



Santiago STEAM Magnet Elementary

California Disadvantaged School Nominee to
U.S. Department of Education Green Ribbon Schools



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PART II – SUMMARY OF ACHIEVEMENTS

Santiago STEAM Magnet Elementary School, Lake Forest, Calif.

Project-Based Learning Gives Students Agency in Sustainable School Practices

Santiago STEAM (Science, Technology, Engineering, Arts, and Math) Magnet Elementary School (Santiago STEAM) develops customized High-Quality Project Based Learning units to give students the agency to develop real-world solutions for issues directly affecting the school site. Student-developed and led initiatives include waste diversion and site-wide conservation efforts guided by research in collaboration with local experts. The school is improving decades-old infrastructure with eco-conscious upgrades in water-efficient fixtures, Light Emitting Diode (LED) indoor/outdoor lighting, and heating and ventilation. School volunteer-led initiatives include the addition of efficient aerators to all sinks, highly water-efficient all-native gardens utilizing bioswales and soil remediation techniques, three-quarter acres of restored wildlife habitat and ecological learning spaces, a Green Parent Teacher Association (PTA) policy including equitable low or no-waste events and programming, and the diversion of 70 tons from the landfill by using reclaimed materials for the construction of outdoor learning environments. All students partake in a positive behavior reinforcement program that recognizes good behavior with experiential rewards like recycling helper, lights-out leader, campus cleanup day, picnic lunch with a friend or teacher, and outdoor class sessions. The school prioritizes environmental quality in its indoor and outdoor environments. Each classroom offers two full-length windows with views of nature and two doors with access to an open-air courtyard. Students have a fluid boundary, meaning that in many cases, they are welcome to step outside for a breathing break or take a moment in nature to re-center and find focus. In addition, the school planted an orchard to surround the school's shaded outdoor cafeteria space, allowing students to observe the life cycle of the fruits they enjoy in their daily lunches. Due to the project-based focus of the school, business professionals frequently make guest appearances and hold question/answer sessions related to project units. Recent examples include inventor-entrepreneurs, engineers, wildlife biologists, botanists, and tribal leadership. At Santiago STEAM, the entire local community comes together to support best ecological practices.

PART III – DOCUMENTATION OF STATE EVALUATION OF DISTRICT NOMINEE

Pillar I: Reduce Environmental Impact and Costs

Element IA: Energy

- In 2016, Santiago STEAM was a part of a comprehensive sustainability audit to identify strategic areas for energy savings. Goals identified include: reducing energy and water consumption; using renewable and clean energy technologies and alternatives when available; using environmentally preferable products and services whenever practical; ensuring that any construction of new facilities complies with green building standards; and reducing vehicle emissions.
- The school documents a 9% reduction in greenhouse gas emissions between 2021 to 2022 using the Cool Climate Calculator from the University of California at Berkeley. The school used data from billing histories, average employee commutes, and a school waste audit to perform the calculation.

- In 2016, the school replaced interior lighting with more efficient bulbs using Southern California Edison's Schools Energy Efficiency Program funding. In 2022, Santiago STEAM used Proposition 39 (California Clean Energy Jobs Act) funding to retrofit all outdoor lighting to high-efficiency LED bulbs.
- On-site renewables serve as student demonstration sites for project-based learning initiatives. Installations include solar-powered fountains, garden lighting, and a student-built solar generation station.
- The school purchases energy from its local electric utility, Southern California Edison (SCE). SCE reports that nearly half (48 percent) of the utility's delivered power mix was carbon-free: 34 percent from renewable power sources: solar, geothermal, and small hydro.
- In 2019, Santiago STEAM painted all its roofs with a white polymeric coating to reduce the heat island effect. In addition, Santiago STEAM has trees around school buildings to aid with roof heat. Those trees also shade the courtyards year-round, and their canopies shade significant portions of the school's rooftops with Heating, Ventilation, and Air Conditioning (HVAC) units.
- Each year, sixth-grade students measure the temperature of the school's various surfaces to understand how human construction impacts the environment. Then students ideate improvements for the school to undertake. Past ideas include roof-top gardens, blacktop vs. concrete, white roofs, and dirt areas vs. vegetation areas.
- During the 2022 – 2023 school year, fourth-grade students collaborated with a local artist to design custom decals as part of their campaign to raise awareness about lighting use and the collective impact of individuals on the power grid. As a result, all classrooms now have "lights out" stickers on each light switch.
- The school's district, Saddleback Valley Unified School District (SVUSD), centrally controls its HVAC system via an energy management system. In addition, bi-annual cleaning and maintenance ensure units are working at their highest energy efficiency.

Element IB: Water and Grounds

- Santiago STEAM documents a 43% reduction in indoor water use and an 8% reduction in outdoor water use from 2018 to 2021. The school attributes its indoor water conservation to high-efficiency aerators, low-flow toilets, and timer-controlled sinks. The indoor water system also features a leak-monitoring design and leak-detection notifications. Outdoor reductions are attributed to reduced watering times and fallowed land and offset by new plantings with efficient drip irrigation.
- The district controls outdoor water through a centralized, weather-based controller with flex sensing and auto-shutdown. The sports field is split into seven zones according to slope, shading, and sizing. Each zone has high-efficiency sprinkler heads with leak-detection sensors. In addition, surfaces not actively used for education or recreation are minimally irrigated or fallowed. The school maintains a net zero consumption for all newly landscaped areas on previously fallowed land. All new plantings are exclusively low-water native species and succulents. District staff also monitor daily overflow reports and adjust watering schedules seasonally.
- Santiago STEAM volunteers, the local water authority, and district staff have joined together to improve the water efficiency of the school's landscape. As a result, the school's outdoor water consumption is approximately 25% lower than any other school in the district and consistently 20-50% under the water district's budget guidelines.

