

A Deeper Shade of Green



Sustainability Plan 2018

Berkeley
PUBLIC SCHOOLS
Berkeley Unified School District



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EXECUTIVE SUMMARY

“Being prepared for climate change is very important. Educating our children to know what role they play is vital to our survival as a human race.”

Dr. Donald Evans, BUSD Superintendent

As we grapple with the reality that we are already seeing dramatic effects from climate change, from wildfire to droughts and rising sea levels, preparing students for this uncertain future while taking responsibility as global citizens to reduce our carbon footprint must be a priority.

The vision of the Sustainability Master Plan is that all Berkeley students have access to healthy, green school buildings and grounds and hands-on environmental and outdoor education.

The Sustainability Plan offers a comprehensive and holistic way for the District to reduce the environmental footprint of schools and promote environmental literacy, which are fundamental to a high-quality 21st century education. The Plan outlines both the significant efforts that the District has already undertaken to become sustainable, as well as offers recommendations to achieve further outcomes.

The Plan outlines recommendations for facilities improvements, maintenance projects, nutrition services functions, curriculum integration and everything in between.

Some of these recommendations will be simple and easily embraced; others will be challenging. Ultimately we know if implemented they will achieve crucial goals for the BUSD community:

- Reducing energy costs
- Reducing bus and other fleet motor vehicle costs
- Supporting NGSS Standards
- Reducing BUSD’s environmental footprint
- Improving physical health
- Supporting social and emotional learning for students

The Berkeley Unified School District’s Sustainability Plan is aligned with a long list of international, federal, state, county and city efforts to support sustainability and combat climate change. Within the State of California:

- The Department of Education published a Blueprint for Environmental Literacy in 2015, outlining a comprehensive approach to integrating sustainability into schools.
- Governor Brown passed a resolution to be carbon neutral by 2045 and have 100% renewable energy use by 2050.

- The City of Berkeley passed a Climate Action Plan in 2009, a Resiliency plan in 2014, and declared a Climate Change Emergency in July of 2018.

Berkeley is known around the world as a mecca of environmental thought leaders, from UC Berkeley's extensive environmental department to the David Brower Center to world-renowned environmental leaders Michael Pollan and Carl Anthony.

According to the Center for Green Schools, more than 150 school districts now host Sustainability Managers. Districts with sustainability departments and plans include San Mateo County, San Francisco Unified, Oakland, Denver and Philadelphia.

The BUSD Sustainability Plan will help to ensure that the next generation, who will be most impacted by climate change, is engaged in being part of the solution.

Honoring BUSD's Mission and Values

This Sustainability Plan stays true to BUSD's mission and values by:

- Inspiring academic excellence: Education for sustainability showcases critical thinking, rigorous science and hands-on learning, which are best practices in education.
- The Plan helps students make positive contributions to the world by exposing students to meaningful ways to improve the natural environment.
- The Plan helps to save financial resources through energy and waste conservation practices.
- The Plan helps students to learn teamwork and learn how to treat the environment around them with respect and dignity.
- The Plan allows for robust partnerships with community organizations.
- The Plan creates more equity with environmental literacy by providing more students with opportunities for hands-on experiences, field trips and other enriching activities.

Who We Are: Berkeley Unified School District by the Numbers

- Number of Students: 9,400
- Acres of land: 100
- Number of sites: 23
- Number of Buildings: 45
- Number of Employees: approximately 2,000
- Square Feet of Buildings: 1,800,000

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HISTORY

Berkeley Unified School District has a long history of sustainable practices and education, as further noted in subsequent chapters.

1992: Berkeley voters pass the first of three construction bonds which have helped the District to modernize its buildings and update its fixtures to be more efficient.

1993: The first school garden is developed at LeConte Elementary (now Sylvia Mendez). Eventually gardens are developed at all of the school sites.

1995: The Edible Schoolyard is established on a vacant lot at King Middle School.

1995: Ann Cooper is hired as BUSD's lead chef and revolutionizes school lunch practices.

2007: The School Board passes a Resolution to adopt CA-CHPS (California Collaborative for High Performance Schools), a building standard that addresses sustainable protocols and practices in new construction and modernization projects.

2010: Ten of the District's elementary schools receive Energy-Star certification.

2011: The Board approves a Solar Master Plan. The District has since installed solar power at seven school sites.

2012: Safe Routes to Schools programs begin at BUSD, eventually collaborating with all of the schools to encourage students to walk and bike to school.

June 12, 2013: The Board passes Resolution No. 13-070 supporting a 90% reduction in waste by 2020.

2012-13: BUSD loses its primary source of garden and cooking funding, making difficult staffing cuts to accommodate the funding losses.

2011-14: The Green Schools Initiative, under the leadership of Deborah Moore and Consultant Silber, secures grants to implement a waste reduction program at school sites and start Green Teams, the program saves close to \$60,000 and is turned over to the BUSD Cooking and Garden program starting in 2014 but is stopped due to budget constraints.

2015: The Facilities Department receives funding from Proposition 39 to support energy efficiency practices.

2016: The Soda Tax passes, paving the way for recurring funding for the garden programs.

June 15, 2016: The Board includes language supporting green buildings standards within the District's Educational Specifications.

November 15, 2017: The School Board passes a proposal written by Facilities Director Tim White to hire Consultant Silber to write its first Sustainability Master Plan.

PROCESS

The Plan utilized various methods to solicit ideas and feedback about the Plan's activities:

Kickoff Meeting: Approximately 60 people attended the kickoff meeting on March 20th to capture a broad understanding of their current needs and vision.

Working Groups: Approximately 25 people applied to be part of the BUSD Sustainability Plan working group. Consultant held seven meetings with various topics with the working groups.

Stakeholder Meetings: Consultant met with the Facilities, Safety and Maintenance Oversight Committee, members of Cabinet, City of Berkeley staff, and local industry experts to gather information and to elicit input.

Berkeley High School Internship: Consultant created an internship program for a dozen high school students in the summer of 2018, in which students conducted research and produced reports about a specific topic related to the Sustainability Plan.

Student Focus Groups: The Sustainability Plan staff visited eight middle and high school classrooms meeting with approximately 300 students. The topics included current environmental practices in their classrooms and schools, and their vision for eco-friendlier spaces. The top ideas were:

- Reusable utensils and less packaging with our snacks
- More nature-based field trips
- Solar on all school roofs

Research: The extensive outreach and one-on-one interviews with a variety of sustainability professionals for this plan included researching how other districts developed their sustainability plans, best practices for curriculum, and funding sources for sustainability programs.

SURVEYS

The consultant distributed five different surveys to PTAs, certificated staff, community members, Berkeley High School students and principals. The following is a sampling of the 439 survey results:

ALL GROUPS: How crucial do you feel it is for students to learn about climate change, environmental justice and other topics related to sustainability?

- 85% extremely urgent
- 10% fairly important
- 5% not important at all

ALL GROUPS: Please check off any barriers preventing the integration of projects or teaching related to sustainability

- 90% The teachers' curriculum is jam-packed and the school doesn't have time to prioritize environmental literacy projects or programs.
- 33% Not enough funding for projects
- 33% Not enough professional development related to sustainability
- 47% Not enough support from custodians or other staff

COMMENTS FROM PRINCIPALS: Share your bold vision for a more sustainable school and district!

- I would like to see attention to basic operational and facilities decisions that impact our carbon footprint
- Breakfast/lunch utensils and packaging could all be composted or reused
- I would like to see how we can incorporate sustainability into the already existing state standards

COMMENTS FROM CERTIFICATED STAFF: Share your bold vision for a more sustainable school and District:

- Too much reliance on paper forms. More work at the district level needs to be done to help staff streamline registration processes, permission slips, etc. by going paperless.
- Reduce the amount of waste associated with breakfast. Plastic containers of cereal daily, individual milk cartons, plastic wrapped cheese, disposable spoons. For 10,000 kids. It is a mind boggling amount of trash generated on a daily basis.
- Less concrete on yards, more trees, grass and natural environments for kids to play, read and relax
- First step would be to narrow down standard-aligned and culturally relevant curriculum, as well as PD opportunities.
- Greater involvement (funding!) of outdoor education vendors like MOSAIC, Kids for the Bay, Headlands/ Yosemite Institute, etc.
- I think we should be working with the city on better bike routes to schools. I see many families and kids biking to schools on streets that are pretty unsafe. We should be leaders in promoting very safe ways to walk, roll, bike to school.
- Composting and Recycling in every classroom in the district.

Goals

GOAL #1: To reduce the District's environmental footprint:

Climate change is one of the greatest challenges humanity has ever faced. By reducing our environmental footprint, the District can be a leader in addressing this threat. In addition, lower-income families and neighborhoods are often the first communities affected by climate change and pollution. By addressing climate change, the Plan also supports the District's commitment to equity and social/environmental justice.

GOAL #2: To support Next Generation Science Standards:

Environmental education programs provide numerous opportunities for hands-on learning, linked learning, community service and other best practices in education. The Sustainability Plan will detail opportunities for outdoor and environmental education for all students, including linking green facilities to lesson plans that support schools as learning labs for students.

