



**EXCITE
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EXPERIENCE**





BERKELEY LAB

Bringing Science Solutions to the World



U.S. DEPARTMENT OF
ENERGY

Office of Science

Update on K-12 STEM Programs

Government and Community Relations - K-12 STEM Education & Outreach Programs

September 14, 2020



Value Statements for Berkeley Lab K-12 Programs

K -12 programs are an extension of community outreach and diversity, equity and inclusion initiatives at Lawrence Berkeley National Laboratory.

These programs exist to excite young people about the expansive world of STEM, engage students in activities that will strengthen their STEM identity, and increase the number of students from underrepresented groups that pursue a STEM major/career.

Outline

1. Recap of 2019
2. Programs - Spring/Summer 2020
3. Fall 2020 and Beyond
4. DOE/ Personnel Updates



Guiding Issues in STEM

- **There is a large (and widening) gap in equity and access for:**
 - students of color
 - students with disabilities
 - students that have been marginalized by gender & sexual identity/presentation
 - students from low income households
 - students that are first-generation US citizens
 - students that will be the first to attend college in their family
- **Teachers continue to need support connecting scientific concepts and standards to real world applications**
- **We haven't had a way for these groups to learn about ALL of the outreach taking place at Berkeley Lab (tours, internships, campss, scientists in the classroom)**
- **We haven't been able to fully capture HOW MUCH outreach is being developed and disseminated across the Lab**

Alone we can do so little; together we can do so much. ~Helen Keller

Recap of 2019



Nuclear Science Day
(March 2019)



Bring A Kid to Work Day
(formerly DSTW, April 2019)



OUSD Science Fair at Chabot Space Center Science Day
(May 2019)



Oakland Summer Town Camp (July 2019)



UC Berkeley Upward Bound Visit (July 2019)



Classroom Renovation (Summer/Fall 2019)

Recap of 2019/ Early 2020



Rising Sun Design Challenge (August 2019)

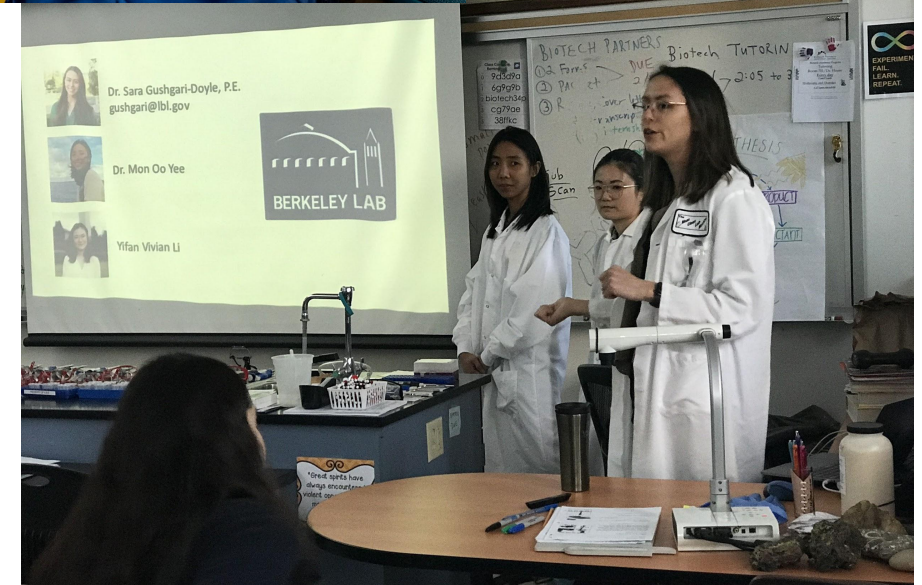


Pinole & Richmond Engineering Academy Visit (January 2020)



National Lab Day in University of Toledo (October 2019)

K-12 STEM Education & Outreach



Antioch High School Visit (March 2020)