- The school Garden Club recently expanded to become the STEAMGREEN Team. The club's initial focus was on the garden and outdoor learning spaces. In 2022, it expanded to include recycling programs, eco-friendly initiatives, and community events such as service days and a guest speaker series. To improve water retention, the school has made a concerted effort to raise soil quality and absorption rates. Santiago STEAMGREEN Team volunteers worked with University of California Agriculture and Natural Resources (UCANR) Santa Clara Master Composters to improve soil structure, increase absorption, and slow the flow of water by:
 - Installing 9.5 tons of compost and 15 cubic yards of mulch to improve soil water retention capabilities and regenerate topsoil strata.
 - Installing permaculture bioswales across a large swathe of the campus, and currently constructing two rain gardens.
 - Utilizing Australian drought-alleviation soil improvement methodology of horizontal trenching to slow downhill flow and improve local retention.
 - Installing strategic drainage systems redirecting water to a newly created dry creek bed and permaculture retention area.
 - Installing two new outdoor classroom sites that utilize permeable flooring materials.
 - Reducing unprotected soil (with mulch or ground cover) by 20%, covering approximately half an acre.
 - Creating two turf replacement zones and planting native ground cover as an alternative to grass.
 - Planting water-wise, deep-rooted native plants such as coastal live oak, Engelmann oak, toyon, lemonade berry, and native shrubs/flowers.
- In early 2022, sixth-grade students invited the local water authority to collaborate on a project on water efficiency. Together the students and the water authority performed an efficiency audit and set efficiency improvement goals. The audit and goals helped the school design efficient drip irrigation and spray coverage for all new planting areas. The audit also verified that Santiago STEAM could use recycled water. In addition, the water district provided students with take-home kits to educate household members about domestic water efficiency and leak detection.
- All play structures have bark underneath for a safe, permeable landing surface. Additionally, the school removed 1000 square feet of asphalt and repurposed the area into an outdoor learning space built with porous materials.
- Students invented an interactive Water Recycling Station for leftover drinking water installed in a high-visibility area at the main entrance/exit of the school. The student-inspired installation draws attention to how small water-saving efforts can make a significant impact. The station is a funnel over a small network of pipes. After school, students can empty their reusable water bottles at the station to water the garden.
- In Spring 2022, graduate students at California State Polytechnic University (Cal Poly), Pomona School of Environmental Design performed a water flow analysis of the school property. As a result, they made further recommendations, which are the basis for the next phase of the school's garden expansion.
- With every newly landscaped area, Santiago STEAM makes decisions to ensure they are inviting, meet specific curriculum needs, and contribute to a biodiverse learning environment. Approximately 20% of the school's 9.2 acres are ecologically beneficial grounds, with an additional 40% slated for rehabilitation in the next two years.

- Santiago STEAM STEAMGREEN Team created a student-envisioned Healing Rainbow Garden at the school entrance featuring upcycled art installations, a relaxing water feature, an interactive water recycling station, and 13 native aromatherapeutic specimen plants labeled with scientific names and a custom webpage for each species.

Element IC: Waste

- The school documents a 50% waste diversion rate from composting and recycling between 2021 and 2022.
- Santiago STEAM is a dedicated Master Composter Outreach Site where a UCANR Santa Clara Master Composter works directly with students year-round. Under the guidance of the master composter, students designed a school-wide composting system/program as part of the second and fifth-grade Project Based Learning (PBL) project. Based on the student-generated plans and with the support of parent volunteers, the school now operates a three-bin thermophilic composting system, three compost tumblers, two hot pile composters, and a series of vermicomposting bins.
- Students in special education classes manage the day-to-day operations of the composting program with a student leader from each classroom. Second and fifth-grade students coordinate the educational and training elements of the compost program based on their in-depth project-based learning units on food recycling and the chemistry of composting.
- The school collects compost materials from school lunch waste, schoolyard green waste, after-school program waste, and school refuse (paper towels, shredded paper, and pencil shavings). In addition, Santiago's STEAMGREEN Team has partnered with a local goat farm to obtain supplemental nitrogen-rich layering materials and is piloting community-scale composting. Some examples include community pumpkin composting, a leaf compost drive, and serving as a ShareWaste host site.
- The school uses mature compost on-site to support school garden initiatives. The STEAMGREEN Team has also partnered with a local commercial composting facility to support the site's need for soil remediation. Volunteers brought in and laid 9.5 tons of compost and 15 cubic yards of mulching materials in the 2022 – 2023 school year alone.
- Students actively work to reduce the volume of consumable food waste as part of their project-based learning goals and in alignment with the Environmental Protection Agency's "Food Recovery Hierarchy." Examples of student contributions include the following:
 - All students offer consumable, unwanted food for recirculation at a food-share station at lunchtime and refrigerated between mealtimes.
 - Food waste that cannot be reused, but can be recycled, is used in the school's composting program. Students triage and collect food waste in small buckets daily, then count and add it to the composting bins. During the first three months of the 2022-2023 school year, Santiago STEAM has composted over 250 pounds of landfill-bound green waste.
 - Sixth-grade students collect consumable food waste, then weigh, track, and donate it to a network of local food pantries via a non-profit organizational partner. In the 2021 – 2022 school year, Santiago STEAM donated 295 pounds of consumable food (245 meals) to local food pantries.