GOAL #3: To save money:

It's a simple fact that saving resources saves money. Savings from energy conservation programs alone could result in cost savings of tens (even hundreds) of thousands of dollars.

GREEN BUILDINGS & MATERIALS



VISION: BUSD buildings will be constructed and maintained in ways that are healthy, safe and sustainable.



OBJECTIVES

- The District will use green materials where feasible for new construction and remodeling.
- Curriculum will include green building assessments and lesson plans.
- All schools will use green cleaning products.

Green Buildings: Making the Case

On average, students spend over 900 hours per year in school buildings. (Center for Green Schools)

The way in which school buildings are constructed and maintained has profound impact on areas such as student health, school spending, carbon footprint, and water use. Buildings provide a framework for water and energy use, able to either support or impede overall environmental goals. Green buildings create a school environment that fosters learning while saving money and energy.

Green Buildings Improve Student Health and Productivity while dramatically decreasing the environmental impact.

Construction materials vary greatly in their health impacts and environmental footprints; use of nontoxic materials increases employee safety during construction. Effective thermal regulation can reduce energy use and improve student comfort and health.

Recent reports from the World Green Building Council, quoting global research over the past two decades, identified lighting, indoor air quality, thermal comfort and acoustics as key areas where sustainable improvements can positively affect students.

Findings for each environmental factor include:

- Lighting – Students in the US showed a 36% increase in oral reading fluency when exposed to high- intensity light, while those in standard lighting conditions increased by only 16%
- Indoor air quality – Every 100 parts per million increase in CO2 was associated to a roughly one-half day per year reduction in UK school attendance
- Thermal comfort - Students citing their classroom as ‘comfortable’ achieved 4% more correct answers in a math test compared to those who were hot, according to a survey of more than 4,000 Finnish students
- Acoustics – For every 10 decibel increase in noise, the language and math scores of French students decreased by 5.5 points
- Optimizing lighting, indoor air quality, thermal comfort and acoustics can not only help to improve students’ learning outcomes, but – depending on the strategy used – can reduce energy use and lower carbon emissions in schools.

(World Green Building Council website)

Green Buildings Materials and Design

The District has a unique opportunity to integrate green building design as it undertakes writing a new Facilities Master Plan. The Sustainability Plan staff met with the Facilities Master Plan consultant to discuss the integration of green building design, materials and other sustainability components into the Master Plan. This Master Plan will inform the District’s upcoming bond measure, on which the Berkeley community will be voting in 2020.

Berkeley’s city limits contain some of the finest examples of green buildings anywhere in the Bay Area. One such green building is the David Brower Center (pictured on the first page), named after one of the world’s most influential environmentalists, who was born and lived in Berkeley. Located just one block from Berkeley High School on Allston Way, the Center is home to dozens of environmental groups and contains such innovative features as:

- Rooftop solar arrays provide both shade and energy;
- 53% of the materials used in construction were recycled;
- Foundation walls are composed of environmentally-friendly concrete;
- Toilets and irrigation use runoff water from a greywater system;
- 100%-day lighting in all office areas;
- Non-toxic carpet;
- An interactive building dashboard allows tenants and visitors to monitor the building’s current energy consumption

Case Study: Berkeley High School's Green Buildings Project

Every year after their rigorous AP Environmental Science test, students let out a sigh of relief that their test is over but then get right back to work with a fun assignment that showcases the best of project-based learning. Using everyday materials like toothpicks and cotton balls, students create their own green building models, incorporating renewable energy, gardens, water conservation and more into their design. They are then judged on their models during the end of year Science Showcase. Future green building designers unite!

Cleaning Products

Cleaning products are essential for keeping our schools clean and safe. However, many also contribute to indoor air pollution, are poisonous if consumed, and increase asthma rates if inhaled. They are responsible for nearly 10% of all toxic exposures reported to U.S. Poison Control Centers (*Organic Consumers website*).

Green cleaning products are safer and healthier alternatives. Green cleaning products are defined as those which contain no toxic substances or carcinogens. Green cleaning products and practices:

- Protect the health of students, teachers and custodial staff who use the chemicals frequently
- Help prevent student and faculty absences

Though the bulk of its cleaning products are considered green, the District does not currently have a written policy that mandates the use of green cleaning products. The Plan recommends that the Facilities Department pilot test green cleaning products at one school to evaluate the effectiveness and cost. If the pilot test is successful, the department should expand the use of green cleaning products to all sites.

Some of the many school districts who have adopted the use of green cleaning products include San Francisco, Novato, Fresno and Elk Grove Unified School Districts. Mark Bishop of the Chicago-based Healthy Schools Campaign said, "In follow up discussions with more than 25 districts, (who adopted the use of green cleaning products), not a single facility manager told us that their costs increased. Most of the facility managers we spoke to said that while some elements of the green cleaning program cost more, some elements cost less; overall, green cleaning resulted in no additional cost."

Objectives and Actions

OBJECTIVE ONE: Evaluate and implement green cleaning standards

Actions:

- Evaluate the cost impact and effectiveness of green cleaning products, including pilot testing specific products at one school.
- Draft a policy to adopt standards for green cleaning products.
- Institute green cleaning product policy at all BUSD sites.

OBJECTIVE TWO: Evaluate and implement the District's green building practices including green building materials for new construction and remodeling.

Actions:

- Continue to engage the 2020 Facilities Bond Committee in integrating green building practices into the bond measure.
- Assess indoor air quality, including CO2 levels using ARC platform.
- Evaluate the cost of green building practices for new construction and remodeling.
- Draft and institute a Green Building policy.

OBJECTIVE THREE: Integrate green building assessments and projects into curriculum and professional development.

Actions:

- Work with the US Green Building Council to promote their mentoring program, supporting green building audits and curriculum.
- Integrate BUSD green building concepts into BHS's existing end of year AP environmental science projects.
- Incorporate green building design into career tech classes.
- Support professional development opportunities for teachers to learn about green building opportunities and curriculum, including field trips.

Collaborators:

- Center for Green Schools

Resources:

- U.S. Green Building Council
- Healthy Building Network
- Responsible Purchasing Network
- Green Schools Alliance

TRANSPORTATION



VISION: BUSD shall be non-polluting whenever feasible. Single family car trips shall be reduced to less than 20% by 2025, with 80% of students who live within a 2-mile radius getting to school via Active Transportation (walking and bicycling).



OBJECTIVES

- Work with the City of Berkeley to prioritize infrastructure projects that support safer bicycling and walking routes close to schools.
- Convert at least 50% of all school buses to electric buses by 2030.
- Partner with Safe Routes to Schools to encourage/prioritize non-motorized and active transportation for students.
- Integrate transportation as a core topic into relevant subjects.

Sustainable Transportation: Making the Case

“Active transportation - bicycling, scooting and walking - are the most desirable given they are non-polluting and also offer the added benefit of increased exercise. Making it easier for children to walk and bike to school safely plays an important role in helping them lead healthier lives. It’s one of many ways in which we should strive to increase the amount of safe, fun and convenient physical activity our kids get every day” *Robert Johnson Foundation*

Whether it be in a car, on the bus, riding a bicycle, or on foot, every student’s school day begins and ends with some form of transportation. With transportation accounting for approximately 44% of the City of Berkeley’s greenhouse emissions (*City of Berkeley website*), it’s imperative that the District focus on reducing the number of students riding to school in single occupancy vehicles. Sustainable transportation also makes BUSD families less impacted by gas prices, while bikes and scooters are useful in earthquake and disaster situations.

The District is committed to providing buses for elementary school students living more

BUSD’s school bus fleet meets stringent federal air quality regulations for diesel emissions and also includes several Compressed Natural Gas (CNG) buses. We have successfully partnered with the Bay Area Air Quality Management District to upgrade our fleet with more efficient and cleaner burning engines and to retrofit our buses with particulate traps that filter harmful emissions.” –

than a mile from their designated school, a service driven by its decades-old progressive zoning policies drawn to desegregate the schools. Many students are simply not able to walk or bike, especially those who commute from the East Bay Hills. Berkeley's high cost of living also means that more and more staff are living outside of Berkeley because they cannot afford to live where they work, thus limiting their use of active transportation. The Sustainability Plan reflects these challenges by proposing a diversity of strategies to discourage single-occupancy vehicles.

Safe Routes to Schools Partnership

Safe Routes to Schools is an international program that encourages students to walk and bike to school, currently serving every school in Alameda County. For the last 12 years, it has supported a liaison in each school that meets once per month with Safe Routes staff. BUSD schools have employed such programs as:

- Walk and Roll to School Days, which many BUSD schools organize each year.
- A K-5 Educational Guide with lessons that teach students how to navigate busy streets a middle school PE program to teach students about bicycling.
- Evaluation programs to help schools measure walking and bicycling. Parent and student surveys indicate how students get to school and barriers to be addressed.