Berkeley Lab Teaching Scholars Program



Joint program between Early Career Pathways and K-12 Offices

Website launched November 2019

First Cohort – February 2020

Entering Spring/Summer 2020



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EXCITE

K-5



K- 5 : EXCITE

- **Continue partnerships with organizations that directly support K-5 students**
 - Scientific Adventures for Girls
 - Community Resources for Science
 - Lawrence Hall of Science
 - Chabot Space & Science Center
 - Local School Districts
- **Update BLISS Kits for virtual and in-person use**
 - support parents taking kits into their child's classroom



EXPLORE

6-8

6 - 8 : EXPLORE

- **Continue partnerships with organizations that directly support 6-8 students**
 - Community Resources for Science
 - Mathematics Engineering Science Achievement (MESA)
 - Self e-STEM
- **Nuclear Science Day**
- **Bring a Kid to Work Day (formerly Daughters & Sons to Work Day)**
- **Scientists in the Classroom**
- **Live Science Programming**

K-12 Virtual Homework Help → Let's Talk about STEM

Website

Program summary and volunteer info: <https://k12education.lbl.gov/programs/virtual-programs/lets-talk-about-stem>

What is Homework Help?

Homework help was developed by the GCR- K-12 team during the initial shelter in place and transition to virtual learning in March. COVID-19 pandemic. Berkeley Lab staff volunteered their time in weekly tutoring sessions for children of employees at the Lab. The sessions covered most STEM subject areas and several volunteers offered help in english, history and government.

Program Format

		During Program	Total time
Students/Employees		Employees booked one hour slots according to day/time/subject area.	
Volunteers		40 volunteers signed up to help, 17 volunteers were booked for one or more sessions	~48 total hours of volunteer time were booked

Next Steps: The program will transition to Let's Talk about STEM to support teachers for the fall

Live Science Series: May - August 2020

Live Science

What the Stars Tell Us

Friday, Aug 21 at 2pm pst

Join our scientists in exploring how innovative research meets fun hobbies

The Lawrence Hall of Science
SCIENCEat Cal
scienceatcal.berkeley.edu

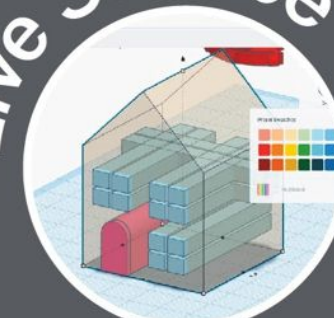
A white telescope pointing towards a dark space with stars.

Live Science

3D Design & Fabrication

Friday, May 22 at 2pm pst

Join Berkeley Lab staff in exploring how innovative research meets fun hobbies

A 3D printer with a colorful print and a color calibration chart.

Live Science

Sustainability & Soil Science

Friday, July 10 at 2pm pst

Join Berkeley Lab staff in exploring how innovative research meets fun hobbies

A pair of hands holding a small green plant growing out of dark soil.

Live Science

Advanced Light Source

Friday, June 19 at 2pm pst

Join Berkeley Lab staff in exploring how innovative research meets fun hobbies

A diagram of a light source with colorful rays and a central image of a building.

Live Science

Science in the Sky

Friday, July 31 at 2pm pst

Join Berkeley Lab staff in exploring how innovative research meets fun hobbies


A person's hand interacting with a large screen displaying a blue, abstract, cloud-like pattern.

Live Science

Yeasts & Sourdough

Friday, May 8 at 2pm pst

Join Berkeley Lab staff in exploring how innovative research meets fun hobbies

A glass jar containing a thick, bubbly mixture. Labels indicate "water and flour", "fermentation at work", and "CO2 bubbles".

265 individual log-ins via zoom - 1000 views on YouTube
Next Session: National NanoDay Friday, October 9, 2020 - 10am PST

Next Steps:

- Review survey results for appropriate time and content
- Connect more content to CA science and engineering standards
- Continue solicitations to Lab members for ideas and participation
- Increase post production value by engaging animators and video assistance
- Develop additional content that can support recorded programming

EXPERIENCE

9 - 12



9 -12 : EXPERIENCE

- **Introductory College Level Experience in Microbiology (iCLEM)**
- **Short Courses**
 - ATLAS/ALICE Masterclasses
- **Career Talks**
- **Scientists in the Classroom**
- **Formal Internships**
- **Berkeley Lab Director's Apprenticeship Program (BLDAP)**
- **Science Accelerating Girls Engagement in STEM (SAGE-S)**

Bioscience Research

July 24 @ 10am PST

Romy Chakraborty is a microbial researcher and Ecology Department Head in the Earth and Environmental Science Area of Berkeley Lab. Her lab is interested in identifying novel microbes, studying the effects of climate change, and more!



