



I'm not sure what I would have done these last 10+ years without CRS. From weekly newsletters to amazing scientists visiting from companies and UC Berkeley, CRS has helped my students to become scientists and me to become a better teacher. Thank you!

—2nd Grade Teacher, Oakland

Community Resources for Science

Empowering educators & scientists to engage young learners in wonder, exploration & discovery

2022-23 Impact Report: Reviving Joyful Science Teaching & Learning



After participating in the CRS summer training, I completely rearranged my teaching schedule to make sure we did science every week. I made Wednesdays 'science day'. Student attendance is up because no one wants to miss science, and I've gotten further along in the curriculum than I ever have before. And, I am more effective in bringing in the reading, writing, and math skills to reinforce what students are learning in those areas, by having students use those skills doing interesting science investigations. It has been a very challenging year, and science has been the bright spot for me and for my students.
– 3rd grade teacher, Oakland

This feedback, shared with us by a teacher who attended our Joyful Math and Science professional development collaboration prior to the start of the new 2022-23 school year, encapsulates the type of transformation that Community Resources for Science programs and services are designed to bring about. Since 1997, CRS has provided long term partnership with the teachers we serve, a range of opportunities to meet their changing needs, and connections with scientists, museums, and other partners to bring active learning experiences to life for children.

This brief report presents a snapshot of the quantitative and qualitative impact of CRS programs and services for East Bay science educators and TK-8 students during the 2022-23 school year.

Program Metrics: Impact By the Numbers

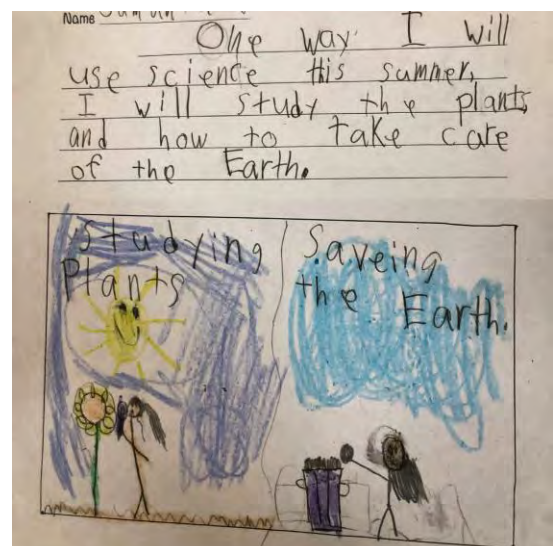
CRS served **1,800 teachers**, in **149+ schools** across 6 East Bay school districts, impacting learning for **45,000+ TK-8 children**

750+ well prepared scientists and engineers directly engaged more than **15,000 young learners**, leading 500 in class lessons and dozens of festival and special event presentations

Nearly **650 7th grade students** had individual mentoring support from **135 UC Berkeley science and engineering grad student mentors**

Nearly **2,000 children – and 55 teachers** - earned **Champions of Discovery** recognition, receiving thousands of science kits, books, and other prizes.

200+ teachers took part in professional learning



My TK students are full of curiosity and they ask so many questions. They love to give information as well – they talk about their families, themselves, their cultures. So showing students how they can be scientists and find the answers to questions is huge! This experience helps them to already know they are part of the scientific community.
– Transitional Kindergarten (TK) teacher, Richmond

Empowering Teachers: Real-World Connections, Support & Training

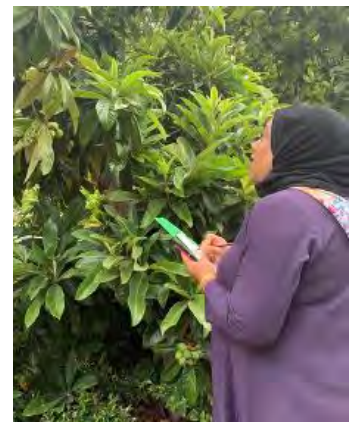
Thank you for helping me see how to effectively build student belonging. During this unit, I read the story, Mario and the Hole in the Sky: How a Chemist Saved Our Planet. It aligned perfectly with our celebration of Hispanic Heritage Month. I had a student ask me if Mario was a real person and when I told him yes, he couldn't believe that someone who spoke Spanish was a scientist. This book helped students see that they, too, can be scientists.