Creating Safer Streets with the City of Berkeley

The City of Berkeley has partnered with Safe Routes to Schools over the last decade to support infrastructure that makes our streets safer for walking and biking. The collaboration includes school walk audits to determine intersections where safety improvements are needed, and subsequent grant proposals to then fix these intersections. Other cities have set the precedent of prioritizing projects close to schools, and we recommend following this example by prioritizing shovel-ready projects that are close to schools. Other City-District collaborations for which communication could be improved include bike rack installation at various schools and support for Bike Repair Days.

Case Study: San Francisco's Y-Bike Program

Sustainability Consultant Susan Silber started the Y-Bike program in 2004 with the vision of inspiring students to ride bikes. Today the program operates after school programs at several San Francisco schools, teaching hundreds of students each year how to navigate city streets safely on their bikes. They also operate an Earn-a-Bike after school program, with participants learning about bike maintenance, riding safety, and navigation while working on a donated bike that they keep at the end of the program. Both programs are highly replicable models which could prove to be popular classes at any BUSD middle school.

Electric School Buses

Electric school buses have become a popular, effective way to combat climate change, with the state of California allocating millions of dollars to fund their purchase. An all-electric bus costs about \$400,000, three times more than a diesel school bus. But

operation and maintenance costs are expected to be approximately \$12,000 less per year than diesel buses.

BUSD is in the process of writing grants to purchase eight electric school buses which District will then seek funds to install solar charging stations to power the buses. The target is for at least half of all its buses become electric. It is not feasible to incorporate only electric buses yet because buses are also used for field trips for which the charge is not sufficient.

BUSD does not provide buses for middle and high school students, so collaborating with the City of Berkeley to provide free youth bus passes would greatly support equity and reduction of single occupancy vehicles. Alameda County piloted a free AC Transit program with approximately two dozen districts for three years, so expansion of this program lies, in part, in promoting it on the county level.



Objectives and Actions

OBJECTIVE ONE: Work with the City of Berkeley to prioritize Safe Routes to Schools and other infrastructure projects that support safer bicycling and walking routes.

Actions:

- Meet with the City of Berkeley (including meetings with BUSD City Council) to discuss prioritizing Safe Routes to Schools and other infrastructure projects that support safer bicycling and walking route and free youth bus passes.
- Prioritize installation of bike racks at schools.

OBJECTIVE TWO: Partner with Safe Routes to Schools to encourage/prioritize non-motorized and active transportation for students and staff.

Actions:

- Continue to promote Active Transportation including Safe Routes activities, such as Walk and Roll to School Days, Golden Sneaker Contests and Walk Audits.
- Promote Family Bike Rides in collaboration with PTAs.
- Support the development of after school bike riding and repair classes at middle schools and high schools.

OBJECTIVE THREE: Convert at least 50% of all school buses to electric buses by 2030.

Actions:

- Support pilot test of eight electric school buses, including installation of solar charging stations.
- Seek additional funding to eventually purchase more electric school buses

OBJECTIVE FOUR: Integrate transportation as a core topic into relevant subjects.

Actions:

- Promote lesson plans that integrate sustainable vs. unsustainable transportation as a core subject.
- Support Safe Routes to Schools in offering a professional development training that incorporates transportation into core subjects.
- Pilot test the incorporation of bicycling into one PE middle school class, and expand if feasible.

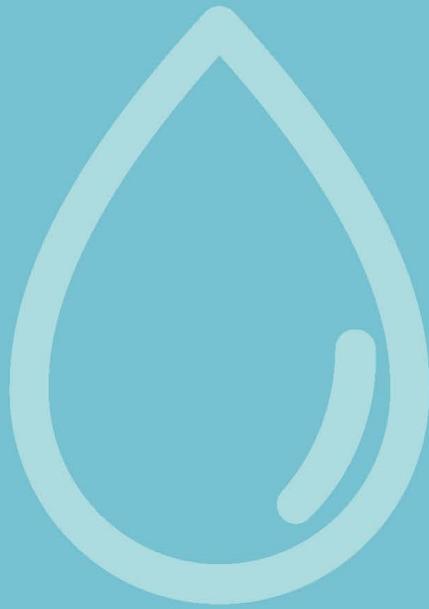
Active Collaborators:

- Safe Routes to Schools

Resources:

- Cycles of Change
- Waterside Workshop
- Bay Area Air Quality District (Protect Your Climate curriculum, Spare the Air Youth Program)

WATER



VISION: BUSD will reduce water usage by at least 15% by 2030.



OBJECTIVES

- Assess buildings and school sites for water conservation projects
- Develop projects to keep water onsite to facilitate storm water management, including bioswales, rain gardens and other green infrastructure projects.
- Provide professional development and other opportunities to integrate water conservation themes and green infrastructure projects into curriculum and service learning projects.

Sustainable Water Usage: Making the Case

“Water is the key ingredient in maintaining and supporting thriving ecosystems, and at the same time is essential to human nutritional health,” *Dr. Elizabeth Dougherty, Director, WhollyH2O.*

Currently each American uses an average of 80-100 gallons per person per day of water at home (2016) ‘*Residential End Uses of Water, Version 2*’) Water Research Foundation

According to the 2014 Government Accountability Report, 40 out of 50 state water managers expect water shortages under average conditions in some portion of their state over the next decade. As we experience the effects of climate change, conserving this resource is vital in order to protect our communities.

Climate Change in California

California is currently recovering from one of its most severe droughts on record. While California's history is one of repeated drought, climate change is exacerbating its effects. 2012 to 2015 was the driest period in recorded California history. The National Integrated Drought Information System (NIDIS) reported that as of July 2017 "abnormal dryness or drought are currently affecting approximately 34,564,000 people in California, which is about 93% of the state's population."

There has been an increase in wildfires as well as deterioration of groundwater quality and a decline in surface water flows. Many water allocation projects have been reduced or compromised. California's agriculture industry has lost billions, especially with crops relying heavily on large amounts of water, like almonds and walnuts. Water prices climbed while rivers ran dry and groundwater sources were depleted. Pierson, David, (July 15, 2014) '*California Agriculture Industry Facing \$1 Billion in Drought Losses*', *Los Angeles Times*

During the most recent drought, the City of Berkeley took action by reducing water usage by 26%. East Bay Municipal Utility District (EBMUD) and other water agencies also imposed stricter regulations on residences and businesses. In California, wet and dry seasons govern water supply. Therefore, summer water from the Mokelumne River, the primary source of EBMUD's water supply, derives largely from snowmelt. However, snowpack is decreasing and melting earlier in the dry season, leaving Berkeley vulnerable to limited water supplies in the event of future droughts. BUSD could be impacted by reduced access to water and price hikes when the next drought state of emergency occurs.

Kids for the Bay

KIDS for the BAY (KftB) has been partnering with Berkeley public schools for the past 25 years, leading environmental education programs for teachers and students. Programs, which support NGSS and Common Core Standards, focus on the on the local creeks at the San Francisco Bay estuary watershed. The program overlaps with complementary waste reduction goals as students learn how pollution, including plastic trash, can get into local creeks and affect the entire watershed ecosystem. Students then complete a trash clean-up project to reduce pollution to the watershed.

"The KIDS for the BAY curriculum is exactly what our students need. They need more hands-on science, instead of just getting it in textbooks. Your program is hands-on, engaging, and how students really learn. I have heard from our teachers that they love it, that their students have grown a lot through the program, and that they care more about their watershed now."

Rene Molina, Principal, Berkeley Arts Magnet Elementary School, Berkeley

Case Studies: Bioswales and Rain Water Catchment

“Slow It, Spread it, Sink It.” Green infrastructure strategies such as rainwater harvesting, pervious pavement, rain gardens, and bioswales provide numerous ecosystem services. Not only do they help conserve water but can also filter pollutants as rainwater/storm water passes through vegetation. These strategies also support tree and plant growth which in turn can reduce the urban heat island effect, cooling the city even as temperatures rise with climate change. The increase in tree coverage can also reduce energy use, clean the air, sequester greenhouse gases, restore biodiversity, and increase property values, health and well-being.

Green infrastructure can serve as exciting hands-on projects that students can plan and implement with support from outside community groups. For example, the NorCal Resilience Network and EBMUD teamed up to support students at Oakland’s Emilio Zapata Academy as they design bioswales and raingardens. Work parties were held with the local community to implement the designs. The lessons incorporated math, science and ecology.

Colleen Mahoney is a passionate environmentalist and parent at Jefferson Elementary who started a student Green Team in 2013. During the height of the drought, she worked with students to access the playground for a rainwater catchment system to irrigate a new pollinator garden. She enlisted the help of UC Berkeley’s Engineers for a Sustainable World, EBMUD and parents, organizing a work day in which a multi-generational crew helped to install a rain water catchment system. The system is a huge help in capturing rain water to support the beloved pollinator garden.

Objectives and Actions

OBJECTIVE ONE: Assess buildings and school sites for water conservation projects.

Actions:

- Evaluate school sites as candidates for smart irrigation upgrades and install where feasible.
- Evaluate school sites as candidates for water catchment projects and install where feasible.
- Install bottle filling stations at 3-4 schools per year.
- Track and asses water usage, safety and conservation through ARC platform.
- Install large-scale rainwater catchment systems under King Middle School.