Joined by lab members:



Shruthi Reddy
Undergraduate Researcher



Vivian (Yifan) Li
Recent Graduate



Mon Oo Yee
Postdoctoral Researcher

Entrepreneurship and Industry

July 17 @ 10am PST



Raj Bhakta
Fiber and Polymer Researcher
Co-Founder of Funxion -
technology for energy efficient
textile manufacturing



Natasha George
Battery Engineer
Co-Founder of SomEV -
electric mobility vehicles
revolutionizing transportation



Ning Sun
Research Scientist at
ABPDU - Advanced Biofuels
and Bioproducts Process
Development Unit



Russell Carrington
Chief Technology Transfer
Officer & Deputy Head of the
Intellectual Property Office at
Berkeley Lab

SAGE-S Career Talk

Monday August 3 - Thursday August 6

Science Accelerating Girls' Engagement in STEM

Monday, August Accelerator Science & Heavy Elements
Tuesday, August 4 Astrophysics & Astronomy
Wednesday, August 5 Biosciences & Microbiology
Thursday, August 6 High Energy Physics & Data Science

All talks will be held at 2pm PST



SAGE-S (Science Accelerating Girls' Engagement in STEM) is a one week long summer camp for public high school students (age 14-17). Hosted SLAC National Accelerator Laboratory and Lawrence Berkeley National Lab, the program allows scientists, engineers and staff to share what everyday life in a STEM (Science, Technology, Engineering, and Mathematics) profession is like.

This year, the program will offer afternoon talks that are open to the public! We invite you to share in our excitement about STEM and learn more about the research at the Department of Energy National Laboratories.



367 participants

Material Science Research

July 31 @ 10am PST

Sinéad Griffin leads a research group in both the Molecular Foundry and the Materials Science Divisions at Berkeley Lab. They are a multi-disciplinary group that study material challenges in technology and physics.



Joined by lab members:



Brianna Aguilar-Solis
Undergraduate Intern



Evan Sheridan
Graduate Student



Thomas Harrelson
Postdoctoral Fellow

The Importance of Communication

July 10
10am PST



Linda Vu
Senior Editor // Berkeley Lab



Dione Rossiter
Executive Director // Science at Cal



Rachel Henderson
Science Writer // Freelance

This seminar series will show multiple perspectives on what STEM careers look like, as well as provide guidance on how students can work towards such careers. Science communication panelists will discuss the importance of communication in supporting and sharing scientific research. This series is open to everyone!



SLAC

SAGE




BERKELEY LAB

SAGE-S Virtual Summer Camp 2020

Website

Programs summary and volunteer info: <https://conf.slac.stanford.edu/sage-2020/>

What is SAGE-S?

SAGE-S (Science Accelerating Girls' Engagement in STEM) is a one week long *on-campus residential summer camp* for *public high school* students (age 14-17). It is hosted by scientists and engineers who will share what everyday life is like in the STEM profession.

SAGE mission: This program aims to foster innovation, grow the STEM community, and engage intelligent, creative, and passionate young women in the everyday life of scientists and engineers at the National Laboratories.



