CRS
COMMUNITY RESOURCES FOR SCIENCE
practical support for great science teaching

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2013-2014 School-Year Report & Program Evaluation: Accomplishments and Impact

Overview:
CRS works to nurture students' understanding of the world around them by connecting classroom teachers with scientists, museums, enrichment providers, and professional development programs in order to bring more science learning experiences to students. CRS also helps individuals and organizations involved in science education to work together and become stronger partners for teachers and schools.

Our goal is simple: help teachers give elementary and middle school students more opportunities to "do science" – to ask questions, test ideas, get their hands on real science activities.

Teachers and principals have expressed appreciation for the support they receive – and many have also expressed surprise at how much more science they are teaching as they become more aware of effective ways to connect science experiences across the curriculum.

In the words of one teacher:
"There are many things to love about Community Resources for Science, for example; their breadth of knowledge and services, their professionalism, their eagerness to advance the cause of science education, but what I love most about CRS is that they make my extremely complex job a little easier." – Cherene Fillingim-Selk, BUSD 4th & 5th Grade

Highlights for 2013-14

CRS continued to develop our partnerships with Oakland, Berkeley, Emeryville and other districts and schools during the 2013-14 school year. We sustained high quality program and service support, serving about 1,100 K-6 teachers (plus a dozen or so 7th and 8th grade teachers as well). Together, these educators teach over 25,000 students, in over 110 schools in mostly low-income communities. (72% of the schools we serve are Title 1 schools; about three-quarters of the students qualify for free or reduced-priced school meals.)

CRS direct support activities and services for teachers included:

- **1,100 teachers at 110 schools receiving CRS membership services (detailed below).** Together, they educate over 25,000 students.

- Support for **all Lead Science Teachers in all Oakland elementary schools & all Science Resource Teachers in all Berkeley elementary schools.**

- **Special focus on OUSD Science and Literacy Cohort schools.** This included onsite professional development workshops, science support sessions during staff meetings, focused BASIS presentations aligned with school science goals, support for special events such as science fairs and school science/engineering festivals, and collaboration with afterschool programs on some school sites to highlight ways to link afterschool to in-school learning

- CRS presented **416 in-class BASIS lessons** in local classrooms. *Because they generally work in teams, these classroom presentations resulted in* ***over 1,400 scientist & engineer role model interactions with more than 10,000 students and teachers in classrooms, adding up to 2,700 hours of scientist & engineer volunteer time.***

- **Recognition of 112 teachers for excellence** in elementary science education through the Science Super Star Challenge, resulting in increased science learning – and prizes – for **3,000 students**. Special recognition was also awarded to the **13 OUSD Science & Literacy Cohort schools** for their sustained focus on connecting science and English language arts instruction.

- More **than 60 classes (over 1,500 students) received special in-school field trip presentation**s from Aquarium of the Bay, Rock Steady Juggling, or the East Bay Regional Parks mobile aquarium as part of the Science Super Star whole school recognition.

- CRS prepared **266 customized science resource reports for individual teachers,** providing personalized support for teachers' unique planning and teaching needs.

CRS Membership Services for all member teachers included these elements:

- **Personalized on-call science support to meet individual teacher requests.** Teachers asked for CRS support in finding information about resources such as field trips and timely content sources, planning lessons, applying for classrooms grants, and more.
- Invitations for free in-class scientist-led **BASIS lessons** (details below).
- **Monthly ScienceBlast Email newsletters** delivered directly to each teacher's email inbox, with easy click-through links to a wealth of science resources and information.
- **Quarterly Comprehensive Science Resource & Educator Opportunities Guides** (up-to-date listings of exhibits, material and lesson planning, professional development, websites, classroom grant opportunities, and much more)
- Invitations to **Science Field Trips for Teacher resource workshops at local science centers**. Events this year were held at **Oakland Museum of California** and **The Exploratorium**. Participating resource partners included Cal Academy, Kids on the Bay, East Bay Regional Parks.
- Round the clock **access to the online resources** which include teaching tools, lesson plans, tips, and the **CRS Science Resource Database**, a curated, searchable online database covering the comprehensive array of Bay Area science programs & resources.