OBJECTIVE TWO: Develop projects to keep water onsite to improve storm water management, including bioswales, rain gardens and other green infrastructure projects and strategies.

Actions:

- Work with UC Berkeley Engineers for a Sustainable World to assess school sites for water conservation projects, including bioswales and rain gardens. Develop projects after assessments, in collaboration with school community.
- Meet with City of Berkeley to assess at least one permeable pavement project near a school.
- Turn at least two lawns into drought tolerant landscapes, through a public work party.

OBJECTIVE THREE: Provide professional development, service learning projects and other opportunities to integrate water conservation themes and green infrastructure projects into the curriculum.

Actions:

- Support professional development opportunities focusing on water conservation.
- Work with Kids for the Bay and other community organizations to provide students with opportunities to learn about watersheds and protecting nearby creeks.
- Provide lessons related to sustainable food choices as they relate to water conservation.
- Work with garden program to support water education lessons that tie into existing school infrastructure.
- Promote water conservation curriculum and resources from EBMUD to teachers.

Active Collaborators:

- Kids for the Bay
- City of Berkeley

Resources:

- EBMUD
- Engineers for a Sustainable World
- NorCal Resilience Network

ENERGY



VISION: Achieve carbon neutrality by 2050, with at least a 15% reduction in energy use by 2025.



OBJECTIVES

- Assess buildings for efficiency and prioritize efficiency projects that can be paid for through the 2020 Facilities Bond measure.
- Install solar power systems on all buildings where feasible.
- Integrate lessons about energy (fossil fuel consumption, conservation, renewable energy carriers), and implement conservation campaigns with District community.
- Switch all gas appliances to electric by 2050.

Clean Energy: Making the Case

Burning fossil fuels to create energy is the most significant driving force behind the greenhouse effect and, ultimately, climate change.

According to the International Energy Agency, energy accounts for two-thirds of total greenhouse gas emissions and 80% of CO₂ produced.

Schools typically spend more on energy than any other school-related expense, aside from personnel.

Energy is the second largest expenditure for schools, after personnel. Schools that target energy efficiency in their operations and maintenance can typically reduce bills by 5 to 20 percent. The money saved can significantly help schools alleviate strain on school budgets.

Renewable Energy

Solar energy

The Solar Master Plan was written in 2014 to provide a roadmap for completing solar projects at ten BUSD sites. Currently seven sites have installed solar:

- Rosa Parks Elementary
- Washington Elementary
- Emerson Elementary
- Malcolm X Elementary
- Berkeley Arts Magnet Elementary
- Cragmont Elementary
- Berkeley High- Donahue Gym

The Plan recommends using the Solar Master Plan as a guide while doing further analysis on the feasibility of installing solar BUSD's remaining 13 buildings. The 2014 Plan could add other sites given:

- 2020 Facilities bond measure could pay for other solar projects
- The District could look further at installing solar on sites with more than one story, which the 2014 Plan did not address
- The District should look closely at installing solar to accommodate charging stations for the electric buses and other vehicles

East Bay Community Choice Energy

One exciting new opportunity is the East Bay Community Choice (EBCC), which stipulates a new local energy supplier will provide cleaner, greener electricity at lower rates while investing earnings back into the community to create local green energy jobs, programs and projects.

Turn It Off Campaign and Other Curriculum Integration

Saving money saves resources. A campaign to shut off lights and computers is easy to implement and can save the District thousands of dollars. Other schools have implemented this strategy with much success. The Eco-Schools Website has outlined successful case studies of Turn It Off Campaigns around the Country:

- The Sustainability Consultant at the Acton-Boxborough Regional School District organized a group of students from one high school to design a comprehensive Turn It Off Campaign. One such project was Power Down Fridays, in which students designed and made colorful door tags to hang on classroom and office doors to remind staff to power down equipment on Friday afternoons. They also worked with classrooms to perform energy audits three times during the year and left hand-written notes for teachers and staff with tips and advice for

reducing their energy consumption. The results from the campaign saved the district thousands of dollars.

- Arlington School District was spending \$15 million in utilities for its 74 campuses. By focusing on energy conservation, they saved \$30,000 by shutting down computers at night (not just putting them into “sleep” mode), and saved \$280,000 during vacation breaks by ensuring that energy use was reduced to minimum levels.

Energy is an easy topic to integrate throughout the curriculum. Several years ago before the school installed comprehensive solar panels, Rosa Parks Elementary received grant funding from PG&E that paid for a small solar panel that powers their pond and supports the organization of a school-wide Solar Fair. Students study solar energy, from baking cookies in the solar ovens they designed to conducting solar-based science experiments.

With renewable energy being one of the fastest growing job sectors, the Career Technical Education program is another obvious way to integrate this topic.

Objectives and Actions

OBJECTIVE ONE: Assess buildings for efficiency and prioritize efficiency projects that can be paid for through the 2020 Facilities Bond measure.

Actions:

- Using benchmarked data, begin to develop utility tracking through ARC website.
- Continue to work with Facilities Bond Committee to prioritize energy efficiency, solar and other sustainability projects that can be paid for through the bond measure.
- Continue to update lighting to LED, prioritizing outside lighting.
- Continue to seek funding and opportunities for efficiency projects.

OBJECTIVE TWO: Install solar power systems on all buildings where feasible.

Actions:

- Research options for funding for solar power systems and install as feasible.
- Research potential for battery storage on selected facilities which could be used during emergencies and possibly reduced rates.

OBJECTIVE THREE: Integrate lessons about energy (fossil fuel consumption, conservation, renewable energy carriers), and implement conservation campaigns with District community.

Actions:

- Plan and implement a District-wide *Turn It Off* Campaign with students in Fall 2019.

- Work with Science Departments to develop lesson plans about energy during this campaign.
- Promote energy conservation lessons and professional development opportunities.
- Work with career tech and environmental science classes to support learning about renewable energy and climate change.
- Work with Rising Sun Energy Center to support solar-based career tech.
- Install radiant barriers on schools with single-pane glass windows to reduce solar gain and keep classrooms warm in winter, and cooler in summer.
- Savings from site-based conservation efforts can be shared in order to continue the efforts of the sustainability programs.

OBJECTIVE FOUR: Switch all gas appliances to electric by 2050

Actions:

- Conduct a study to determine the feasibility of switching gas appliances to electric.
- If feasible, pilot at one site by 2030.

Active Collaborators:

- Kids for the Bay
- City of Berkeley

Resources:

- EBMUD
- Engineers for a Sustainable World
- NorCal Resilience Network

WASTE



VISION: BUSD will achieve an 80% diversion rate by 2025.



OBJECTIVES

- Reduce cafeteria waste to 80% diversion
- Reduce classroom/buildings, after school program and school events waste to 80% diversion
- Educate BUSD staff and community about the 4 R's and encourage a culture of zero waste

Waste Reduction: Making the Case

The BUSD community contends with waste on a daily basis, from seeing litter on the playground to sorting waste in the cafeteria. It is one area in which students and staff alike can make a huge difference.

“There is no such thing as away. When we throw it “away” it must go somewhere” – Annie Leonard, Greenpeace Executive Director and former BUSD parent

Alarming Facts about Waste *(by Dr. Mercola; mercola.com)*

More Than 100 Tons of Waste for Every American: The average American throws away more than 7 pounds of garbage a day. That's 102 tons in a lifetime, more than any other population on Earth.

Bottled Water Is the "Grandfather of Wasteful Industries." Edward Humes, author of the book *"Garbology: Our Dirty Love Affair with Trash,"* counts bottled water among the most wasteful of industries. In the US, Americans toss 60 million water bottles daily, which is nearly 700 each minute.

Food Waste Is a Problem Too: Americans throw away 28 billion pounds of food a year, which is about 25 percent of the US food supply.

Cafeteria Waste

Cafeterias can be chaotic places, with students in a hurry to eat. The last thing on their minds is how to properly dispose of their waste. Some schools have dramatically reduced the amount of waste being thrown into the landfill by instituting some best practices that could be replicated across the school district:

- **Lunchtime Monitors:** Students in younger grades are often confused about where to deposit their waste, especially when many students bring their lunches from home and have a variety of products in them. To solve this issue, many schools have been using the lunchtime monitoring system, where some students are trained to assist their fellow students in sorting waste properly.
- **Recess before Lunch:** With many students in a hurry to get to recess, they don't eat all of their lunch. John Muir and Rosa Parks Elementary Schools are among the schools that have instituted recess before lunch in an effort to help students first enjoy their recess and then slow down to eat their lunch, resulting in less food waste and healthier students.
- **Food Share Tables:** Oakland Unified has successfully instituted a practice wherein students place unwanted food on a table which can then be eaten by fellow students or donated to a food redistribution center.

“Burying organic waste in landfill is a big problem and it’s not just because of the resources we lose. When organic waste is dumped in landfill, it undergoes anaerobic decomposition (because of the lack of oxygen) and generates methane. When released into the atmosphere, methane is 25 times more potent a greenhouse gas than carbon dioxide.” (*Environment Victoria.org*)

Case Study: Reusable Utensils

BUSD students throw away thousands of plastic utensils each day during lunch.