Program Format

	Prior to Camp	Week of Camp	Total time
Students	250 girls nominated throughout NorCal	96 students participated	One - week camp with talks, hands-on projects, and professional growth sessions
Volunteers	~47 committee members	~100 day-of volunteers	~1000 hours of prep work ~265 hours week of camp

Next Steps:

Current Work

- Finalize reports and lessons learned with SLAC to share with the Moore Foundation
- Updating statements of work and partnership with SLAC
- Develop workshops for current cohort of students (SAGE Live)
- Support student chapters of SAGE (SAGE X)
- Develop a plan for recruitment to broaden participation of the 2021 cohort

Future Work/Announcements

- The Betty & Gordon Moore Foundation plan to announce the next round of funding soon.
- The next round of funding will support an additional DOE Lab

Berkeley Lab Director's Apprenticeship Program



Berkeley Lab Director's Apprenticeship Program 2020

Website

Program summary and volunteer info: <https://k12education.lbl.gov/programs/high-school/BLDAP>

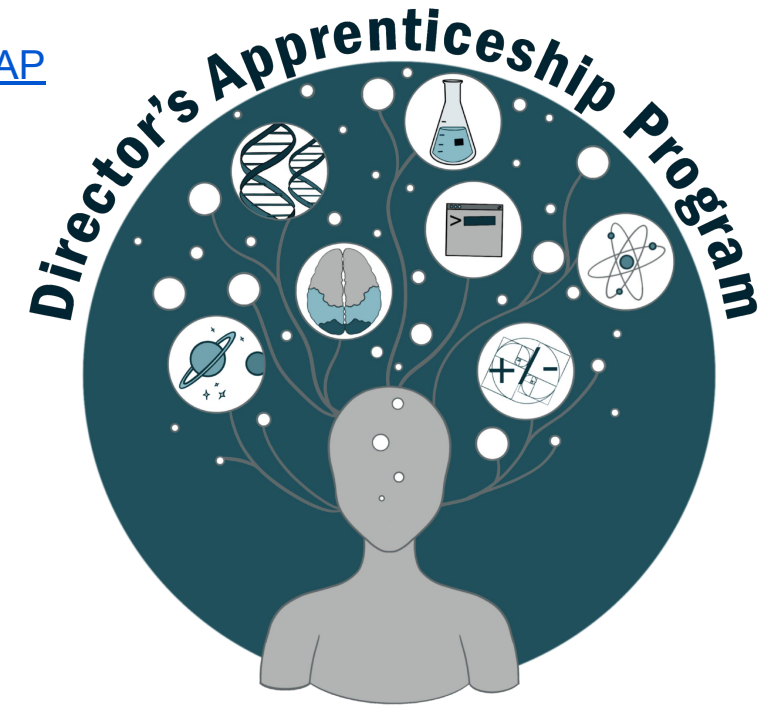
What is BLDAP

The BLDAP provides STEM work experiences for promising high school students through exposure to STEM professionals, new skills, and research based projects at Berkeley Lab.

BLDAP mission: The program aims to remove systemic barriers, such as a lack of access to professional networks and work-based learning opportunities. The program focuses on building STEM confidence and skill sets along with providing a network of STEM professionals and role models.

Program Format

	Prior to Program	During Program	Total time
Students	81 applicants from the Bay Area	17 students participated	Four Week Introduction to Python and Data Science Program
Volunteers	15 prep and logistics volunteers	42 program volunteers	~360 Hours of volunteer time



Next Steps:

Current Work

- Finalize reports and lessons learned from initial program
- Develop monthly workshops for current cohort of students
- Develop a plan for recruitment and onboarding for the 2021 cohort
- Apply for grant funding/donations to support students
- Explore expanding virtual (one or two week) camps to Central Valley
- Begin mapping out framework for apprenticeship and internship cohorts
- **Implement clear policies for working with minors at the Lab (virtually and in-person)**

Partnerships

- Berkeley Lab Foundation - <http://www.berkeleylabfoundation.org/support>
- Alameda County Office of Education - K12 SWP Round 2 Grant - Student Stipends
- UC Berkeley - Data Science Education Programs - Content Development

Spring / Summer Volunteer Support

Program	Participants	Volunteers	~Volunteer Hours
Homework Help	17	40	48
Live Science Events	265	28	50
Summer Seminars	367	24	22
BLDAP	17	42	360
SAGE	96	100	1265
SAfG	~400	42	150
Totals	1162	276	1895