BASIS (Bay Area Scientists in Schools) Program Lessons:
STEM Professionals Inspiring Students & Building Relationships with Teachers

CRS teacher members were invited to apply for standards-based in-class science presentations by our diverse, enthusiastic BASIS scientist and engineer volunteers. These are offered, at no additional charge, on an as-available basis to supplement CRS support and to build teacher knowledge and enthusiasm for incorporating science into their classrooms by demonstrating the power of scientific activities for engaging all kinds of learners in hands-on, exciting, and 'real world' science.

This year CRS recruited, trained, and placed over 500 scientists who provided 416 BASIS presentations in all the schools we serve. There are about 75 BASIS lessons currently in circulation for classroom presentations. *Sample list of BASIS presentations below.*

In addition to these K-6 Science Connections Program accomplishments, CRS work with districts during the 2013-14 school year included:

Connection requests and specialized assistance

- Planning and delivering customized professional development workshops
- Recruiting scientists to present at district teacher professional development sessions
- Facilitating connection requests for family science night events, science fairs, and other school site events seeking speakers, presenters, and judges

Hands-on outreach, science activity tables for students, families, and teachers, including

- OUSD Science Fair, Chabot Space and Science Museum
- Recruiting scientist participants and assisting at OUSD Dinner with a Scientist events.
- Support for Family Science & Engineering events and school science fairs
- Bay Area Science Festival, Farmers Markets, Cal Day, Science@Cal, and other community outreach events

Science Super Star Challenge Program

This year, **112 teachers** successfully completed the "best practices" challenge, documenting their efforts to incorporate hands on science lessons, reading and writing projects connected with science, professional development, and more. These teachers earned Science Super Star recognition for their Excellence in Science Teaching. This more than doubles the number of teachers and students who participated last year! Over **3,000 students** received prizes including science-related books for each student to take home and have for their very own!
Prizes included museum passes and class field trips, on-site assemblies, books, science activity kits, and more.

The full list of Science Super Star Whole Schools and Classroom Honorees is listed on the CRS website: http://www.crscience.org/educator/SSS2014

Evaluation of Impact: External Assessment

In addition to our comprehensive internal program assessment, this year CRS engaged Rockman et al to conduct an external, research-based evaluation. The final report is expected by early July, 2014. Preliminary "top line" findings include the following:

- Participation with CRS has dramatically increased teachers' enthusiasm for teaching science
- CRS resources and programs have helped students better understand important scientific skills and concepts
- CRS support to participating teachers and schools has helped fill critical gaps in quality science teacher professional development and science materials resource availability within the participating schools and districts
- CRS resources and programs have helped teachers introduce and implement a greater diversity and quality of hands-on scientific experiences for their students
- CRS-BASIS lessons with scientist volunteers heightens student engagement with science and improves student identification with science as a career and broadens their appreciation of the diversity of individuals working as scientists (women/minorities)

- According to teachers and principals, CRS as an organization is much more proactive, and their support more personalized and customized, than other community-based science education and service organizations in the region
- Observing CRS-BASIS lessons provides opportunities for teachers to adapt and model different methods for teaching science in the classroom
- Students are independently requesting the addition of more BASIS lessons during the semester

Internal Program Evaluation Summary: Quantifying Impact on Practice

During the school year, CRS conducts post-BASIS presentation surveys of participating teachers; in addition, CRS conducts a comprehensive year-end overall program evaluation survey for teachers, along with a separate year-end program evaluation survey for volunteers. Throughout the year, and at the conclusion of the year, CRS analyzes empirical and narrative responses, adjusting program practices and making refinements as needed. Responses over the years have consistently shown this program to be a substantial success, rating very highly in areas of teacher and scientist volunteer engagement and satisfaction. More importantly, responses consistently indicate the CRS support services have a positive impact on teacher practice (and, by extension, student learning experiences). Other measures, such as growth in the number of teachers served, growth in the number of teacher information requests fulfilled, and growth in numbers of volunteers recruited, prepared, and placed in classrooms, also point to the project's success. A brief summary of survey responses and narrative comments follows.