Two middle schools in Minnesota (totaling 2,000 students) recently replaced their single-use utensils and bowls with reusable alternatives and published a comprehensive case study to outline how they made the switch. Their efforts including receiving a grant to buy stainless steel utensils, adding another tub to the cafeteria sorting line to collect the utensils and bowls, and using lunchtime monitors to ensure that students were not throwing away the utensils. The study summarized that by using reusable utensils, the schools:

- Reduced their plastic waste by 6,712 pounds
- Expect to save \$23,000 over the course of three years by no longer purchasing plastic utensils, taking into account the additional 20 minutes of staff time needed to wash the reusable utensils
- Found that using steel utensils instead of plastic ones reduced the greenhouse gases created by 77%.

Building Waste

Plan Consultant worked with the Green Schools Initiative from 2011-15 to support BUSD building waste reduction. The program increased waste diversion rates from 35% to 65% and saved the District \$60,000. She wrote and received grants in Spring 2018 from the Altamont Advisory Board and Stopwaste to jumpstart these efforts again during the 2018-19 school year. The project includes:

- Distributing signage, compost and bottles/cans recycling bins to school sites
- Hosting educational workshops and meetings with custodians, staff liaisons from each school, students and parent-led Green Teams
- Organizing a District-wide Zero Waste Campaign (beginning in January) that educates the BUSD community about the 4 R's while inspiring innovative projects and a culture of sustainability.

Stopwaste Partnership

In 2018 BUSD signed a Priority Partnership Agreement with Stopwaste, which commits the District to reducing waste, with the agency offering a number of resources through its 4R's Education Program to help reach this goal. The resources include:

- **4th Grade Field Trips:** Every 4th grade classroom is eligible to take a field trip to the Altamont Transfer Station, an eye-opening and smelly experience which takes students into the waste station to view for themselves where their waste goes.
- **5th Grade Lessons:** Teachers can sign up for a series of lessons that educate students about the 4 R's and support them in a school-based action project.
- **Teacher Training Opportunities:** Stopwaste offers a number of professional learning opportunities throughout the year for teachers and certificated staff.
- **Other Resources: assemblies, high school projects and more:** Stopwaste will help to organize a zero waste-themed dinner for the community, usually spearheaded by high school students.

Objectives and Actions

OBJECTIVE ONE: Reduce cafeteria waste to 80% diversion rate.

Actions:

- Pilot test Food Share tables and utensil dispensers in 1-2 schools, and expand upon successful completion of pilot tests.
- Continue to support lunchtime monitoring at elementary and middle schools.
- Collaborate with Nutrition Services to research costs and feasibility of switching to reusable utensils at schools with dishwashers. Pilot test if feasible at 1-2 schools and expand upon successful completion.
- Work with Nutrition Services to research feasibility of providing low-waste food products.
- Purchase rolling carts (pictured above) for all schools.
- Provide funding to switch to paper cups instead of plastic.

OBJECTIVE TWO: Reduce all classroom/building waste to 80% diversion

Actions:

- Work with the PTA Council to study and adopt a low-waste policy for PTA events.
- Seek grant funding to support the program, including yearly grants to Altamont Advisory Board.
- Pilot test an End-of-Year Yard Sale in collaboration with the Center for Creative Reuse at 1-2 school sites, and expand upon successful completion.
- Study and pass a Sustainable Purchasing policy with PTA Council and District offices.
- Provide compost and recycling bins at all sites.
- Evaluate impact of switching to paper with at least 50% recycled content; purchase as feasible.
- Research alternatives to single serving snacks during after school programs.
- Provide training for after school programs to educate students about the 4 R's and sorting
- Support classroom waste audits and yard bin waste audits.
- Work with City of Berkeley to reduce pickups after successful zero waste campaigns, which will result in cost savings.

OBJECTIVE THREE: Educate BUSD staff and community (staff, parents) about the 4 R's and encourage a culture of zero waste

Actions:

- Implement a Zero Waste Campaign in January 2019, which includes workshops, audits and PTA presentations.
- Continue to support community engagement in subsequent years, including PTA presentations, yearly professional development and zero waste campaigns and contests.
- Work with teachers to develop a short lesson plan that introduces the 4 R's and sorting at the beginning of each school year.
- Collaborate with Stopwaste to promote their 4 R's educational resources.

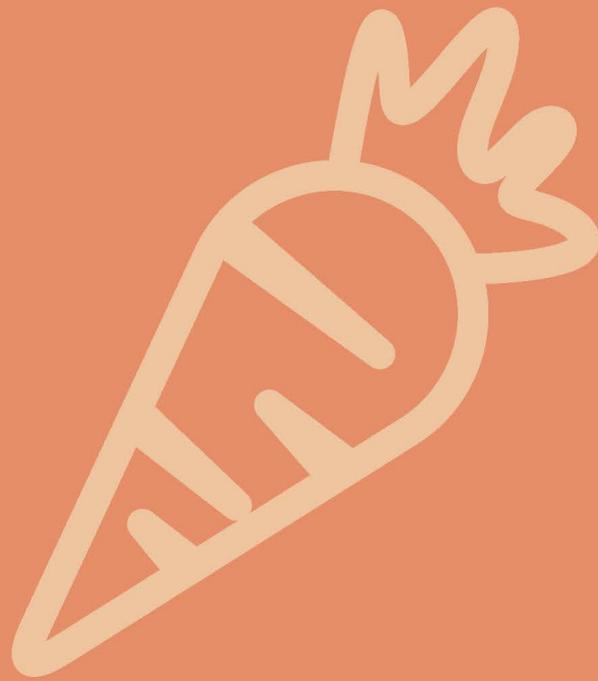
Active Collaborators:

- Stopwaste
- Ecology Center

Resources:

- Wisdom Supply
- Terracycle
- Recology
- Fix-It Cafes

FOOD



VISION: BUSD students are served nutritious, organic, locally-grown, humane, freshly-prepared meals in the cafeteria, and are educated about their food choices and the impact those choices have on their health, the community and the environment.



OBJECTIVES

- Promote the successful school garden programs and innovative practices of Nutrition Services, which includes cooking from scratch.
- Adopt the Good Food Purchasing Policy to further encourage cafeteria food that is organic, humane, plant-based and local.
- Provide opportunities in addition to garden programs to integrate food justice curriculum and healthy foods to students and parents.

Sustainable Food: Making the Case

The Board of Education recognizes that the sharing of food is a fundamental experience for all peoples; a primary way to nurture and celebrate our cultural diversity; and an excellent bridge for building friendships and intergenerational bonds.” – *BUSD website*

Healthy organic food has a variety of benefits:

- For some BUSD students, the food that they are served at school is the only healthy food they eat all day. When students eat healthy meals they learn and focus better.

- Industrial agriculture carries a number of negative ramifications, from polluting soil to contributing to air and water pollution resulting from overuse of machinery and chemical fertilizers polluting local waterways.
- Eating food together is universally recognized as an essential way to build community.

Animal-based food production plays a huge role in climate change by requiring huge amounts of water and spewing tons of greenhouse gas emissions. For example, Friends of the Earth's recent analysis of school foods showed that hot dogs are extremely carbon intensive, generating seven times the carbon footprint of a tofu & veggie rice stir-fry.

According to a 2016 *Menus of Change* report from the Culinary Institute and Harvard's School of Public Health, a diet emphasizing plant foods "*is the single most important contribution the food service industry can make toward environmental sustainability.*"

School Lunch Initiative

"One of the first programs of its kind, the School Lunch Initiative, created in 2004, was based on the hypothesis that "if young people are involved in growing, cooking, and sharing fresh, healthy food while learning about it in the curriculum, they will be more likely to develop lifelong healthy eating habits and values consistent with sustainable living." (School Lunch Initiative website).

BUSD's School Lunch Initiative has won accolades for its commitment to serve locally-sourced nutritious meals. Parents in the 1990's successfully brought salad bars and locally-made food into the schools, and in 1999 BUSD became the first district in the country to have a food policy that recommended soda machine bans and replacing processed foods with wholesome ones. In 2004, BUSD, the Center for EcoLiteracy, Alice Waters and the Chez Panisse Foundation (now the Edible Schoolyard Project) formed a partnership to develop the School Lunch Initiative, focusing on cooking cafeteria food using raw and unprocessed ingredients. Thanks to the leadership of Director of Nutrition Services Bonnie Christensen, this achievement has continued to this day. Other accomplishments include:

- Salad bars in all of our schools
- Hormone and antibiotic-free milk
- Fresh fruit and vegetables served daily
- A majority of our food is now purchased locally
- Whole-grain pizza crust
- 25% of our produce is organic, including sliced bread and dinner rolls
- All hamburgers and hot dogs are natural and grass-fed

Good Food Purchasing Policy and Other National Initiatives

The Good Food Purchasing Program is a non-profit organization that works with school districts to transform the way they purchase food, focused on five core values: local

economies, health, a valued workforce, animal welfare, and environmental sustainability. Their support includes technical support, a verification system and other comprehensive tools to help districts meet their goals. The recommended goal of adopting the Good Food Purchasing Program will help the District to promote their existing policies while supporting efforts to provide more organic, healthy, locally-made food while creating less waste.