– Teacher, West Contra Costa

CRS teacher members demonstrated their dedication to improving their science teaching by engaging in professional development, inviting scientist visitors into their classrooms, and documenting ways they led their students in meaningful explorations of science phenomena connected to their daily lives. Throughout the year, CRS provided hundreds of East Bay elementary teachers with information, support, and scientist visitors who led their students in exciting investigations. Through CRS workshops and professional development, teachers collaborated with peers to plan the science experiences for their greater school communities.






Professional development collaborations this year included:

- Integration of Math and Science in Joyful Explorations
- Equity in STEM Teaching: Practices, Tools and Lenses for Designing Inclusive Instruction
- Climate Change & Environmental Justice, piloting new curriculum
- Sketching and close observation: Building Reading, Writing & Discussion in Science
- Physical science: Forces, Motion, & Waves
- Summer Climate Institutes & OTACA Teacher Collaborations
- Science Fair Success: Scaffolding Student-driven Investigations
- Climate Connections for Garden Educators
- District Climate Literacy Planning
- Becoming an effective Peer Coach: Leadership in Science Teaching



Clockwise from top: MLK team in Oakland; Joyful Math & Science peer coaches; Sketching; BUSD science specialists explore equity with STEM4Real.

The State of Science: As a result of CRS services and programs, teachers indicated:

<p>98% Discovered their students are more highly engaged & motivated during science, making science a powerful engine for learning</p>		<p><i>My students love to do the hands on part of science because every student can participate and succeed during science. This gives them confidence to do other tasks such as writing and solving math problems which are harder for them. Sometimes they are so caught up in the science that they are not aware that they are actually writing!</i></p>
<p>94% Became more confident and enthusiastic about teaching science</p>	<p><i>CRS has played an integral role in making science significant and accessible to my kindergartners for the past 5 years. Every year I learn new strategies and practices through CRS, all of which contribute to the joys of teaching and learning. Thank you so much CRS for leading the work in equity and success, one science lesson at a time!</i></p>	
<p>87% Added new science lesson, field trip, or other experience for their students this year</p>	<p><i>My science hero is Eugenie Clark because she loves and protects sharks and I love sharks- too!</i></p> 	<p><i>I believe that I really stretched my teaching muscles by having to think about how to engage my students for each lesson. I especially loved collaborating with other third grade teachers. Honestly, I don't believe I would have taught this lesson without the support of CRS and of my third grade colleagues.</i></p>
<p>87% Effectively used Science to build Language arts or math skills</p>	<p><i>This year my students reading levels grew in both Spanish and English (we are a DL program). Science is taught in Spanish but we bridged the vocabulary and concepts in English. I think it was a huge reason we had such growth!</i></p>	
<p>81% Teach science an hour or more per week</p>		<p><i>Our mantra while working in the 'lab' is pictures, words and numbers. Students are eager to add labels, captions, descriptions to their diagrams but also adding mathematical data. Science is a more meaningful way to do math, writing, and reading comprehension. Students see a purpose in what they're learning.</i></p>

Engaging Scientists: Fostering Belonging for Young Learners

After nearly two years of pandemic disruptions, we were delighted to once again be sending our 900 caring and well-prepared Bay Area Scientists Inspiring Students (BASIS) scientist and engineer role models and mentors back into classrooms for in-person learning with thousands of eager young students. While digital tools allowed for some teams to continue to offer virtual lessons from their labs or remote research and workplace locations, most teams were equally eager to step back inside the classroom doors where high-fives and silly jokes punctuate the earnest conversations about data and experimental methods.

Scientists and engineers -- 650+ from UC Berkeley and 250+ from local STEM industry -- brought their expertise and countless bins of supplies including seeds, soil, batteries, balloons, and microscopes to:

- lead lessons in classrooms
- serve as experiment mentors & role models
- host STEM activities at science festivals
- lead teacher professional development
- engage families at school science events
- serve Science Ambassador residencies

Teachers value not only the content of the lessons, but also the diversity of the scientists (65% identify as a person of color, nearly 60% identify as women) who share about their own pathways into STEM fields and inspire children to imagine their own bright STEM futures.