- Kindergarten students collect used markers and monitor the level of beverage container recycling in dedicated recycling bins. When bins are full, Kindergarten students alert volunteers so they can collect, weigh, and recycle the contents.
- Each month, STEAMGREEN Team volunteers run an awareness campaign and family recycling drive surrounding a specific hard-to-recycle item. Past campaigns include books, coffee pods and grounds, candy wrappers, leaves, and sneakers. When possible, this links to a monthly guest speaker. For example, the STEAMGREEN Team volunteers installed a Little Library book trade box and invited families to stock it with old or unwanted books in all languages. Then the STEAMGREEN group hosted an event with the Orange County Public Libraries for a friendship-themed craft and story time.
- Santiago PTA has transitioned to environmentally conscious programming, which includes low or no-waste events and fundraisers. In addition, they also incorporate natural or upcycling requirements in contests and experiences as prizes.
- Santiago STEAM only keeps a minimal amount of potentially hazardous products on campus, such as batteries, Compact Fluorescent Lamp (CFL) bulbs, and aerosol cans. The school keeps these materials within a locked staff-only storage area. A partner organization, Teens Against E-Waste, collects and recycles used batteries as part of the One Million Batteries campaign. The school's plant foreman stores aerosol cans and lighting tubes in a locked storage room. Then he delivers them to the district office for proper disposal. The district also collects end-of-life e-waste and appliances as needed for recycling and proper disposal.

Element ID: Alternative Transportation

- School personnel conducted a bi-weekly observation/survey over two months of environmentally-beneficial methods of transportation students used to get to school. From the survey, the school recorded 45% of their students carpool, 40% walk, and 5% use human-powered modes of transportation (i.e., bike, scooter, skateboard).
- Santiago STEAM Magnet Elementary supports and promotes human-powered transportation to school through the following initiatives:
 - The PTA publishes a Suggested Route Map, in cooperation with the City of Lake Forest, highlighting crossing guards, traffic signals, and other helpful information for pedestrians.
 - The school offers a messaging platform to foster "walking teams" and carpool connections. While the school does not sponsor a formal "walking bus," school families have created an informal system to support each other's walking commutes.
 - The school installed a large new storage rack at the front of the school in 2021 to replace outdated bike storage.
 - Crossing guards are stationed at five locations at and near the school to service the growing number of walking/biking students and families. As a result of petitioning by the school's PTA, the City of Lake Forest employs three crossing guards. The school staffs a fourth and fifth crossing point with employees.
 - The school distributes Youth Free Ride city bus passes in partnership with the County's Transportation Authority. This program gives students free access to all county public bus services.
- To promote awareness for human-powered transportation, the school's PTA sponsored its first "2-wheel, 2-feet Tuesday" event on 2/2/2022. Building on that initial success, the

PTA has enacted a monthly “Walk & Roll (or Carpool) to School” program. On these days, the school notes a 40% increase in pedestrian traffic and carpooling and a 25% reduction in student tardiness.

- Santiago STEAM has made efforts to reduce the number of vehicles waiting for students and idling near school buildings. Families who commute by car are encouraged to carpool, park in nearby residential streets, and walk to school. On average, approximately only 45 vehicles per day opt to use drive-thru drop-off.
- Second-grade students, as part of their carbon footprint project unit, are leading the development of a no-idling policy for the school, complete with educational campaigns and newly designed signage. The 2022 – 23 school year is the first year of the program. The principal has pledged full support for the initiative and is committed to purchasing and installing permanent signage.

Pillar II: Improve the Health and Wellness of Students and Staff

Element IIA: Environmental Health

- Santiago STEAM and Saddleback Valley Unified School District (SVUSD) practice Integrated Pest Management (IPM) and strictly follow the California Healthy Schools Act. Santiago STEAM prohibits herbicides and uses herbicide-free methods such as manual removal, tilling, trimming, or regrading.
- Santiago STEAM avoids pesticide use and uses natural methods when possible. Sites are visually monitored continuously by staff and periodically by Healthy School Act-Certified third-party contractors. If the school identifies pests, the first approach is to remove food, fix leaks, and seal cracks. In the event of an infestation, the school will use glue traps or sealed bait stations. In addition, all floor drains feature a technology that allows for the downward flow of water and debris while blocking gasses, odors, and pests. The school also contracts a certified bee rescue and removal company to relocate bee hives in hazardous locations.
- The school district will only consider pesticides after careful monitoring indicates that all non-chemical methods are ineffective. At this time, they will use pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment. For example, Santiago STEAM’s site has received targeted chemical treatment for gophers, and the district is currently piloting a natural alternative using carbon dioxide. In each case, the school notifies the community with warning signage when they use pesticides at the school and retain records for four years.
- All student garden areas and outdoor learning spaces employ and teach organic gardening practices. Students monitor insect and animal populations during periodic biological surveys, during which they identify, document, and track observed species.
- Santiago STEAM follows district policy that prohibits the use of tobacco products, electronic cigarettes, or other devices that deliver a vaporized liquid at any time at all district properties or vehicles.
- The school has elemental mercury in trace amounts in fluorescent lighting tubes, which are stored and disposed of following hazardous waste protocols. Typical radon rates at the school are under 0.5 pCi/L (picocuries per liter of air), well below the 4.0 pCi/L threshold.
- Per district policy, Santiago STEAM has chemical management training that includes storage and labeling requirements, training and handling guidelines, and preferred

purchasing standards. In addition, the school is audited annually by a third party to ensure compliance.