Both San Francisco and Oakland Unified have adopted Good Food Purchasing policies. The Oakland switch was relatively simple given that the school district already had health- and environment-focused programs in place including Lean and Green Wednesdays and California Thursdays (a program mandating that only food grown in California be served on Thursdays).

The OUSD Nutrition Services Department's primary focus was to buy less meat and cheese and to purchase more plant-based proteins. "By increasing the district's fruit, vegetable, and legume purchases by 10 percent, reducing its meat and dairy purchases by 30 percent, and improving the quality of its meat by buying organic grass-fed beef from retired dairy cows in Northern California, FOE found that OUSD reduced its carbon footprint by 14 percent, reduced its water use by nearly 6 percent, spent 1 percent less per meal, and saved \$42,000 in the process." (Good Food Purchasing website).

The National Farm to School Network is another resource that provides support to connect and expand the farm-to-school movement across the United States. Joining the Network would be very useful in supporting the Plan's stated goal to secure more food from local farms.

The City of Berkeley's Green Monday Initiative

BUSD has the opportunity to follow in the City of Berkeley's footsteps through its recently adopted Green Monday policy. According to a press release from the City of Berkeley's website, "Green Monday certificates will be issued to restaurants featuring vegan items on their menus. All facilities owned and or managed by the City of Berkeley will provide plant-based foods on Mondays (or another day of the week), and the Council itself will procure vegan food for its meetings. Public programs, posters, and literature on the environmental advantages of plant-based food choices will be featured at libraries, and community centers around town.

Many other school districts across the country have adopted Meatless Mondays (which are not necessarily Vegan), with Oakland Unified choosing Wednesdays to serve strictly vegetarian food.

BUSD Garden and Cooking Programs

All of BUSD schools are blessed with an edible garden, run by the Garden and Cooking Program for the past 20 years. The program provides instruction to all K-8 students and a wonderful opportunity for students to be outside to get their hands dirty and learn about gardening, nutrition and environmental stewardship. Art, English language learning strategies, science and other subjects are all woven into the curriculum, which was developed a few years ago. It also provides nutrition and sugar awareness lessons

with healthy, garden-fresh cooking activities. Other programs include after school nutrition and cooking classes and family nights at some schools, inviting students to bring their families to prepare and share a healthy meal.

Another BUSD gem is a college and career pathway program at Willard Middle School called *Growing Leaders*. The program's many elements include 6th grade cooking and gardening, an entrepreneurial class in which students cook and sell a meal (proceeds are reinvested back into the program), a teen summer employment program, and high school mentoring.

The Edible Schoolyard Project and Garden Program are collaborating to pilot test a Career Technical Education public health pathway which includes cooking demonstrations and nutrition education campaigns at Berkeley High School. This is an exciting opportunity with many potential projects, including students preparing snacks for fellow BHS students.

Local Field Trips

In addition to its school gardens, Berkeley's plethora of local farms provide further opportunities to take local field trips to learn about local farms. The Gill Tract Community Farm, UC Berkeley Student Garden and Urban Adamah are local organic farms all within Berkeley's city limits. They could potentially offer affordable and convenient ways for students to be further inspired and learn about urban agriculture and where their food comes from.

Objectives and Actions

OBJECTIVE ONE: Promote the successful school garden programs and innovative practices of Nutrition Services, which includes cooking from scratch.

Actions:

- Promote existing cooking from scratch practices from Nutrition Services.

OBJECTIVE TWO: Adopt the Good Food Purchasing Policy to further encourage cafeteria food that is organic, humane, plant-based and local.

Actions:

- Assess the percentage of organic food in cafeterias and determine feasibility of switching all "Dirty Dozen" produce to organics
- Collaborate with the Berkeley Food Policy Network to begin studying the Good Food Purchasing Policy; perform the baseline assessment and develop a multi- year plan for incremental improvement.
- Update procurement guidelines to enable more direct purchasing from local, organic farms.
- Study the feasibility of participating in the California Farm to School Network. Join the Network if feasible.

- Study the feasibility and benefits of participating in the Meatless Mondays program promoting the environmental and health benefits of a plant-centric diet. Participate if feasible.
- Update the Wellness Policy to include bold language related to the health of our children, the environment and sustainable practices.

OBJECTIVE THREE: Provide opportunities in addition to garden programs to integrate food justice curriculum and healthy foods to students and parents.

Actions:

- Promote local field trips and community service opportunities to nearby community gardens and farms.
- Support professional development opportunities to integrate topics related to food justice and healthy foods into relevant subject areas.
- Support the development of a Green Classroom model, which encourages classrooms to develop a low-sugar policy for class celebrations.

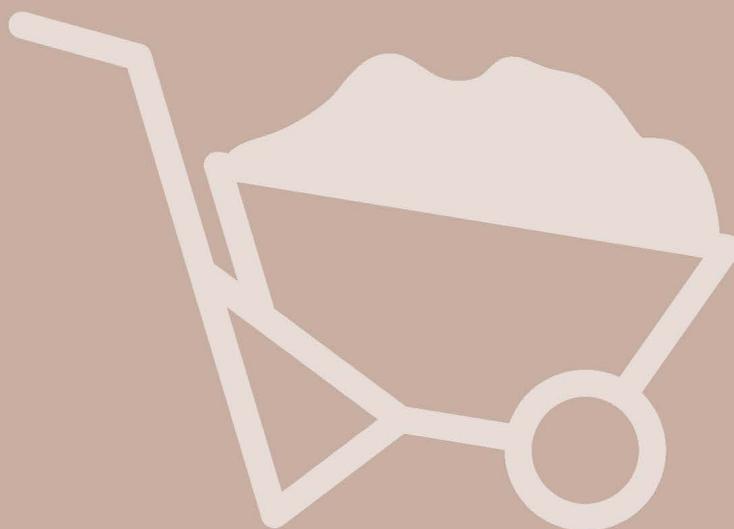
Active Collaborators:

- Edible Schoolyard Project
- Ecology Center
- Berkeley Food Policy Network

Resources:

- Good Food Purchasing Network
- Farm to School Network
- Center for EcoLiteracy
- Gill Tract Community Farm
- Urban Adamah
- NorCal Resilience Network

SCHOOLYARDS



VISION: BUSD’s schoolyards are dynamic, multi-use, nature-filled public spaces that improve the well-being of children and the environment at the same time.



OBJECTIVES

- Develop design standards that create schoolyards that are environmentally-friendly and nature-based places.
- Integrate smaller schoolyard projects into science and other classes to encourage project-based and hands-on learning, including pollinator gardens, Food Forests, natural building projects and sheet mulching.
- Develop a long-term policy and funding sources for living schoolyards, including outdoor classrooms.

Well-designed living schoolyards model the ecologically-rich cities we envision for the future, at a smaller scale, and serve as hands-on classrooms that can teach the next generation how to live in an environmentally responsible way.” – *Sharon Danks, Green Schoolyards of America Executive Director and BUSD parent*

Green Schoolyards: Making the Case

Green schoolyards (also called “living schoolyards”) are multifunctional outdoor areas within a school that enforce strong connections to nature in the community. They can include outdoor classrooms, bee farms, storm water capture, vegetable gardens, greenhouses, renewable energy projects, material reuse programs, nature trails, and much more. They also provide teachers with a convenient way to immerse students in the natural world, right outside the classroom door - an added bonus for Berkeley’s students, many of whom do not have access to nature on a regular basis.

Research demonstrates that learning outdoors, surrounded by nature, has a diversity of benefits for students and staff alike. According to the Green Schoolyards of America website, a living schoolyard:

- encourages academic success
- lowers levels of stress
- improves the overall health of students
- inspires children to lead an eco-friendly lifestyle
- develops and strengthens relationships with nature
- educates students about real-life environmental issues and real-life solutions
- is a valuable asset to ensure the success of children’s social-emotional learning

Asphalt Playgrounds

Schools were built to be functional, and the easy and inexpensive method was to install asphalt for the outdoor areas. Asphalt is a non-renewable source that also has proven to be much hotter than natural surfaces, which will become more and more problematic as temperatures rise from climate change.

“By transforming these asphalt covered schoolyards into park-like environments, we can plant trees to shade and cool hot asphalt and reduce energy costs in adjacent buildings, while also improving the watershed by absorbing rain water,” Sharon Danks noted.

Examples of Green Schoolyards

Rosa Parks Elementary is one example of how a little funding and parental support can go a long way. They were fortunate enough to have Green Schoolyards Director Sharon Danks as a parent for several years. She began the work in 2006 with the PTA for several years to design a living schoolyard, supported by students’ ideas. The result is a schoolyard that boasts a pond, pollinator gardens and a variety of fruit trees, all on a bare-bones budget. Science classes often use the pond for their lessons, while during recess it’s a popular place for kids to hang out by the rocks and observe the wildlife. The school hosts work parties several times each year to maintain and work on various elements of the much-loved schoolyard.

