



*CRS saved science in
distance learning this
year!*

-- Richmond teacher

Community Resources for Science

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

2020-21 Impact Report: Meeting Unprecedented Challenges for STEM Education

Science is a pillar of equitable education, and my students and I are grateful for the opportunities that CRS has provided throughout this year to make science and engineering accessible in the safety of our own homes. – Richmond elementary teacher

During the 2020-21 school year, with students and teachers mostly in distance learning, CRS redoubled our efforts to deliver support and programs in new ways when and where they were needed most. This brief report highlights the metrics and milestones of the year, as well as the stories beyond the numbers. Despite the challenges, thousands of children learning from home met diverse, inspirational scientists and engineers who visited their virtual classrooms. Thousands of children received kits of science materials so their teachers could confidently lead high-quality science lessons after participating in customized professional development sessions. This report also reflects on the lessons and strategies learned or refined during this pandemic that will inform our work going forward.

Each lesson, each class visit, each training session, provided opportunities for people – children, teachers, and scientists – to laugh and learn together, even as they needed to remain safely physically apart. CRS fostered curiosity, community, critical thinking, and most of all joy during a year without in-person field trips or schoolyard games.

CRS Program Highlights, By the Numbers

Overall CRS served 1,700 teachers, impacting learning for 45,000 TK-8 kids, across 140 schools and more than 5 school districts.

Bay Area Scientists Inspiring Students (BASIS) reached 775+ classes, engaging 20,000 young learners in authentic science & engineering

7th Grade STEM mentoring paired 700 students with 160 UC Berkeley mentors

9,000+ children in Richmond, West Contra Costa, Berkeley, Emeryville and Oakland received science at home material kits

CRS engaged 400+ teachers in 75 PD sessions, including climate & environmental literacy, physical and life science, and featuring dozens of scientists, parks, museums, & other partners

CRS' Core Elements Met the Moment

Partnerships and collaborations, long the heart of CRS approach, provided critical resources to meet the urgent & ongoing challenges of distance

Customized, responsive support, another longstanding CRS core value, allowed CRS to meet the huge range of needs among teachers, across schools and districts.

Access to materials, equipment & training made all the difference in how much science teachers included in their lesson plans each week

Virtual connections allowed greater **engagement with families and caregivers**, once the immediate gap in access to devices & internet was addressed

Effective integration of digital tools allowed even the youngest students to demonstrate ideas and creativity, gave quieter students space to 'speak'

STEM professionals are powerful partners, able to adapt to changing formats to engage kids

*I know CRS has my back whenever I need support with teaching science!
– Oakland teacher*

Empowering Teachers: Information, Connections, Support & Training

The seeds of interest are planted all along your life journey. If a child finds something interesting in Kindergarten, every time they hear something related to that interest, they think: "Hey, I know about that!" They feel so happy that they already know about this thing. Those small connections of interest and happiness propel students toward wanting to know more and more. "Wanting to know more" is the thing we want to teach.

– Richmond teacher, Science Super Star honoree Pam S.

CRS teacher members are dedicated to providing learning experiences that bolster students' 'wanting to know more' – activating curiosity as a powerful engine for learning. Throughout the school year, teachers turned to CRS for support in transitioning their carefully planned science and engineering



lessons to fit the constraints of teaching at a distance. Fortunately, those who had previously taken part in CRS (or other) professional development were able to lean into science by carrying over the same strategies they were using to strengthen science during in person learning.

Teachers reported some of the most effective practices and strategies that carried over well to distance learning included:

Using science notebooks for sketching, writing, data

- 66% of teachers indicated they used science notebooks prior to school closures
- Of those teachers, 95% indicated the practice of students using science notebooks was essential to continuing science lessons during distance learning
- Of those who had not used science notebooks prior to the pandemic, most who implemented the practice as part of CRS professional development indicated they will continue to use science notebooks when they return to in person teaching

- Teachers have students write, draw, collect data, and discuss with peers

Academic discussions of claims and evidence

- 90% of teachers indicated they discovered new digital tools to foster more ways for students to share their thinking and have productive discussions with classmates to refine and deepen their thinking