- Ninety-five percent of the cleaning supplies used at the school are Green Seal Certified. In addition, Santiago selects educational products that are low/no- Volatile Organic Compounds (VOC), less toxic, and eco-friendly when possible. For example, in 2022, Santiago purchased film cameras and child-safe darkroom supplies for use with sixth-grade student projects. For developing the film, students use Caffenol C (washing soda, vitamin C, and instant coffee), diluted products for fixing, and soapy water for rinsing. All film products are free of carcinogens, non-biodegradable organic compounds, perfumes, or dyes.
- All routine chemicals used at the school are hydrogen peroxide or alcohol-based. In addition, the school selects supplemental products for specific needs from the Healthy Schools Act-approved products list, which is provided online to all families each year. Santiago STEAM prohibits teachers from requesting unauthorized cleaning products from back-to-school lists (i.e., Clorox wipes, baby wipes, and hand sanitizer).
- For safe handling of chemicals, janitorial staff undergoes annual IPM training. Additionally, janitorial staff complete product-specific training for each new chemical product introduced, including which Personal Protective Equipment (PPE) is required and recommended during use. Additionally, custodial staff use machine-diluted hydrogen peroxide solutions for two-step cleaning and sanitization of surfaces. Finally, the custodial team has training in green cleaning procedures and deep cleaning protocols using Environmental Protection Agency-approved cleaning supplies.
- Santiago STEAM takes extensive measures to minimize asthma triggers, such as frequent vacuuming, safer cleaning products, and allergen reduction strategies. In addition, the school prohibits using bleach and limits the use of fragranced products when possible.
- If mold or a suspicious odor appeared, the affected room would be closed, and classes relocated until third-party laboratory testing confirms the situation. Once necessary abatement is completed, students return to the affected room(s).
- District staff receive daily Air Quality Management District alerts and notify school sites of elevated particle pollution levels in the air. Certain outdoor or strenuous activities may be reduced or avoided depending on the air quality. For example, the school's lunch period or Physical Education (PE) classes may be indoors, and classrooms may open early to minimize time outdoors. In addition, the district is piloting Purple Air monitors to assess local air quality on campuses and fields.
- Santiago STEAM's STEAMGREEN Team volunteers, through partnerships with Shadetree Alliance, California Native Plant Society, and the local branch of a home improvement chain, have planted 100+ new trees and flora across the school campus since 2001. More than 50 of these plants and trees are species noted as having bioremediation properties, such as soil detoxification and removing particulate matter from the air.
- Each occupied indoor space has a Medify air filtration and fan system with High-Efficiency Particulate Air (HEPA) filters. HVAC filtration systems are centrally programmed to run two hours before students' arrival on campus and continue two hours after dismissal to increase classroom airflow and remove residual aerosols. In addition, all HVAC systems undergo twice-yearly maintenance, including installing new Minimum Efficiency Reporting Values (MERV) 13 filters and cleaning of coils and inside structures.

- Santiago STEAM takes a layered approach to protect indoor environmental air quality, including the following:
 - Every classroom features two large windows with permanent vents.
 - Classrooms have a centrally monitored thermostat and climate control system that draws excess moisture out of the air through a condensing and economizer system. Then the resulting water is recycled into landscaping. Relative humidity in classrooms has been periodically tested utilizing Raspberry Pi technology and found to be between 30-60%.
 - Each classroom has two opposing doors that open to the outdoors; when opened together, they provide a fresh cross-breeze to flush indoor air. In addition, HVAC systems intake 100% outdoor air exchange.
- Each classroom features two windows that span nearly the full height of the room, one facing an inner courtyard and one facing the school's perimeter. With trees and planters in each courtyard and trees and gardens around the school perimeter, each classroom offers two different perspectives on trees and nature. Natural light fills each classroom from both sides.
- Due to the date of construction (1972), SVUSD makes a conservative assumption that all painted surfaces (interior and exterior) at Santiago STEAM contain some lead. Therefore, contractors, workers, and subcontractors must comply with all applicable laws, rules, and regulations governing lead-based materials (including Title 8, California Code of Regulations, section 1532).
- The local water authority servicing Santiago STEAM Magnet Elementary meets all standards for lead in the United States Environmental Protection Agency Lead and Copper Rule. All water at Santiago STEAM comes from municipal water sources.
- In 2017, Santiago had drinking fountains tested by a National Environmental Laboratory Accreditation Program and American Association for Laboratory Accreditation Network to analyze for lead in the drinking water. The analysis didn't find any copper in any tested sources. However, testing detected that one drinking fountain contained lead. The school building utilizes copper piping; the lead source was determined to be inside the fountain, so the school replaced the entire unit.
- Santiago STEAM has coordinated campaigns to encourage the use of reusable beverage containers, including installing new refill stations and offering bottles and bottle stickers as prizes. As a result, ninety-three percent of students and staff now use reusable containers filled with drinking water from home.
- Santiago volunteers have covered approximately 30% of previously bare, exposed soil with two inches of compost and four inches of organic mulching material under the guidance of a UCANR Santa Clara Master Composter. This action drastically reduces large particulate matter stirred up in the wind and protects the topsoil layer. All surfaces under playground equipment are permeable, natural bark mulch.