John Muir Elementary is home to Harwood Creek, a special place where students can be seen working on art projects, participating in hands-on science experiments, writing in journals, or just playing a fun game of hide and seek. Twenty years ago the creek was overrun by weeds and not used at all by the school until Berkeley-based non-profit Kids for the Bay stepped in to help turn it into the vibrant habitat that it is today. They weeded out the invasive plants, cleaned up the area, and created a butterfly garden and freshwater pond. It became a “magical place”, as many parents have described it. “The creek is amazing and inspires so much that happens at school,” commented one parent on Berkeley Parents Network.

Small-Scale Schoolyard Projects

While Transforming schoolyards is a long-term goal, there are many projects that schools could undertake which require very little funding. For example:

- Rain water catchment systems can serve the dual purpose of storing rain water for schoolyard plants and the garden, while educating students about water conservation. Jefferson Elementary received grant funds to install a system, which it installed through a work party which educated students and parents about water conservation. Rosa Parks Elementary also received a grant to install a 2500-gallon system, which it uses for its garden.
- Installing Pollination Gardens are another popular and easy school project which are wonderful teaching tools. Students can learn the science of pollinators while improving their schoolyard.
- Compost bins on schoolyards teach students about how to make soil.
- Many schools have also undertaken sheet mulching projects as part of their classroom learning, a technique designed to suppress weeds, improve soil health and reduce the need for irrigation.

Long-Term Funding for Green Schoolyards

Many green schoolyard projects are large-scale and require an influx of funding to make them a reality. School districts are finding ways to fund them. For example, Oakland Unified has developed a partnership with the Trust for Public Land and Green Schoolyards of America to develop five pilot sites in lower-income schools. Using outside funding, the schools will be transformed into park-like outdoor learning environments with trees, gardens and natural materials.

Other potential sources for larger funding include Proposition 68, a parks bond that includes schoolyards if they stay open to the public on the weekends, and Cal Fire grants for tree planting projects.

San Francisco Unified has passed bond measures totaling \$14.5 million dollars, completing green schoolyard projects at more than 30 schools. Projects range from removing asphalt from a schoolyard and replacing them with ponds, trees or gardens, to building outdoor classrooms and gathering spaces for students looking to play in natural settings during recess.

Objectives and Actions

OBJECTIVE ONE: Develop design standards that create schoolyards as environmentally-friendly and nature-based places.

Actions:

- Showcase school sites with existing green schoolyard projects and promote curriculum resources that support green schoolyard learning.
- Increase permeable surfaces and tree cover when modernizing schoolyards.

OBJECTIVE TWO: Integrate smaller schoolyard projects into science and other classes to encourage project-based and hands-on learning, including pollinator gardens, Food Forests, natural building projects and sheet mulching.

Actions:

- Encourage sites to work with Facilities Department to implement small-scale projects.
- Promote lesson plans that use schoolyards as outside learning spaces.
- Support professional development for teachers to integrate small-scale schoolyard projects into their existing curriculum.
- Work with local permaculture designers to collaborate with teachers on smaller-scale design projects.

OBJECTIVE THREE: Develop a long-term policy and funding sources for living schoolyards, including outdoor classrooms.

Actions:

- Research funding sources and develop a priority list of plans, including potential for projects to be paid for by future bond measures.
- Develop long-term and large sources of funding for larger-scale green schoolyard projects, including outdoor classrooms and natural building projects.

Active Collaborators:

- Edible Schoolyard Project
- Green Schoolyards of America

Resources:

- San Francisco Unified School District's Green Schoolyard Program
- EBMUD (for water conservation Projects)
- NorCal Resilience Network
- Common Vision (fruit tree planting)

ECO-LITERACY & NATURE BASED EDUCATION



VISION: All students are environmentally-literate, frequently exposed to nature-based instruction and educated about climate change solutions.



OBJECTIVES

- Create a comprehensive Eco-literacy plan that outlines a scope and strategy to integrate environmental and climate change topics across all subject matters.
- Integrate project-based learning to complement small-scale sustainability projects.
- Students participate in at least one nature-based field trip at each grade level.
- All middle and high school students receive at least one lesson or academic experience in climate change each year.
- Integrate environmental topics into professional development opportunities for BUSD staff.

Eco-Literacy: Making the Case

Ecoliteracy is a term coined by environmental educator David Orr and Physicist Fritjof Capra as “The ability to understand the natural systems that make life on earth possible. To be eco-literate means understanding the principles of organization of ecological communities (i.e. ecosystems) and using those principles for creating sustainable human communities.”

Besides the stated urgency to educate BUSD students on the how’s and why’s of taking care of our natural world, environmental education also has a multitude of other well-researched benefits, from their social-emotional well-being to physical health to academic achievements:

Eco-literate schools demonstrate better academic performance across the curriculum and offer all students equal chances for academic success.

Schools that adopt environmental education as the central focus of their academic programs frequently demonstrate the following results:

- Reading, science, social studies, and mathematics scores improve.
- Students develop the ability to transfer their knowledge from familiar to unfamiliar contexts.
- Students “learn to do science” rather than “just learn about science.”
- Classroom discipline problems decline.
- All students have the opportunity to learn at a higher level.

Ecoliteracy Helps Build Critical Thinking and Relationship Skills.

Environmental education emphasizes specific critical thinking skills central to “good science”—questioning, investigating, forming hypotheses, interpreting data, analyzing, developing conclusions, and solving problems. The subject matter is standards-based, but students are learning it by tackling real-world projects as opposed to merely doing workbook exercises. Excerpted from: *Archie, M. (2003). Advancing Education through Environmental Literacy. Alexandria, VA: Association for Supervision and Curriculum Development.*

Ecoliteracy Instructional Strategies Help Foster Leadership Qualities and learn how to be Real-World Problem Solvers.

Environmental education emphasizes cooperative learning (i.e., working in teams or with partners), critical thinking and discussion, hands-on activities, and a focus on action strategies with real-world applications. As a result, students who study environmental education develop and practice a plethora of leadership skills, from promoting actions that serve the larger good to connecting with the community to listening to and accepting diverse opinions. *Excerpted from: The North American Association for Environmental Education (NAAEE) and The National Environmental Education Foundation (NEEF). (2001). Using Environment-Based Education to*

The average American child under 8 spends more than 2.5 hours per day behind a screen, and tweens and teens spend an average of 6 hours per day using social media, playing video games or watching TV. These same children spend an average of 20 minutes per day outside.

Advance Learning Skills and Character Development.

Nature-Based Learning

School Gardens and Grounds: Taking students into nature right outside of their classrooms is the easiest and most affordable way to give students a daily dose of nature. The Schoolyards section outlines options for further developing schoolyards as nature-filled areas, from building outdoor classrooms to creating pollinator gardens. Some schools also keep their gardens open at recess a few days a week to encourage students to spend more time in these beautiful spaces.

Outdoor Education: The majority of elementary schools participate in an overnight outdoor education trip. Students spend the week immersed in nature as they learn about the natural environment through hands-on experiences.

Day-long Field Trips: The Berkeley Marina, Tilden Park and other East Bay parks are some of the many nature-based field trips available to Berkeley students.

Climate Change Education

Today's students must be well equipped to face the ugly realities of climate change. While the Plan outlines many ways that students will get engaged in climate solutions, learning the facts about climate change is also essential. Berkeley High School's environmental science classes already tackle this subject, while many students also learn about it in their science classes. However, no professional development is offered for teachers, and teachers must search for lesson plans on their own if they do want to include it as part of their curriculum.

Development of an Eco-Literacy Plan

Integrating environmental science into all subjects will show how actions in parts of our lives impact the other facets. Environmental literacy can be embedded in existing instructional programs through teacher and staff professional development and by partnering with community-based environmental education providers. Students' understanding of the links between climate and the social, cultural and economic challenges we face in the 21st Century will prepare them to become leaders of our global future.

Next Generation Science Standards

The newly-adopted Next Generation Science Standards (NGSS) offers an excellent opportunity to further sustainability themes into existing curriculum. They contain a major content focus related to energy, climate, sustainability and the natural world.

The Plan recommends working with the K-8 Science Coordinator to include NGSS in the above-mentioned Eco-Literacy Plan.

Objectives and Actions

OBJECTIVE ONE: Develop a comprehensive Eco-literacy plan that outlines a scope and strategy to integrate environmental and climate change topics across all subject matters in all grade levels.

Actions:

- Meet with Change Scale, Lawrence Hall of Science and Director of Schools to discuss development of and funding for eco-literacy plan, including professional development opportunities.
- Work with K-8 Science Coordinator to evaluate and promote sustainability topics in NGSS standards.

- Work with BFT and other partners to organize a panel discussion about the value of eco-literacy.
- Promote outside partners offering eco-literacy topics, and develop a speakers' bureau for presentations.
- Work with BHS to develop lessons for U-9 about sustainability.
- Work with Career Tech Education to assess feasibility of integrating sustainability into selected career pathways.
- Pilot test eco-literacy plan.

OBJECTIVE TWO: Integrate environmental topics into Professional Development opportunities for BUSD staff.