CRS is a fantastic organization that supports teachers and students in science learning! – Ann Park, Bridges Academy at Melrose, OUSD

On the year-end survey, yet again **all teachers reported that their students respond positively to science experiences**, and **an increasing number are reporting they spent more time teaching science this year**. Survey responses do indicate that overall teachers are becoming more confident and enthusiastic about including science learning experiences for their students and that **CRS services help to increase both the quality and quantity of science in their classrooms.**

As a direct result of CRS support services teachers (including those who had BASIS lessons and those who did not) indicated they:

- **Increased the amount of science they teach** **80%**
- See how effectively science activities engage all types of students 81%
- Know where to find information and science teaching resources 88%
- Added a new field trip, lesson or activity 82%
- **Became more enthusiastic about science teaching** **88%**
- Know where to ask for help with resources and planning 86%
- Feel more confident professionally 72%

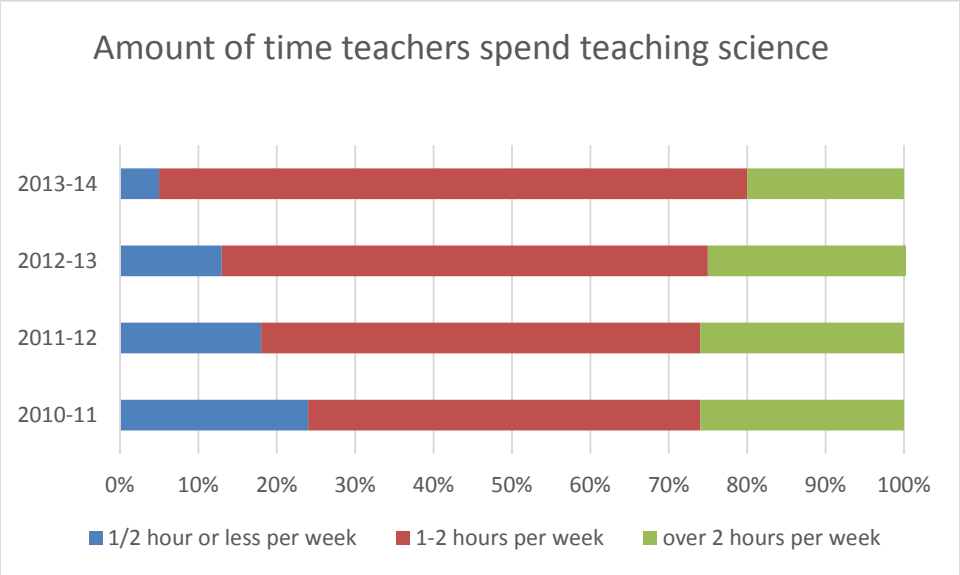
Of teachers who DID have BASIS in class presentation, 98% reported being fully satisfied with the presentation **and 100% plan to request one again**. Specific benefits of BASIS lessons cited include:

Observing my students' engagement in the BASIS activity encouraged me to include more hands-on science activities in my classroom. **93%**

Presentations helped dispel student stereotypes of "who" is a scientist 88%
Through BASIS activities, teachers said students:
Grew more interested in science 98%
Connected what we learned in the classroom with experiences in their lives and the real world 96%
Asked thoughtful questions 91%
Were engaged in hands-on experiences 100%
Discussed their own science observations and ideas 98%
Effectively learned new science concepts 98%
More clearly understand that science is a process, not just a bunch of facts 95%

Significantly, 83% of teachers reported being surprised by at least one of their students participating or demonstrating skills above his/her typical classroom level, showing them new ways to engage this student through hands-on activities and motivating teachers to add more hands-on science lessons. This is a figure we have seen rise each of the past several years, from just below 50% to now more than four out of five teachers!