Element IIB: Nutrition and Fitness

- Santiago STEAM participates in the United States Department of Agriculture (USDA) Department of Defense Fresh Fruit and Vegetable Program (USDA DoD Fresh) to use USDA Foods entitlement dollars to buy fresh, locally sourced produce. The district allots approximately \$100,000 annually to the USDA DoD Fresh program, and the school receives deliveries twice a week. In addition, the cafeteria has committed to the Skip the

Plastic Straw initiative, and the California Department of Food and Agriculture has publicly applauded the forward-thinking of Santiago STEAM's practices.

- In the classroom, each grade level studies progressively challenging aspects of food, nutrition, or the agricultural economy. Examples include the following:
 - Kindergarteners study what humans and animals need to survive with an introduction to nutritious foods.
 - First-grade students explore the role of foods in world cultures.
 - Second-grade students undertake a complete project unit relating to food and nutrition. They learn about the food web, agricultural zones, plant growth, and nutrition. Students then develop their own "Farm Box" full of produce to help consumers eat healthier. Finally, students create a marketing campaign to bring their Farm Box to market.
 - Third-grade students learn about the agricultural industry, its history in the region, the vital role of migrant workers in the food supply, and how food moves from farm to table.
 - Fourth-grade students study plant structures, the chemistry of cooking, and taste-test fresh foods grown in the school's five-foot hydroponic garden.
 - Fifth-grade students explore the importance of clean drinking water and compost microbiology in a multi-week project. The project culminates with a cooking show for the school community.
 - Sixth-grade students explore philosophical questions surrounding agriculture and its impact on ecosystems.
- Santiago's STEAMGREEN Team and PTA have partnered to develop free after-school programming that includes nutrition education for students and families. For example, in 2022, the PTA led a multi-sensory experience event focused on leaves. At the event, participants made herbal lemonade by muddling edible leaves (Italian and Thai basil, thyme, rosemary, lemon balm, and various mints) with fresh lemon slices and water to make custom beverages.
- In 2021, Santiago used 6,000 square feet next to its outdoor dining area for its Food for Thought Garden. With the garden's location, students can observe the full life cycle of edible plants while consuming them in their lunch. The garden contains eleven fruit trees and a collection of edible flowering plants such as lavender, marigold, hydrangea, sage, and mint. As those plants take root, the school secured funding from a national retailer to sponsor a 2,700-square-foot fenced food garden complete with seven large raised beds and an outdoor learning center.
- Santiago STEAM STEAMGREEN Team converted approximately three-fourths of an acre of barren, depleted land into habitat restoration efforts and outdoor learning environments featuring 98% native plants and all organic gardening methods - each in alignment with student project learning goals. The area includes a 5,000-square-foot native pollinator garden and pollinator patio outdoor classroom, a 5,000-square-foot oak grove student project area, a 4,050-square foot heritage garden and outdoor learning circle, a 4,000-square-foot composting center, a 2,000-square-foot erosion garden, a 1,000-square-foot rock habitat and community art garden, and a 1,000-square-foot healing rainbow garden.
- In 2022, STEAMGREEN Team broke ground on a Heritage Garden, a tribute to the history of the specific parcel of land where the school was built. It features a conversation circle, plants with ethnobiological significance, and connections with the region's Indigenous people. There, Santiago was honored to host the Spiritual Overseer

and Cultural Director for Acjachemen Nation, who taught students about the history and future of this land and a universal connection to nature through song and spoken word.

- The school's Pollinator Garden features a nature path in the shape of a butterfly wing and an outdoor classroom - a circular Pollinator Patio with student-created natural seating for 34 students. The space is certified by North American Butterfly Association and National Wildlife Federation Schoolyard Habitat. The Monarch Walk area is dedicated to conservation and education specific to endangered Western monarch butterflies and is also a certified monarch waystation. Monarch Watch and the Xerces Society support educational content and plants for the garden.
- Santiago STEAM has a minimum requirement of 200 minutes of physical education every two weeks. Upper graders have a dedicated Physical Education (PE) educator for two 50-minute weekly sessions, and lower graders have one session with a dedicated PE instructor and one with teaching staff. In addition, teachers lead guided walks two to three times daily and frequently utilize movement as a learning tool. In the classroom, teachers and students engage in brain breaks such as dance, yoga, or breathing exercises to help with focus.
- Santiago's PTA offers a running club with Kids Run the OC (Orange County) outside school. Children in the program accrue 25 miles, one mile at a time over a series of weeks, then participate in a community run to complete a marathon.
- Santiago STEAM's Leadership and Cultural Proficiency committees meet monthly to set goals and priorities for school wellness initiatives. They also address equity and social justice, monitor teacher and staff feedback, monitor behavioral data, and determine school philosophical pathways.
- The school's Wellness Policy has directly and positively impacted student health. For example, school staff do not use food to reward student academic performance accomplishments or behavior. As an alternative, Santiago STEAM students generate a list of experiential rewards such as campus cleanup day, recycling helper, "lights out" leader, picnic lunch with a friend, dress up days, time at the Wellness Center with the principal, or lunch with the teacher.
- Kindergarten students complete an annual adaptation of the SunWise program integrated into their Project Based Learning curriculum. First, students learn about the sun, its role in the solar system and on Earth, and the interdependence between it and living things. Then they learn about the weather, weather patterns, seasons, and climate. Next, students compare weather in geographic regions and how to protect themselves from the sun - including an activity where they create sunglasses using recycled materials. Finally, they complete a design challenge where they engineer a shelter for an animal (simulated using an ultra-violet bead) and present their findings.
- Since 2019, third through sixth grades partake in Panorama Social Emotional Learning (SEL) surveying twice per year. With the information gathered, the district and school assess each student's ability to manage emotions, set positive goals, show empathy for others, establish/maintain positive relationships, and make responsible decisions. It is also helpful to evaluate the effectiveness of various social-emotional learning strategies the school and district have implemented.
- Efforts are being made at the school and district levels to support and increase staff wellness. For example, Santiago STEAM provides staff fitness classes such as yoga, a district-wide bowling league, and discounted gym memberships. The district also offers staff reduced-cost lunch deliveries and a complementary district-sponsored salad bar. In

addition, every Monday, all district personnel receive a “Mental Health Monday” email with tips and practices such as meditation and mindfulness.

