices (“What Scientists Do”), The Disciplinary Core Ideas (“What Scientists Study”), and the Crosscutting Concepts (“How Scientists Think”).

Through BASIS lessons, volunteers help kids to see themselves as science people – perhaps future scientists or engineers, but more broadly critical thinkers and contributors to society. Sharing their personal pathways to science and serving as role models, our BASIS volunteers are now equipped with engaging, NGSS aligned, hands-on lessons. Through the BASIS program, these amazing volunteers continue to inspire thousands of elementary students each year.

## Science Al Fresco: Festivals Feature Hands-On Fun

Science doesn't only happen in the classroom and the lab! This fall, CRS brought hands-on science activities to unexpected places, such as Berkeley Farmers' Markets with our partner Science@Cal. Children explored leaves and plant parts, using market-stand produce to discover hidden leaf patterns and consider what parts of plants people eat.

These Farmers' Market events were part of the 6th annual Bay Area Science Festival, which CRS has participated in every year. With more than 50 events spanning 10 days, the Festival offers something for all ages and interests, including many family-friendly events.

The highlight of the Festival was Discovery Day at San Francisco's AT&T Park on Saturday, Nov. 5th. Over 30,000 people passed through the ballpark, sampling science and engineering activities from companies like

Bayer and Clorox, and from many UCSF and UC Berkeley student groups.



*Students take wind measurements with an anemometer at Discovery Day*

At the CRS table, students explored how “strong” the wind is and learned about real-life applications for wind energy. Kids engineered an effective wind turbine and recorded wind data using an anemometer to measure the wind speed at AT&T Park.

As best put by one volunteer, “I'm inspired by the excitement on kids' faces as they begin to understand science!”

Congratulations to CRS Advisory Council members Katherine Nielsen and Rebecca Smith, whose Science & Health Education Partnership (SEP) at UC San Francisco organizes this massive annual celebration of science, engineering, and discovery. The Bay Area Science Festival has grown into an impressive, region-wide collaboration.

# Thank You to Our 2016 Partners & Supporters

*The support from these foundations and businesses makes it possible for CRS to provide teachers, schools, and districts with free support and in-class scientist presentations. Thank you to these partners for helping to educate the scientists, engineers, leaders, and problem solvers of tomorrow.*

## 2016 Foundation Grants

Bayer Health Care  
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Sweet Basil Thai  
The Cheese Board Collective  
The Golden Skate  
The Natural Grocery Co.  
Trader Joe's Rockridge  
Yogurtland Berkeley



*Clorox volunteers bring a "Day of Science" to Chabot Elementary*

# Kicking Off Our 20th Year of BASIS Lessons

More than 100 UC Berkeley scientists and engineers gathered in September to kick-off the 2016-17 school year of Bay Area Scientists in Schools (BASIS) with pizza, lesson demos, and inspiring testimonials from other volunteers. Last year BASIS volunteers brought over 500 lessons into local classrooms, serving as STEM role models for over 15,000 young students, and we aim to reach that target again this year.

CRS staff, including Traci Grzymala who recruits and trains our volunteers, and Michelle Fabros who arranges classroom visits, were on hand along with BASIS Steering Committee members to greet returning volunteers and

welcome new prospective volunteers. Professor Robert Bergman, who helped BASIS grow from a handful of chemistry volunteers

to over 500 UC-based volunteers from across all science and engineering disciplines, provided some inspirational words about the incredible impact that BASIS volunteers have on both the students and teachers in our local community.



*BASIS Volunteers freeze ice cream using liquid nitrogen*

Table demonstrations for some of our BASIS lessons (Squishy Circuits, Adapting to Survive, and Hear All About It!) were set up around the room so that new volunteers could experience the fun of BASIS activities for themselves. One of our current BASIS teams also made liquid nitrogen ice cream, inviting those in attendance to decide what states of matter were represented (solid, liquid, gas). Regardless of the cream's state of matter, we came to the conclusion that it was delicious!

## Fun Facts: CRS at 20

- Teachers served to date (many for 10 years or more!): Over 3,300
- STEM professional volunteers to date (many for 5 years or more!): Over 2,000
- K-8 students BASIS teams have directly interacted with: Over 100,000
- Inspiration Delivered: Impossible to Count!