Potential Plans for the Fall

- **Host Educator “Open House” - Saturday, September 19, 2020**
- **Continue Live Science Series as a Public Program**
- **Continue Career Panels as Public Programs**
- **Continue to Engage SAGE and BLDAP Students**
- **Begin Scientists in the Classroom**
 - STEM Subjects
 - Career Talks
- **Begin Rotating Monthly Themed Virtual Tours**

Let's Talk About STEM

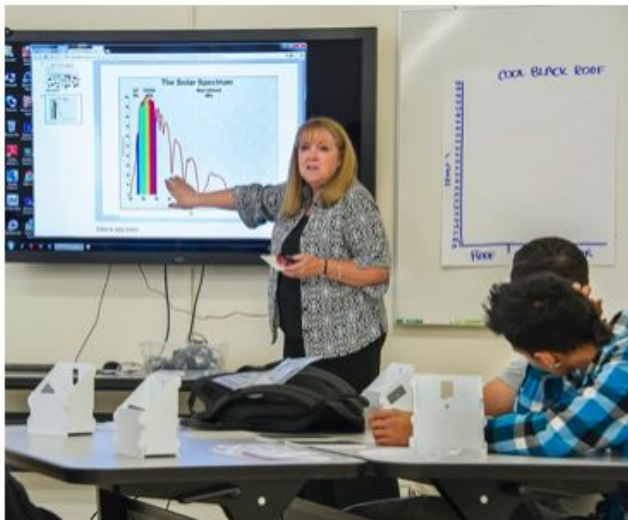


Subject Exploration

Our researchers have expertise in a number of STEM subjects and are excited to connect their research to specific scientific concepts covered in the classroom. Learning about the periodic table? Hear from our nuclear chemists and particle physicists. Studying biology? Talk to our researchers at the Joint Genome Institute. Allow us to help you connect concepts in the classroom with real-world research.

Career Chats

What does a scientist or engineer do all day? Do you have to love science your entire life to become a scientist as an adult? What if you want to work in a STEM space but not be a researcher? If you could go back, what classes would you say made the difference? Learn about how our staff arrived at their professions and get insight on their current work. Hear from researchers, science communicators, project managers, and administrators who demonstrate the wide variety of career paths in STEM.



Virtual Tours

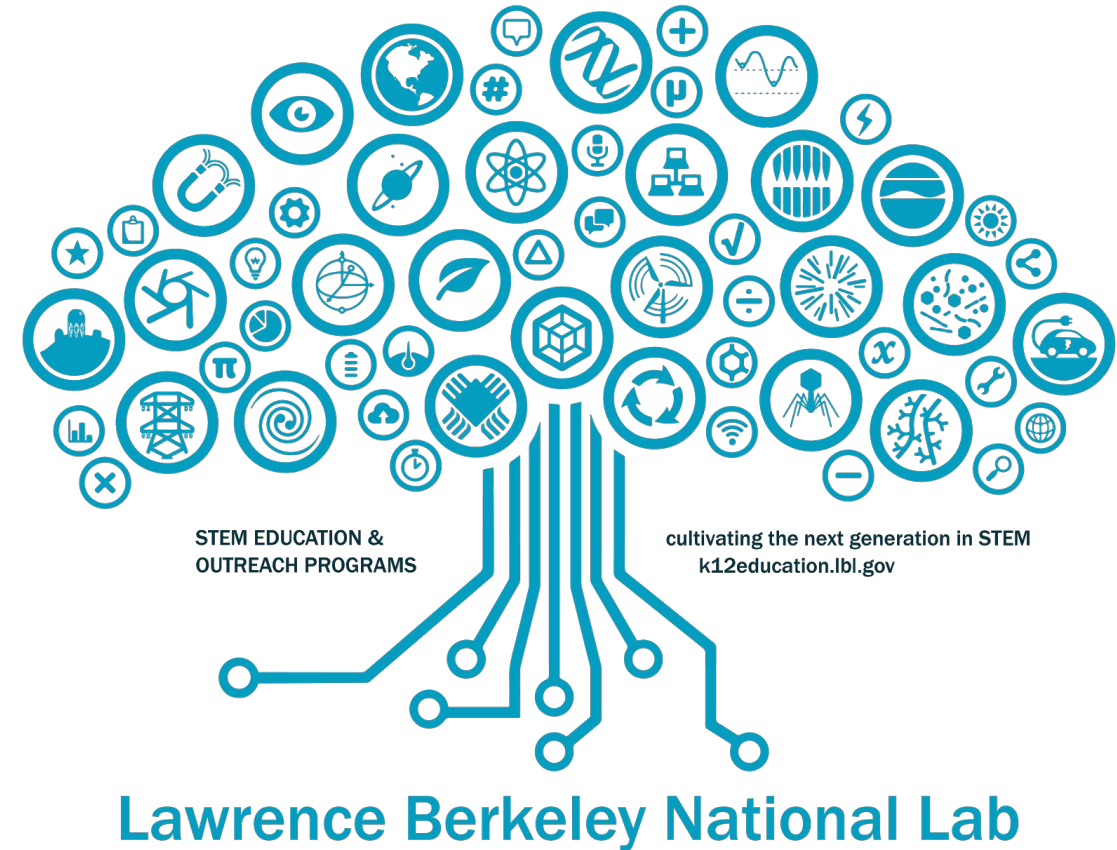
Go on a virtual tour with a friendly researcher or an enthusiastic science communicator. Virtual tours focus on the multi-million dollar facilities that Berkeley Lab staff support, maintain, and make amazing new discoveries. Speak with scientists and engineers as they show off the facilities that shape fundamental research like the Molecular Foundry, Advanced Light Source, and National Energy Research Scientific Computing Center, and Joint Genome Institute.