- Custodial staff members wear a wide-brimmed hat during daytime outdoor duties. In addition, the school provides ultra-violet-protective umbrellas for playground supervisory staff.
- In the Spring of 2022, Santiago STEAM debuted its new on-site Wellness Center. The room has space for collaborative problem-solving meetings, individual sessions, creative art-based therapy, and light therapy, all in a comfortable home-inspired setting. The school selected furnishings for their soothing profiles, sensory textures, movement, and sound absorption. In addition, the space utilizes the psychology of color with calming greens, blues, and wood tones accented with warm, energizing orange. The entire teaching staff have access to the Wellness Center when it is not in use by the counseling team. Additionally, all students can redeem tickets to enjoy a recess period in the Wellness Center to promote the center and counseling activities.
- Santiago STEAM's health office and wellness center are staffed with a health aide, a team of counselors, and a bilingual community liaison. The health aide and health office are available for the entire school day as an additional relationship-building opportunity for at-risk students. Counselors are on site three days per week and offer open-door walk-ins, social problem-solving support, and traditional sessions. Additionally, they partake in high-visibility social activities such as playground visits to build relationships and destigmatize interventions.
- Santiago STEAM school participates in Second Step, a holistic approach to building supportive communities for every child through social-emotional learning. The program includes a classroom-based, social-emotional learning curriculum for kindergarten through sixth grade that nurtures social-emotional competence and foundational learning skills, paired with family-focused lessons in English and Spanish for support at home. In addition, the principal sends a weekly message to families with Second Step information and encouragement on specific school-wide behavioral goals, such as growth mindset, accountability, gratitude, and inclusivity.
- Santiago STEAM PTA hosts "Check-In Tuesdays" every Tuesday across social media platforms. This program shares resources aligning with Second Step program, such as fairness, flexible thinking, calming down, asking for help, bullying prevention, self-care, and digital citizenship. In addition, the PTA invites students to expand empathy in an annual Kindness Challenge fundraiser, where they reward acts of kindness with a school-wide bubble celebration.
- Before distance learning due to the pandemic, Santiago STEAM worked closely with Western Youth Services supporting children and families in five languages with emotional and behavioral issues, depression and anxiety, post-traumatic stress, child abuse issues, grief, and crisis intervention. In addition, to evaluate school site security, the school works with the Orange County Intelligence Assessment Center's Critical Infrastructure Protection Unit. It has periodic visits and monitoring from Orange County Sheriff's Department School Resource Officers.
- Santiago STEAM partners with the American Heart Association to educate students about heart health and how to make healthy choices. Santiago STEAM's commitment to this program has resulted in the school achieving the highest participation rate out of all schools in the county for the 2021 – 2022 school year.
- In 2022, SVUSD opened a Student Marketplace within walking distance from Santiago STEAM and accessible to the school's families. It provides free food, home/personal

care products, clothing, school supplies, and information about services available to students and families for whom support is helpful. Additional support comes from the school's partnership with Mission Viejo Community Foundation and Second Harvest Food Bank.

- All students also partake in Positive Behavior Intervention Systems (PBIS), for which the school has earned Bronze Certification. This positive behavioral program aims to provide equalized, positive reinforcement and early intervention. Students earn "GEAR Tickets" when demonstrating "Grateful, Engaged, Accountable and Reflective" behaviors - values that were selected with intention by Santiago's teaching staff to strongly align with the school's mission and vision for community wellness and environmental impact; gratitude being inspired by indigenous teachings.
- In 2021, Santiago PTA added two colorful, handmade "Buddy Benches" to the playgrounds and developed programming to introduce the initiative. These benches are safe spaces where students can support those in need of a friend.
- All classes engage in Restorative Circles to build community and support empathy when problem-solving. Most Restorative Circles are intentional and proactive in making connections between students using positive or lighthearted themes. The school also uses Restorative Circles to repair, heal, and solve specific issues to guide future behavior.
- In 2019, the school implemented the Peer Assistance Leadership Program (PAL) as a club where fourth through sixth-grade students receive training in the PAL curriculum and plan campus outreach activities to empower fellow students. The PAL program develops youth leaders who connect with their peers to create a caring, safe, and supportive school environment for all.