Hands on investigations

- 98% of teachers who received material kits to send home with students said it made a huge difference in their ability to do hands on investigations
- Nearly all teachers indicated a strong desire to include more hands-on science when they return to in-person school

Virtual Tools & Increased Confidence

As a result of CRS support and services, teachers indicated they:

- 95% Discovered & used virtual/online resources to keep science a part of their teaching**
- 88% Discovered resources for teaching students about issues that impact students' lives directly, including health and climate change**
- 85% Feel equally or more confident teaching science as compared with other subject.** (We have seen this grow substantially since 2015, when the majority of CRS member teachers indicated they felt less confident teaching science.)

Teachers indicated CRS was their trusted go-to source for resources and support, during distance learning and later as some transitioned back into hybrid or in person teaching.

CRS has had a very positive impact on my students and has improved my teaching practice over the years. The experts that have visited my class not only engaged the students but also showed them that a science career is possible for everyone, and that curiosity and a growth mindset go hand in hand.

– OUSD 3rd Grade teacher, Anne P.

In their own words, teachers tell us: CRS has been...

...so helpful during the pandemic. Providing ideas and resources as well as supplies for the students. It was such a new and crazy situation. As teachers, we had to adapt quickly to new expectations and forms of instruction. Knowing that CRS was there to support us and recognized and sympathized with our struggle was huge during a lonely and very stressful pandemic.

... a tremendous partner for many, many years...This year, CRS helped me run a Family STEM Night over Zoom. I really could not have done it without their great ideas and help recruiting scientists for the event. The families had a great time!

... one of a few programs/ organizations that have really boosted my confidence and competence as a science teacher. It is so rarely a major focus in teacher preparation but is crucial to understanding the world and keeping kids engaged. Thanks CRS!

... bringing excellent in-class programs to our school and supporting our students with their focus on equity. The scientists who come in are dedicated to support the needs of our school.

... such a blessing! They have been a big part of my science teaching development...I always find that my thinking goes deeper and I can give my students better learning opportunities. I used to be much more intimidated by "science" and now I really enjoy teaching it, mostly because of CRS!

... such an amazing central source of information, resources, grants, and curriculum... CRS is so responsive to teachers' needs, and as a result they have such a big impact on science education in the Bay Area.

... a wealth of knowledge about all things science. They are incredibly helpful and proactive.

...providing game-changing tools, education, connections and ideas for the youngest learners in the school district to have access to scientific experiences and knowledge - making science exciting and applicable to everyday life!

...helping us discover we can do science, and have fun, even on a screen!



Lessons Learned: What Will Keep When you Return to School?

What I noticed during DL is that it was important for the students to be heard individually. They enjoyed participating and sharing even through the computer.

The science journals were a hit!

Guest speakers, virtual field trips and videos gave students opportunities to have so many more experiences in science and with scientists.

I want to keep more family engagement with investigations kids can do at home.

Using some safe and non-toxic materials from home that students can use to build STEM projects, such as cardboard tubes and basic kitchen ingredients.

Engaging Scientists & Engineers to Inspire Kids, Lead (Virtual!) Explorations

Scientists and researchers here in the Bay Area have played leading roles in solving the health challenges of this pandemic. CRS transitioned our Bay Area Scientists Inspiring Students (BASIS) outreach program to online, and added a new “Scientist Ambassador” component, and hundreds of graduate students at UC Berkeley and employees of local STEM businesses were eager to



continue sharing their love of science. With coaching and support, **they made more than 775 presentations, reaching 20,000 Kindergarten through 6th grade students.** They brought joy, and the calm that comes with having information in the face of uncertainty, exploring with young learners: What are germs and virus? How do vaccines work? Or, bringing exciting lessons about topics of great interest to kids, from space to airplanes, from animals to seed germination to dinosaurs, and much more. We also presented several virtual Family Science events, bringing together families from multiple schools for fun activities.