## ED Report: Shifting to Phenomena-Centric Science



Students observe of density of gasses in balloons during a BASIS lesson

*Rain leaves glorious puddles in some places, but runs away into a drain or creek in other places.*

*Sometimes dogs bark, and other times they wag their tails.*

Children are astute observers of their world. Something surprising easily captures their attention and curiosity drives them to poke, explore, and test until they figure that thing out. Together, these small discoveries piece together an understanding of the larger world.

Whether stomping in puddles, digging in the sand to create a mini lake and river, or tossing a ball for a family pet, young children's daily lives are filled with experience-based explorations.

For too long, that curiosity-driven approach to learning was left at the schoolhouse doorstep, in favor of more scripted, lecture-based, fact acquisition approach, particularly with science where elementary teachers often lacked training in both content knowledge and effective teaching practices.

The Next Generation Science Standards currently being implemented in classrooms throughout California bring curiosity front-and center. Teachers are encouraged to begin with a phenomenon from which students

explore, experiment, collect data, discuss, and ultimately understand.

Lessons begin with observation. Leaves, ladybugs, ice left out in the sun. What do students observe? What do they wonder about? From there, lessons involve explorations of how to test possible explanations or learn about what is happening. And, of course, answering one question will naturally lead to even more questions!

This approach builds on children's natural curiosity and active learning, but this clearly requires greater planning, preparation, and flexibility for teachers. CRS is working to help identify and address ways to support teachers as they transition to this phenomenon-centered teaching approach.

Among the work we have undertaken:

- Providing teachers with on-call support as well as robust, up to date online resources on the CRS website: <http://www.crscience.org/educators/standardssupport>
- Developing and delivering professional development workshops customized to the needs of individual schools and districts.
- Training our volunteers on how to model the practices of science and engineering which are central to the new standards.
- Updating older BASIS lessons and ensuring all new BASIS lessons model the NGSS approach
- Working with partners on our Advisory Council to identify gaps and develop new resources and tools for teachers and STEM volunteers.

**Try it yourself:** practice finding one thing to observe and wonder about. The condensation forming on your ice-water glass at the café, the pattern of weeds emerging in your garden, or the way different birds in your neighborhood chatter at different times of the day. What questions come to mind, and how could you use your curiosity to explore and learn more?

## Be A Scientist: Reaching Every Berkeley 7th Grader

The innovative in-class mentoring program we call Be a Scientist will reach every Berkeley Unified School District 7th grader this school year! In the last year, 114 of UC Berkeley graduate students and post-docs have served as mentors for 535 students at Willard and King middle schools, guiding students through over 500 research projects ranging from mold growth experiments to testing the structural integrity of different bridge designs.

Now in its third year, the program was designed in partnership with UC Berkeley Professor Mary Wildermuth and BUSD middle school teachers. The program's goal was to ensure that all 7th grade students have in-class mentors to guide them through a 6 week process of designing and conducting independent research projects.

In the Spring, the remaining King 7th grade classes, and all Longfellow 7th grade science classes will have their turn to participate in Be A Scientist.

Supported by grants and donations, an important component of the BAS program is that CRS provides

the materials needed for over 500 experiments – materials that middle schools do not typically have in their limited science cupboards. From buffalo teeth and ping pong balls, to a solar oven and hot water bath, the CRS project coordinators Darlene Yan and Betsy Mitchell round up dozens of supply bins for student experiments. This Fall students have explored plant growth, sound waves, the effect of acids on tooth enamel (watch out coffee drinkers!).



Be A Scientist mentor works with students

It's been a fun past few years and we're looking forward to bringing in more UC Berkeley scientist and engineers to inspire the next generation of scientists, engineers, and critical thinkers!



# COMMUNITY RESOURCES FOR SCIENCE

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## CRS Team

### Staff

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Traci Grzymala, *Volunteer Recruitment & Education Outreach Program Manager*  
Tyler Chuck, *Communications Manager*

### Program Support

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Darlene Yan, *Project Coordinator*  
Betsy Mitchell, *Project Coordinator*  
Meredith Triplet, *BASIS Campus Coordinator*

### Board Members

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Students fascinated by water, ice, and condensation during States of Matter lesson

*"I deeply appreciate all of the up-to-date science resources that CRS has provided for me as a teacher as well as the amazing science presentations for my learners."*

-4th Grade OUSD Teacher



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