To our delight, **teachers continue to indicate they are spending more time teaching science**. This year, only 5% indicating they teach 2 hours or less per month (down from 13% last year, and 18% the year before, continuing a trend of increased time devoted to science). About one third (32%) of teachers indicate they teach science at least once per week or 3-4 hours per month, with 43% indicating they teach twice that much science. And one fifth of teachers indicted they teach even more – 8 hours or more per month**! This represents a gradual continuation of the increase in science teaching over the past two years among the teachers CRS serves.** About half of the responding teachers feel they still teach too little science.



Likewise, principals are seen as more supportive of the importance of science teaching, with about 70% of teachers indicating their principals support science teaching. **This continues to underscore a growing awareness and commitment, particularly in the Oakland schools we serve, regarding the importance of science in elementary classrooms.**

Representative Comments from Elementary Teachers:
Throughout the year, and on the end of year and post-presentation evaluations, teachers share their thoughts, concerns, and feedback with CRS. As a learning organization, we take these comments to heart and work diligently to address the changing needs of teachers, and the tremendous range of needs our teachers articulate. Regarding the **BASIS program,** the comments are overwhelmingly peppered with the phrases: **phenomenal, fabulous, my kids loved it, thank you, and MORE PLEASE!!**

Here are some representative teacher comments:

CRS has been amazing. My students have gained a greater appreciation of science based upon the resources that they have provided. Our last presentation led most of them to joyfully state that they wanted to be scientist. Thank YOU!!! - Nikita Gibbs - Markham Elementary

I have found your newsletter incredibly helpful in terms of learning about science PD opportunities and connecting with local science resources. – Judy Greenspan – Martin Luther King, Jr. Elementary, Richmond

CRS allows our students in low income, urban areas to have more equity within the classrooms. CRS supports bringing science and hands-on activities into the classroom. – Diana Culmer – Grass Valley OUSD

You fulfill a vital function and I am so grateful for your expertise. The BASIS presentations are the best! More, more, more! – Kristine Fowler – Berkeley Arts Magnet School

CRS directly supports teachers in maximizing valuable science and community resources which translates into student learning. – Timothy Douglas – International Community School, OUSD

Thanks to CRS' Science Super Stars program we got fabulous science books for the kids and classroom and a great hands-on climate change lessons from the Aquarium by the Bay. – Joanna Davis, New Highland Academy

Science lessons and awareness is crucial to students. They are young and curious and understanding the world around is essential to their development. - Maribel Lopez, Dover, WCCUSD

CRS is one of the most valuable resources around for teachers! I am amazed at the amount of information and resources CRS provides for me and my students. Thank you! – Susan Tajima – Cleveland Elementary, OUSD

CRS is a great organization! The highlights were the BASIS volunteers (my students regarded them as rock stars) and the Science Superstar program. – Linda Selph – CUES

Thank you for all you do to encourage science excitement in both kids and adults! It is always beneficial to have "new blood" in a classroom to excite and enlist students' attention to learning and the young scientists who come present for BASIS do just that! Thank you, thank you and thank you again for your support! – Sherry Jacobs – Franklin, OUSD

I work in special ed and my students absolutely loved the science experience at our school. We generally don't have an opportunity to leave campus so this was a treat. – OUSD

CRS is bringing valuable academic content, genuinely creative experiences that will foster children's love for science and the world. - Daniel Villarreal – Chabot Elementary OUSD

Science is easily the favorite subject of most of my 2nd grade students. Science is school is incredibly important to help inspire our future scientists and problem solvers. It is crucial that we continue to value and teach science in school. – Liz Cruger, Encompass OUSD