Teacher reflections on impact of scientist interactions:

From the beginning students were excited interact with our scientist. Because she spoke Spanish she connected immediately with students. She was also friendly and prepared her lesson with plenty of images, which included animals and cool places. Because of our scientist, I believe more students, including girls, are interested in science as a career choice.

My students expanded their knowledge in science and also saw that scientists come in all colors, genders, from everywhere in the world. If they can see it, then they can be it!!

This was such a great experience for the students! One student in particular was way more open and talkative during this class than other times and I recognized a deep scientific thinker in him, thanks to (our Scientist Ambassador). She brought the concepts that we'd read about to life. When students showed what they had learned, one student shared detailed artistic skills that I hadn't seen before!

The lesson was interactive and the scientists asked the students many questions and gave them multiple opportunities to engage. There were plenty of visuals and they used amazing strategies to explain the material. They were also so positive and wonderful with the students!

Science Ambassadors collaborated with teachers to develop a series of lessons, sharing their research and allowing the kids to also share what they were learning through multiple class visits. Other teams developed and shared new lessons focusing on stories and discoveries of scientists of color.

I hope to inspire children who come from backgrounds that are underserved in STEM. Growing up as a young Latina I never saw people like myself in STEM or thought it was for me. I want to be a role model so young students are excited about STEM.

750+ Active STEM role models & mentors

From UC Berkeley & STEM Industry

65% identify as a person of color

54% identify as women

Teachers who had BASIS lessons or Science Ambassadors said their students:

98% Learned new science concepts

96% Grew more interested in science

96% Discussed their own ideas & observations

95% Asked thoughtful questions

95% Connected learning to experiences in their lives

7th Grade Mentoring Fosters Confidence, Engagement, and Resilience

The Be a Scientist 7th grade mentoring program provides all Berkeley Unified School District students with UC Berkeley scientists to guide students through the process of designing and conducting independent science or engineering investigations, during science class. For 2020-21 we transitioned the program to virtual, connected 160+ mentors with nearly 700 students. We worked with BUSD teachers to design and implement a virtual version that provided a material kit for every student and gave every student the chance to self-direct their own inquiry. Students have their own scientist mentor serving as consultant to help put their plans into action. Students tell us this experience helps them discover their own power to wonder, explore, discover -- and to take action to make the world they live in a better place. They will be more empowered as learners in 8th grade, as they prepare for the opportunities and challenges in high school.

Connecting Teachers with a Wide Network of Partners & Resources

At the start of the new school year, many of the region's most beloved science centers, outdoor education programs, and parks were closed and unsure of when they would be able to open for field trips, teacher workshops and other public programs. The landscape was changing almost daily as partner organizations worked to revise their programs, develop new virtual-friendly resources, and offer field trips via Zoom. CRS served as a trusted connector, keeping teachers informed in weekly bulletins about new offerings, and providing a clear, effective channel for providers to announce their updated offerings. More than 200 science education organizations are connected through our network, and CRS worked to curate up-to-date online guides and weekly email bulletins for teachers, and online resources for families looking for science-at-home adventures. We engaged partner organizations through our Advisory Council to continue to collaborate as we emerge from distance learning to carry on the lessons we have collectively learned forward so that we return to even better science teaching and learning next year.

Thank you for being our lifeline during this extended closure. While we can't welcome classes into our building right now, we are working hard to share amazing science activities, lessons, videos, and live programs with teachers and families. CRS is an effective partner in making sure teachers know what we have to offer, even though it continues to change frequently! -- Museum partner

CRS worked with more than two dozen science centers, outdoor educators, public agencies, scientists, and researchers to offer 75 virtual professional development sessions, engaging more than 400 teachers from the Bay Area and beyond. We offered both a Fall and Spring series of workshops focused on topics related to climate change and environmental literacy, allowing teachers to explore specific lesson resources, discover sources for local data, learn about citizen science and student action projects, and test out teacher tool-kits and more.



Un-bee-lievable E-STEM Learning Using NGSS (K-5)

Workshop Date: 3/20/2021
Grades K-5
Presented By: Planet Bee Foundation

Educators learned how to implement E-STEM concepts using math and the engineering mindset, while also learning about bees, their importance, biology, and stewardship.