And, they cover a lot of ground!

Here's a snapshot of outreach during just one week in April, 2023

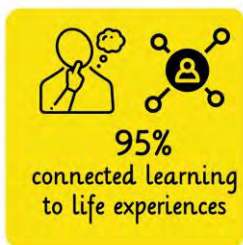


- ★ **Day of Science:** Explorations in flight, seed germination, 3-d printing, 570 TK-6 students, 20 Amyris scientists
- ☆ **BASIS Lessons:** Balloon Rocket Cars & Cloud in a Bottle- 100 1st grade students, 4 UC and Aeva scientists
- ★ **BASIS Lessons:** Magnets and Chromatography- 100 2nd grade students, 3 UC Berkeley scientists
- ★ **BASIS Lesson:** Squishy Circuits- 60 3rd grade students, 4 UC Berkeley scientists
- ★ **BASIS Lesson:** Vaccines, Neuroscience of Light and Chemistry-125 4th grade students, 6 UC and ngmBIO scientists
- ★ **Climate Literacy Lessons:** Climate and Wildfires-100 3rd grade students, 3 CRS scientists
- ★ **Be a Scientist Experiment Day:** Chemistry, Psychology, and Engineering-80 7th graders, 20 UC Berkeley mentors
- ★ **Reverse Science Fair:** 300 8th graders, 15 STEM professionals from Cal and Lawrence Berkeley Lab
- ★ **Climate Science Fair:** 300+ middle school students and families, 10 UC Berkeley scientists
- ★ **MLK Family STEAM Night:** 300 K-5th students, 10 UC Berkeley scientists & Scientific Adventures for Girls Staff
- ★ **Oakland School Science Fairs:** 350+ K-12 students and their families, 2 CRS scientists
- ★ **UC Berkeley STEM Bonanza:** 350+ children, 8 scientists

Every student regardless of academic level, background, prior knowledge or experiences, was able to fully participate, explore, and make meaning from these lessons in a positive and joyful way. It also reinforced our classroom community simply through giving us these shared joyful learning experiences.
 – Elementary science teacher

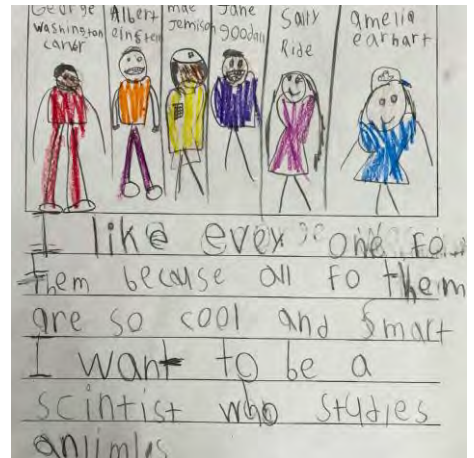


Teachers said their students:



Scientists in the classroom provide teachers a valuable opportunity to observe their students as learners:

89% of teachers indicated they were surprised by at least one student who was participating or demonstrating skills above their typical classroom level, showing teachers a new way to engage an otherwise struggling or disengaged student.



Teacher Reflections on Scientist Role Models & Lessons

The scientists were amazing with the students. It was really great to hear what different sciences all of them were into.

The instructors were very clear, to the point, thoughtful and interacted well with the students. It was so great they began with a book reading...that connected the kindergarteners to the concept of clouds which aligned well with our weather watching activities.

It's always great to hear from real life, working scientists. Students like to see and hear from these folks who bring their experiences to the classroom.

I appreciated the diversity of the scientist group – that representation is wonderful for my students to see. The presenters were well prepared, enthusiastic, and patient.

Our Scientist Ambassador Nathan was awesome. He gave us a Zoom tour around his workplace, showing us specialized lab equipment, experiments in progress, etc. This was a great, authentic experience for the students. There were so many highlights from his visits with us, including his conducting multiple bread mold studies over several weeks that inspired us to run our own similar experiments in class.