As a result of participation in the science superstar program we had a geologist come visit our classroom. The kids were so engaged in asking the scientist questions. They loved seeing the rocks and all hands were in the air. The students wanted to share their knowledge and were curious to learn more. - Sarah Swanson-Hysell – Encompass Academy

I LOVE the energy and enthusiasm expressed in the emails, regardless of the topic! It's very energizing**,** – Anonymous, OUSD Elementary

When CRS scientists came into my classroom, I observed my most behavior-challenged student become focused and engaged. I could see him through new eyes and this allowed me to improve in my ability to engage and teach him. This was invaluable to me. - Franklin Elementary, OUSD

I am thankful for all the wonderful support from CRS! – Vila Wong, Bella Vista, OUSD

CRS has been an important resource to continue Science teaching and learning at my school site. It has allowed students to engage in Science outside of their classrooms. Having BASIS Volunteers come in has made students and teachers excited about Science. – Jeffrey Franey – Hoover Elementary, OUSD

For almost 100% of my students, hands-on science experiments and lessons are so valuable to get them interested and engaged in different science disciplines! Thank you for supporting! - Kevin Jeung - Sequoia Elementary School

Having volunteer scientists has enriched our science curriculum greatly. My students love to meet young scientists who can share both their knowledge of science as well as show what it means to be a student of science - Soo Hyun Han, Bridges Academy

Having CRS as an interested science resource allows me to increase my science knowledge to deliver authentic and creative hands on investigations. - Constance Cobb-Zunino, PLACE@Prescott

Sample comments from our BASIS volunteers:

For me, the best part of a classroom visit is the last 10 minutes. We always end our lessons with a brief recap and ask the students to raise their hands if they learned something, anything at all, from our visit - and every time, each and every student raises their hand. Perhaps they're humoring me, perhaps it's simply because they know teacher is watching, but I like to believe it's because it's the truth. We thank the students for welcoming us into their classroom, and ask them to thank us in return by doing one simple task: Take one thing that you learned from our lesson and go and teach it to someone else. By explaining just one idea to a friend, parent, or sibling you'll not only be giving them a gift in the form of knowledge, you'll also prove to yourself that you really understand the material and can help others to do the same. To me, that's what being a great scientist is all about. – Kelly Byrne, Vision Science

It really challenges me to be better at explaining what I do to young students or adults who do not know much about science. I think this is a really important skill to develop, so that the general public understands what funding for science is used for and why it is important to keep funding research. –Joe Gallagher, BASIS Team Leader, Chang Lab

As always, the visit provided me with perspective. No matter how crazy science and chemistry gets in the academic setting with graduate student life and stress, I am reminded of what society and kids want and need to learn and the excitement about science that children still have. We have the opportunity to encourage them to continue to make observations and experiment and learn and it reminds me of the bigger picture. – Jessica Kisunzu

I like knowing that I am promoting sciences in the schools. I hope what I am doing can inspire kids to follow and actively pursue sciences. This can help improve their lives and in turn, many other lives. -- Adam Updegrove, SECO

I absolutely love being able to interact with elementary age students and teachers; it helps me understand how I can present scientific information in a way that the public can understand. – LeeAnn Louis , SECO

Representative frequent student comments every year echo these themes:

Thank you! I want to be a scientist, too!
It was cool! I learned a lot. Science rocks!

It was fun to hear about the stuff they are doing in their labs.
It was mesmerizing. You guys made me really want to learn more about (biology, chemistry, etc.)
Thank you for teaching us about (weather, bugs, robots, etc). I love science!
This was an interesting and special experience that I will always remember.
Please, please, please, please, please come again someday.
I really hope you come to our class again and do science. I had a wonderful time with you.
I had a great, great, great, great, great time. It was very, very, very, very fun.