Pillar III: Provide Effective Environmental and Sustainability Education

Element IIIA: Interdisciplinary Learning

- Santiago STEAM prioritizes environmental literacy in its mission, vision, and core belief. Through the combination of these goals, Santiago STEAM has created a project-based learning program that uses environmental literacy and sustainability topics as the focus for many of its projects. The school also empowers students to take action to address these issues, which leads to both community and school improvements.
- Through High-Quality Project Based Learning (HQPBL), students are challenged to use research and personal experience to gain a deep understanding of a topic, then think creatively to develop innovative solutions to real-world problems. Each grade level at Santiago STEAM studies multiple environmental and sustainability topics in-depth that closely align with California's Next Generation Science Standards (CA-NGSS) Environmental Principles and Concepts (CA-EP&Cs). Some examples of this natural curriculum integration include the following:
 - Second-grade students investigate climate change and how humans impact the environment. Students read and connect science texts and utilize other science resources about quick and slow changes to the Earth, including how the planet's heating affects the habitats of humans, plants, and animals. Then they deliver a TED Talk-style presentation or podcast on recycling, composting, greenhouse gasses, renewable energy sources, or sustainability.

- Third-grade students learn multiplication and division Math standards in a unit about preserving ecological knowledge, through word problems related to native acorns. In English/Language Arts, students read stories and analyze text about the significance of Oak Trees in the local ecosystem and Indigenous cultures. For Science, students study plant life cycles. In Project Time, students work as a team to plant acorns with geometric spacing and hand-craft accessible signage (English, Spanish, pictorial, and braille) and write first-person narratives about the imagined experience of the acorns. Families and local experts are then invited for a student-curated and guided visit.
- Fifth-grade students become environmental stewards that advocate for and help protect the biodiversity in local coastal ecosystems. Students explain how biotic and abiotic factors integrate and rely on each other, how matter cycles through non-living and living parts of the ecosystem, why it is important to protect these ecosystems, and how actions and inactions can affect these ecosystems. As a final activity, students create a call to action by developing public service announcements, posters, and infographics presented to a state park ranger.
- The school's HQPBL units tie directly to the local and school environments. Therefore, time in the learning gardens is a natural extension of the curriculum. Each garden and outdoor classroom has been specially designed with specific HQPBL goals to make outdoor learning as immersive and relevant as possible. Outdoor spaces also foster hands-on learning, allowing students to experiment with and gain personal experience with the subjects discussed in class. Students are involved in all phases of the garden development, from planning to construction, through to maintenance and community programming - dreaming big, taking action, and developing solutions along the way
- Special Education (SPED) students are fully involved in sustainability initiatives. Garden programming has served as a bridge for inclusivity and cooperation for students: SPED students oversee daily operations of the school's composting center, use technology to assess and monitor wellness indicators at the school, and the SPED instructor takes an active lead in promoting environmentalism and sustainable technology across the school.
- Santiago PTA launched a virtual field trip program to support STEAM learning when in-person field trips were not permitted due to the pandemic. During this time, students utilized custom virtual presentations, interviews, and behind-the-scenes tours by local businesses and experts, including the Irvine Ranch Water District, SolarArt, and NASA's Jet Propulsion Laboratories. Once restrictions were loosened, as an alternative to field trips, grades hosted several local Expert Speakers on campus, including the local water district, for an interactive audit, tribal leadership, and STEM professionals.
- For summertime learning, the school collaborates with the non-profit "Inside the Outdoors" and cable provider, Cox Communications, to provide Backyard Exploration Kits to 300 students. Each kit was equipped with tools such as a magnifying glass, binoculars, a nature journal, and an interactive online guide to local parks to discover.
- Place-based learning is a cornerstone of Santiago STEAM's curriculum. For example, third-grade students start each school year with a walking tour of the school's neighborhood. On these tours, students observe the environment and interview neighbors to learn about the area's history. They complete detailed timelines about historical milestones, including the impact of settlers who introduced invasive plants to the campus and restorative actions such as the all-native Pollinator Garden and National Wildlife Foundation Schoolyard Habitat.

Element IIIB: STEM Content, Knowledge, and Skills

- With Santiago STEAM's unique, self-designed program, sustainability, and the environment are the primary contexts for learning science, technology, engineering, mathematics thinking skills, and content knowledge. Students at all levels engage in this STEAM thinking by participating in the following grade-level projects:
 - Kindergarten students learn to be curious about their world, thinking and wondering about the patterns and interactions of natural systems around them. In addition, students explore their school environment and the world around them through the lens of sustainability and scientific thinking. They also learn about making responsible choices to protect natural resources and apply their observations to early math and engineering skills.
 - First-grade students engineer equitable communication by coding sound and light robotics, building sustainable communities using recycled materials, and utilizing biomimicry to solve a human problem.
 - Second-grade students begin a deep study into global challenges like erosion and global warming. They also connect scientific resources to explore human impacts on plants, animals, and biodiversity.
 - Third-grade students learn about global impact through local actions and the preservation of ecological knowledge. They use math to calculate animal, plant, and insect population trends.
 - Fourth-grade students shift focus to topics such as the history of energy as a tool for transportation and communication.
 - Fifth-grade students continue their inquiry started in fourth grade to now include the future of energy and how it relates to ecosystems. In addition, they practice leadership by researching nutrient transfer and championing the school compost program.
 - Sixth-grade students solve philosophical questions and are challenged to build on their learnings, find inspiration in their surroundings to improve the world, and use complex math skills such as geometry and algebra for hands-on engineering and construction projects.
- Across grade levels, students are encouraged to reason like scientists and think like field professionals. Projects interweave innovation, engineering, and commercialization of solutions, as well as government and non-profit advocacy. Professionals and experts are key resources for students to learn from; they serve as presenters and as an audience for student presentations. Examples of STEAM projects for each grade include the following:
 - Kindergarteners work as a team of scientists to identify an environmental problem and innovative engineering technologies. Recent student-driven examples include a machine to reduce ocean plastic and a protective park to reduce animal poaching.
 - First-grade students learn about civic resources while engineering their own sustainable city. Students learn from guest experts, including a university librarian, firefighter, and water authority representative.
 - Second-grade students study heroes and innovators from distant and recent history who have made a difference in the lives of others. They meet experts in the area of study, such as product engineers, and develop a product idea that will solve a human-caused environmental problem.