Virtual Workshops (Spring 2021)

During our virtual workshops, students will be introduced to new concepts, develop specific skills, and practice tackling challenges with those skills. Topics will range from engineering to bioscience and more. Some workshop plans will include shipped materials for hands on activities that will support the on-line format.

Final Updates

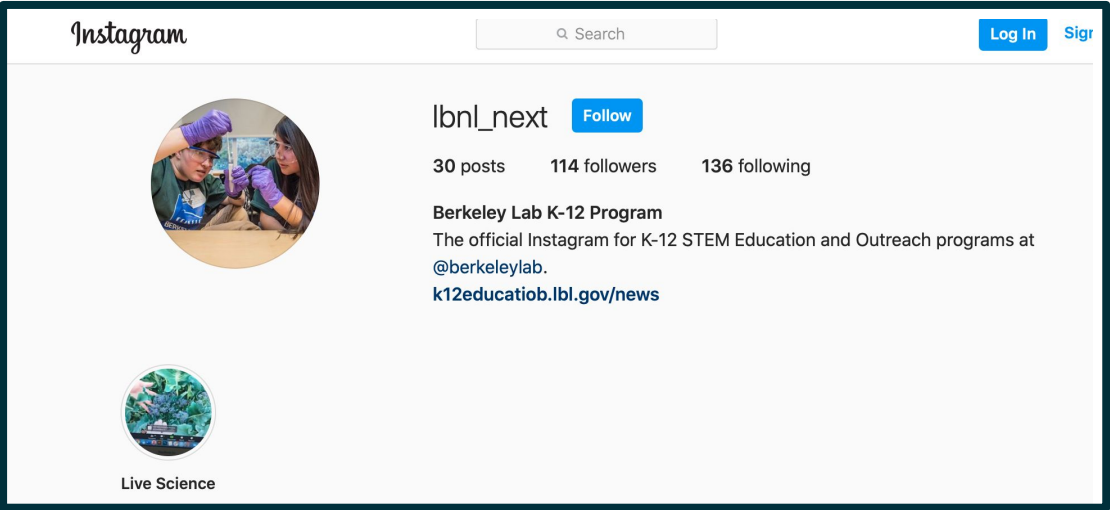
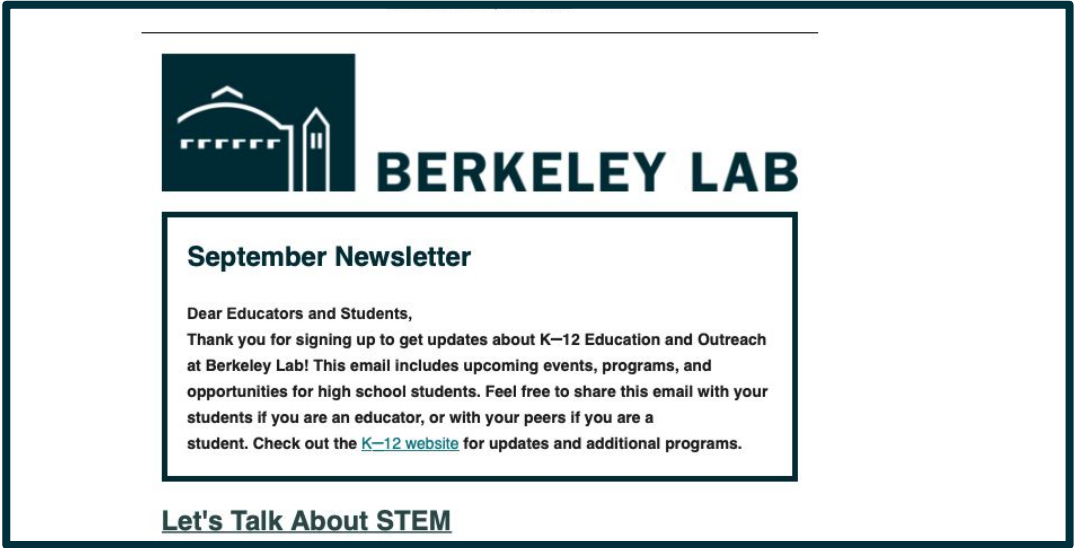
- **NLDC - Education Council**
 - New Education Council established across the DOE complex
- **Personnel**
 - An Instruction and Content Coordinator will be hired by late fall
 - 130 Applications
 - Phone interviews with top 10 (begin today)
- **Strategic Plan**
 - Formalizing 5 year plan