RECORDING & RESOURCES



PEAK - Promoting Energy Action & Knowledge

Workshop Date: 12/8/2020
Grades K-8
Presented By: The Energy Coalition (TEC)

TEC presented this webinar for educators to enrich classrooms w/ environmental STEAM curriculum.

RECORDING & RESOURCES



Climate Change Engineering Design Challenges

Workshop Date: 11/14/2020
Grades 3-8
Presented By: Kim Carter & Emily Goodwin, NCSE

In this workshop, we explored engineering design challenge ideas to teach climate change adaptation.

RECORDING & RESOURCES



Food Footprints

Workshop Date: 11/12/2020
Grades 4-8
Presented By: Haley Thilgen, Chabot Space and Science Center

This workshop explored the intricate feedback loop that exists between food production, climate change, and our role within it.

RECORDING & RESOURCES



Using The New UGC Website To Explore River Otter Recovery

Workshop Date: 10/22/2020
Grades 4-12
Presented By: Jessica Beahm, PHN, UGC Project Leader

RECORDING & RESOURCES



Greenhouse Earth

Workshop Date: 10/24/2020
Grades 5-12
Presented By: Eric Havell

RECORDING & RESOURCES



Watershed Education From Your Front Door

Workshop Date: 10/22/2020
Grades K-5
Presented By: James W.

RECORDING & RESOURCES



Using The GLOBE Program And Observer App To Engage Students In Data Literacy

Workshop Date: 10/16/2020

RECORDING & RESOURCES

STEM Role Models Inspire Students

As they laugh and learn together with graduate students from UC Berkeley and STEM industry, children from the East Bay's most underserved communities have authentic opportunities to experience the wonder of science. Children send us notes and drawings about how they have been inspired by the scientists and engineers they meet



I met chemists, and now I would like to make potions. I would like to invent a potion that makes you invisible. So when you are trying to steal oookies, no one will see you.



I did science with scientists this year! I've learned a lot about the Earth's marine life, and about planets outside of Earth too! Now, I can imagine my own future as a type of scientist when I'm older. The kind of scientist/engineer I may become is a hardware engineer/ A computer scientist.



I did science with scientists this year! Now I can imagine studying nature and drawing pictures to help me see every tiny detail. Meeting scientists this year has inspired me not to take the world around me for granted. --Angella, 5th Grader

BASIS Lessons Featured Health, Dinosaurs, Stories of Scientists of Color & More

Electricity, Magnetism & Motion
Outbreak: One Health One World!
Squishy Circuits
Storytime with a Scientist - Rosie Revere, Engineer
Yn_s Mex_a: UC Berkeley & LatinX Botanist
Honeybees & Dr. Turner
Oceans are for Everyone
Storytime with a Scientist - Henry Turner
All About Vaccines
Leaf Fossils & Climate Change
Parts of the Brain
Sending Solar Panels into Space
Microorganisms
Fantastic Polymers & Recycling
Therapeutics: Treating Disease with Medicine
Germs and Your Body

CheMystery Liquids
Brain & Emotions
Clouds, Clouds Everywhere
Robots that Run
Snapshots in Time: Exploring the Fossil Record
Visual Pathway
Skeletal System
5 Senses
BioEngineering: Design A Pill
Body's Responses to Exercise
Immune System & Vaccines
Eye See It: Understanding Eyes
Drill Down to DNA
The Science of Heating and Cooling
Functional Parts of the Brain
Renewable Energy & Climate Change
Solar Sails and Space Exploration

Earth Day: Seed Dispersal
Science Ambassador
Making Sense of What's Dense
Storytime -- Shark Lady
Physical and Chemical Reactions
Storytime with a Scientist - Mae
Among the Star
Family Science
The Circulatory System
The Digestive System
Storybook Science: Ada Twist
Exploring Aviation
Los Germenés y tu Cuerpo
Storytime: Story of Mary Anning
Microscopes of Tomorrow
Muscles
mRNA Vaccines
Storybook: Mario & Hole in the Sky
Zero Waste
Earth Day: Science Celebration