In addition to these Science Connections Program accomplishments, CRS work during the 2013-14 school year included:

Workshops for educators, including:

- On-site "Introduction to Elementary Engineering", "Understanding and Implementing New Science Standards" and "Discourse: From Lab Meetings to Classrooms" and other customized professional development, delivered at school sites throughout the year.
- Hands-on Activities for Afterschool Providers, through Alameda County Office of Education and the STEM Power of Discovery network
- STEM in the Library: New Standards Conference, SF Librarians Association
- Presentations at the National Science Teachers' Association Conference, Boston; 100Kin10 Network Summit, San Francisco; CSLNet California STEM Summit, Sacramento
- Ongoing work of the CRS Advisory Council on Elementary Education, Bay Area thought leaders in science, education, academia, business, and philanthropy; Action oriented, focused on solutions to challenges in elementary science education
- Introduction to new standards workshop for Environmental Education organizations, in partnership with CREEK and Chabot Space and Science Museum.

<u>CRS & BASIS scientists developed and presented lessons on more than 100 topics, including:</u>

Animal Body Structure and Habitat	1st	Gears in Motion	2nd; 3rd
Botany on Your Plate	1st	Genetics: What makes us different	2nd; 3rd
Can you feel your heart beat?	1st	It's just a phase!	2nd; 3rd
You Are What You Eat! How Diet Shapes Teeth	1st	States of Matter (SECO)	2nd; 3rd
Exploring States of Matter	1st; 2nd	Sounds and Music	2nd; 4th
		Wildfire	2nd; 4th
Light and the Electromagnetic Spectrum	1st; 3rd	Dry Ice Explorations	3rd
Balloon Rocket Cars	2nd	No Bones About It: How Skeletons Work	3rd
Materials and Structures	2nd	Plants Adapt to their Environments	3rd
Plant Life Cycles	2nd	Properties of Matter that Matter	3rd
Exploring Magnets	2nd; 3rd	Robots that Run	3rd
Fossil Formation	2nd; 3rd		

States of Matter: Sublime Suds/ Ice Cream Science	3rd
Energy: The Currency of Science	3rd; 4th
Eye didn't know that	3rd; 4th
Heat Transfer: It's so cool!	3rd; 4th
How to Get Renewable Energy from the Sun	3rd; 4th
Learning About Our Guts is a Must	3rd; 4th
Microbes in Action!	3rd; 4th
Natural Selection: Clipfish	3rd; 4th
Open Scope: Build Your Own Microscope!	3rd; 4th
Optics and Light	3rd; 4th
Seeing is believing?	3rd; 4th
Synesthesia and You	3rd; 4th
The Skin You're In	3rd; 4th
Engineering Catapult Challenge!	3rd; 4th; 5th; 6th
Electricity, Magnetism and the Wall Socket	4th
Microbe-Body	4th
Snack Tectonics	4th
What is Renewable Energy?	4th
Feel Dead Brains	4th; 5th
A Whole New World of DNA and Proteins	5th
Body Systems	5th
Cardiovascular System	5th
Chemical Workout/Blow It Up	5th
Chemistry Magic! - Chemical and State Changes	5th
Chemistry of Soap	5th
Digestive System	5th
Elements of Life	5th
Follow the River to Clean Waters	5th
Glow in the Dark Science	5th
Green Polymers	5th
How to Think Like a Scientist	5th
It came from a single cell	5th
Plants Show Their True Colors	5th
Plastics, Recycling, and Composting	5th
Properties of Materials	5th
Water in our Atmosphere: Make It Rain!	5th
Alternative Energy	6th
Animal Adaptations	6th
Mountain Building	6th
Vision Whitney Lab	6th
MS: Brain Science	7th
MS: DNA	7th
Magnetic Mystery Planets	8th
Germs and Your Body	K
Hidden Colors	K
Sensing the World Around Us	K
Build A Bug	K; 1st
Clouds Clouds Everywhere	K; 1st
Stomp Rocket Engineering	K-5
Clorox Science Celebration Day: Liquid Nitrogen, Dry Ice Bubbles, and Slime!	K-5