Middle School Mentoring & Investigations Build Confidence & Engagement

Middle school students have been particularly impacted by pandemic disruptions. Having scientists in the classroom, providing individual attention and support for self-directed learning, encouraging inquiry, and celebrating successes was an especially powerful experience this school year:

Be a Scientist mentoring program: Reached all 650 Berkeley 7th graders in science class, 135 UC Berkeley graduate students provided individual support for students designing and conducting their own self-selected scientific investigation.



Teachers observed students blossom into ‘scientists in the making’ and noted female students gained lasting confidence working with mentor women in STEM. Students in the Spanish language immersion classes were proud to discover ‘that it’s possible to do science in Spanish’ as they worked with Spanish-speaking scientists. And, African American students applied new determination to their projects with support of African American mentors who encouraged them to deepen their thinking.

Students said: *My mentor was just as excited about my project as I was! That was cool. She was encouraging and positive.*

I liked being able to choose my own science investigation and decide how to do it. My mentor let me figure things out, but helped if I got stuck. I liked collecting and interpreting the data and thinking about how we would improve if we were to do it again.

6th Grade Clean Air Team

UC Berkeley clean air researchers led nearly 200 6th graders in Berkeley and Richmond in a series of lesson investigations that culminated in each student designing and constructing an air filtration device they could take home or position in the school. Students learned how to monitor air quality, and presented what they learned to other classes in their school, deepening their understanding of the concepts.



8th Graders Flip the Script in Reverse Science Fair

More than a dozen scientists from UC Berkeley and Lawrence Berkeley Lab presented their research to small groups of 8th graders during an innovative Reverse Science Fair. Students had a rubric for evaluating the scientist presentations, and listened intently to a series of scientist presenters. The 8th grade teachers were delighted to see their students putting their skills of close listening, careful questioning, and evaluating claims and evidence to good use.

2022-23 BASIS Lessons Featured Health, Energy, Fossils, Climate & More



Adapting to Survive: Predators & Prey
All About Seismology
All About Vaccines
Artificial Photosynthesis
Balloon Rocket Cars: Newton's 3rd
Law of Motion
BioEngineering: Design A Pill
Coating
Biomining
Buoyancy: Who Sank the Boat?
Can We See Your DNA?
Carbon Sequestration
Catapults
CheMystery Liquids
Clean Air Engineering
Clouds, Clouds Everywhere
CSI: Chromatography Science
Investigation
Climate change connections in the
Garden
Electricity, Magnetism and the Wall Socket

Engineer Something For Outer Space!
Energy: Fuel Cells for Clean Cars
Exploring Magnets
Exploring States of Matter
Eye See It: Understanding How Eyes See
Germs and Your Body
Green Polymers
Hear All About It!
It's Just A Phase!
Leaf Fossils & Climate Change
Lights! Colors! Vision!
Making a Medicine
Making Sense of What's Dense
Microorganisms: Good or Evil? Fermentation!
Natural Selection: Survival of the Fattest
Oceans are for Everyone
One Health One World!
Optoelectronics: How Fiber Optics Work
Paper Clip Motor
Parts of the Brain



Pixels: Vision in the Digital Age
Prehistoric Puzzle: Understanding the
formation of fossils
Renewable Energy
Robots that Run
Sewage Sleuths! Investigating SARS-
CoV-2 in Wastewater
Snapshots in Time: Exploring the
Fossil Record
Storytime with a Scientist: Ada Twist,
Scientist
Storytime with a Scientist: Mae
Among the Stars
Squishy Circuits
Using and Storing Electricity
What's the Matter with Gas?
What Is In Outer Space? Planets, Moons, Stars

CRS is an important community resource for teachers who wish to incorporate more science learning but lack the resources and/or know-how. As someone with a science background, I also appreciate how they complement my science teaching and allow my students to see more diverse scientists who live in their community.
—CRS teacher member

Many of the kids where I teach don't have many worldly experiences. CRS helps with that, especially with having scientists come into our classroom to do lessons with my students. That has always been a powerful experience for my students as well as provide them with hands on activities that kept them really engaged.
--CRS teacher member