Actions:

- Work with professional development department to develop series of PD opportunities with environmental themes, including climate change education.
- Promote or co-host Summer Institute with a sustainability focus, in collaboration with Lawrence Hall of Science.
- Establish a Sustainability Teacher Leaders at each site.
- Collaborate with Bay Area Wilderness Training to provide training for teachers to take students on wilderness trips.

OBJECTIVE THREE: All middle and high school students receive at least one lesson about climate change each year.

Actions:

- Collaborate with Alliance for Climate Education and other non-profits to develop climate change education for students.
- Incorporate climate change lesson plans into curriculum.
- Integrate sustainability themes into after school program.

OBJECTIVE FOUR: Students participate in at least one nature-based field trip at each grade level.

Actions:

- Work with the high schools to promote community service projects that are nature-based.
- Explore funding opportunities for nature-based field trips, including overnight field trips.

Active Collaborators:

- Kids for the Bay
- Community Resources for Science

Resources:

- Center for EcoLiteracy
- ChangeScale
- The North American Association for Environmental Education

STRATEGIES

Sustainability Committee

The Plan recommends forming a Sustainability Committee that meets regularly to discuss the Plan's objectives and implementation. The committee will be tasked with further developing sections of the Plan. We recommend a diversity of stakeholders represented on the committee, including but not limited to BUSD staff, parents and students.

The committee may also draw upon the expertise of interested community groups, local subject matter experts, and BUSD staff for specific topics.

Communications

Communications about the Plan will be a crucial component. The Plan recommends:

- Further integration of Sustainability Plan messaging into the BUSD website
- Development of a website that houses comprehensive BUSD sustainability resources
- A monthly column in the A+ newsletter that highlights inspirational stories about sustainability projects and provides tips for eco-friendly practices
- Creation of posters for specific District-wide initiatives, starting with zero waste, disseminated to classrooms and offices

Community Engagement

Community engagement will be another core strategy which will cross departments, stakeholders and the BUSD community.

Green Teams: Schools and Beyond

Many BUSD schools have already formed Green Teams, created primarily to support waste reduction efforts. Driven by parents, they have served to both support staff in their efforts as well as organize new projects. Jefferson parents, for example, have been very active in day-to-day waste projects and have organized a school-wide Earth Day event each year, while at Sylvia Mendez parents have transformed the school culture to embrace the 4 R's.

The Plan recommends:

- Supporting existing parent-led Green Teams while encouraging other school staff and parents to join.
- Encouraging the formation of new Green Teams both in schools where they do not exist, and in District offices. For example, the Facilities Department and District Administration offices could form Green Teams to encourage more sustainability practices and participation in District-wide initiatives such as the 2019 Zero Waste Campaign.

Green Schools

The Plan calls for developing criteria toward which schools can work to qualify as Green Schools. The criteria include practices in all topic areas. The Sustainability Committee and staff could also provide support for schools who wish to apply as a Green Ribbon School, a federal government program awarded to schools who have demonstrated exemplary sustainability practices through both curriculum and facilities.

The Plan recommends that Sustainability Committee develops a whole-school strategy, which includes a criteria and process that can be pilot tested after it is developed. Green Schools will require the robust support of principals, so their feedback about this strategy will be critical. The Eco-Schools Program and Green Schools Alliance are two organizations that have developed criteria and best practices for schools who want to engage their community in sustainability projects and practices.

Examples of Green School Criteria

Infrastructure and Operations

- Ample bike racks
- Green Schoolyard features: drought tolerant landscaping and pollinator gardens

Teaching and Learning

- Support for nature-based field trips
- Integration of environmental topics into curriculum

Culture and Implementation

- Lunchtime Monitoring program
- Participation in Zero Waste Challenge and other District-wide initiatives
- Resources about sustainability provided on school website

Green Classrooms

As the Plan encourages eco-friendly action in all classrooms and schools, the classroom-by-classroom approach will serve to empower individual teachers and students to make sustainable choices. Plan staff hopes to develop and pilot test the Green and Healthy Classroom model with the support of the Sustainability Committee.

Examples of Green and Healthy Classrooms Activities

Waste:

- Conduct a waste audit at the beginning of the school year to determine how much trash is being generated and how well students are sorting.
- Create Waste Monitor student job(s) that reminds students to sort their waste properly.
- Buy a Party basket with reusable plates and utensils for class parties.
- Work with Wisdom Supply to support purchasing waste-free supplies, such as refillable markers, and woody pencils.
- Have students keep water bottles at their desks.

Water and Energy Consumption:

- Create a conservation monitor that reminds students to shut off water and be conscious of their water and energy usage.
- The same monitor can remind students to turn off lights when not in use
- Turn off computers at the end of the day.
- Be sure not to hang pictures on the windows, so that natural light can more easily shine through.

Food:

- Develop a low-sugar snack policy for the classroom.
- If possible, install a garden box outside your classroom and grow a mini garden.

Transportation:

- Participate in Safe Routes to Schools activities to encourage walking, biking, carpooling and taking school buses (or public transit) to school.

Outside the Classroom Nature-based and Service Learning:

- Organize a monthly school clean-up on your yard.
- Organize at least one field trip that involves community service.
- Teach at least one lesson outside the classroom.
- Go on at least one nature-based field trip.

Eco-Literacy:

- Have an ample supply of books with nature- and environmental-based themes.
- Integrate environmental topics into subjects as much as possible, from writing topics to science.

Funding

Some elements of the Plan will cost money; others will save money. The Sustainability Committee will work to develop a more comprehensive strategy that analyzes how to secure funds in each topic area. The following is a summary of some funding streams that have helped other districts to pay for their sustainability programs:

Shared Savings

Many school districts have implemented shared savings programs, whereby the savings from site based waste and energy initiatives go directly back into supporting the Sustainability Program, after paying back the General Fund for its initial upfront costs.

Private Foundations:

Many District Sustainability Departments have been successful in writing grants to pay for projects. Here are a few of the many private foundations who provide funding for environmental education and green schools projects:

- Captain Planet Foundation
- State Farm Youth Advisory Grants
- Kids in the Game Youth Advisory Grants
- Mazda Foundation grants
- Lowe's Toolbox for Education grants
- Target Field Trip grants
- Project Learning Tree grants

City of Berkeley: Given the commitment of the City of Berkeley to sustainability and the potential of the Plan to reach thousands of parents, it is recommended to request funding from the City of Berkeley for any initiatives that can be organized on both a city and District level, starting with waste.

Other Government Funding:

Many county and state agencies have funding for specific areas. Given Governor Brown's recent resolution to have California become carbon-neutral by 2045, more funding for sustainability and resilience will undoubtedly be coming down the pipeline. Here are a few current funding sources:

Electric School Buses:

- Bay Area Air Quality Management District
- California Energy Commission
- PG&E or Alameda Clean Energy
- Low Carbon Fuels Standard credits

General Environmental Education Programs:

- U.S. EPA Regional Funding
- Coastal Commission Whale Tail grants
- Office of National Marine Sanctuaries
- CA State Coastal Conservancy Grants
- NEA Foundation Student Achievement Grants
- DEA Professional Development Grants

IMMEDIATE NEXT STEPS

Many of the recommendations in this Plan are longer-term, big-ticket items that will require further study. Some recommendations are ready for action:

- With grant funding already obtained from the Altamont Advisory Board and Stopwaste, hire Consultant Silber to begin implementing the Pan's waste reduction recommendations.
- The Plan recommends forming a Sustainability Committee that meets regularly to discuss the Plan's objectives and implementation. The committee will be tasked with further developing sections of the Plan and determining funding requirements. The Committee may recommend that the District hire consultants specializing in particular areas.
- Launch a Turn It Off Campaign, with expected savings at each site.
- Research and install water projects including Smart irrigation controllers, rain gardens, bioswales, and water catchment.

Fiscal Impact: January 2019-June 2020

Sustainability Consultant (waste reduction): \$20,000

Sustainability Consultant (all other sustainability categories): \$49,000

Turn It Off Campaign Materials: \$1,500

Sustainability Committee and Plan Launch: \$2,500

Teacher Leader Compensation: \$8,000

Water section upgrades: \$25,000

TOTAL: \$106,000

Funding Sources*:

Waste Reduction Grants: \$20,000

Measure H (Water section upgrades): \$25,000

Measure H (Sustainability Consultant fees): \$8,000

Measure I (Sustainability Consultant fees): \$12,000

General Fund: \$41,000:

- FY 2018-2019 \$14,000

- FY 2019-2020 \$27,000

*Consultants scope will include securing additional funding which can offset the General Fund's portion.

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Community Groups:

Safe Routes to Schools - Leslie Lara-Enriquez)
Ecology Center - Martin Borque and Amy Kiser
Stopwaste - Angelina Vergara
Factory Farming Awareness Coalition - Amy Halpern-Laff
Lawrence Hall of Science - Craig Strang and Vanessa Lujan
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Edible Schoolyard Project - Alice Waters and Angela McKee-Brown
Green Schoolyards America - Sharon Danks
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