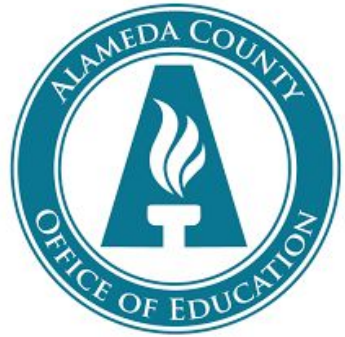
Thank You

Questions?

K-12 STEM Communication



Partnerships



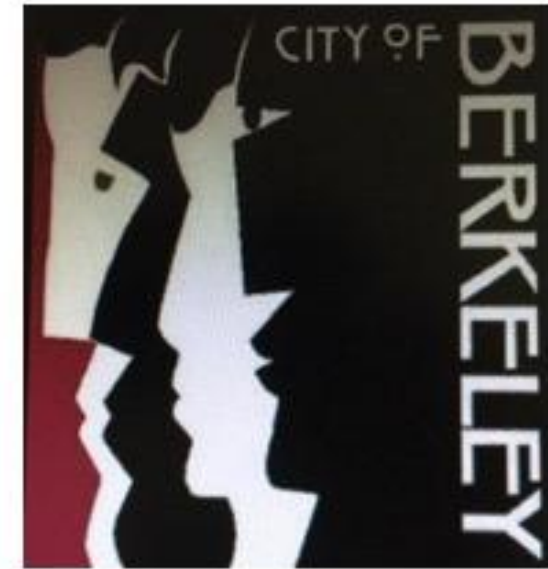
CRS

COMMUNITY RESOURCES FOR SCIENCE
practical support for great science teaching

ESTABLISHED
1997



GORDON AND BETTY
MOORE
FOUNDATION



LBNL Next Digital Engagement

Website

Programs and volunteer opportunities: k12education.lbl.gov

Monthly Newsletters

Audience	Subscribers	Opens
Volunteers	310	~70%
Students & Educators	374	~35%

Social Media

Platform	Handle	Followers	Engagements
Twitter	@lbnlnext	331	30,000/month
Facebook	@lbnlnext	35	150/month
Instagram	@lbnl_next	107	151/week