- Third-grade students learn grassroots action; they interview and survey the community to form a researched understanding of a need and advocate for student-determined causes.
- Fourth-grade students collaborate with the engineering and technology company, BOSCH, as they develop solutions to erosion.
- Fifth-grade students learn the importance of visual design to convey messaging. They create digital and hardcopy presentations for public service announcements, advocate for the protection of a local coastal ecosystem, and present their findings and ideas to a state park ranger.
- Sixth-grade students learn the “Startup Model” to create a new startup business. Then they create an inspirational solution and develop marketing and presentation skills to create a product pitch that lures investors. They also partner with the City of Lake Forest to learn about the roles of local government.
- Santiago's PTA supports the discovery of career and educational pathways through local partnerships. For example, prior to distance learning in 2020, each grade level attended a different interactive campus tour and demonstration at a higher education institute to expose students to future pathways they might not have otherwise envisioned possible. Destinations included a local high school, Community Colleges, a Technical Institute, and State Universities. Future career pathway initiatives include a partnership with NASA's Jet Propulsion Laboratories, virtual field trips to STEM (Science, Technology, Engineering, and Math)-based local businesses, and a partnership with the College of Environmental Design at Cal Poly, Pomona.

Element IIIC: Civic Knowledge and Skills

- Each year, Santiago STEAM opens its doors to families and the surrounding community for “Ignite Night” events, during which students present the findings of their curriculum project units, showcase project deliverables, and educate attendees on various environmental and social topics. Examples from past “Ignite Nights” include:
 - Kindergarten students presented on team prototypes engineered to protect water, clean air, animals, or plants.
 - First-grade students coded robots with lights, movement, and sound patterns to communicate over a long distance to solve the problem of communication for pedestrians with disabilities. They also built a model community using recycled materials.
 - Second-grade students presented solutions to erosion by prototyping erosion control measures adapted to problematic slopes in the region.
 - Third-grade students showcased weaving skills acquired from Acjachemen tribal leaders, shared a student-developed chant demonstrating unity and solidarity with indigenous peoples, and distributed native milkweed seed kits to attendees.
 - Fourth-grade students presented the history of communication and solutions to transfer information using energy and patterns to reduce the impacts of natural processes on humans.
 - Fifth-grade students explained the science behind lemonade and developed a lemonade business inspired by lemon trees in the school's orchard.
 - Sixth-grade students create full-sized game stations to educate the community on hazardous waste disposal, landfills, recycling, and conservation.

- Santiago PTA supports eco-minded learning through free after-school programs such as STEAMGREEN Team and a monthly STEAMGREEN Team Eco Series with a lineup of community partners for fix-it clinics, bike and wheel safety classes, garden and composting classes, and nutrition education.
- The school fully integrates environmental service learning into the curriculum at every grade level, including the following activities:
 - Kindergarteners recycle beverage containers.
 - First-grade students hold an annual clothing drive
 - Third-grade students create a garden
 - Fourth-grade students participate in regional watershed cleanup events
 - Fifth-grade students develop public service announcements to protect local marine environments.
- In 2022, the school used funds generated from the school's beverage container recycling program to purchase carbon offsets. They purchased Verified Emission Reductions through the Gold Standard Carbon Offset Marketplace to support the activities of TerraClear, a maker of sustainable water filtration devices in Laos. The purchased devices reduce the need to boil drinking water and, therefore, their dependence on charcoal and wood fires.
- As a supplement to curriculum initiatives, the school challenges students to help others while being physically and socially active - learning empathy and the power of teamwork through school-sponsored extracurricular activities. For example, students give back by supporting American Heart Association, coastal cleanup events, performing the Kindness Challenge, building and maintaining school gardens, collecting clothing and supplies for those in need, and participating in the school's Little Library- community book-sharing library.
- All grade levels regularly use outdoor spaces as alternative classrooms, a space for group work, and activities that combine two or more classes. These areas are a natural extension of the indoor classroom and are used by students daily. Each outdoor learning environment has been specially designed to align with the kindergarten through sixth-grade curriculum and project objectives and provide students with a meaningful/immersive experience. To achieve this, prior to construction, the Garden Committee conducted extensive surveys and interviews at every grade level, then developed learning gardens specifically to enhance the learning experience.
- In 2022, Santiago STEAM celebrated California's Living Schoolyard Month with the following activities:
 - Kindergarteners adopted and tended to a new grapevine and piloted the school composting program with daily nature walks to the new compost center. They also performed "Wonderful World" outdoors for the City of Lake Forest Seniors.
 - Second-grade students had two units of study on living things, including plants and animals, their interdependence, and the things they depend on to survive.
 - Third-grade students held a series of outdoor assemblies, welcoming a professional botanist and an Acjachemen Nation leader to the school. They researched and advocated for the inclusion of eucalyptus in the composting program, interviewed a Master Composter, and documented new additions to the garden for the school newspaper.
 - Fourth-grade students planted, observed, and tasted herbs and vegetables grown in the school's hydroponic tower.

- Fifth-grade students sat on the student-created natural wood stumps of the outdoor classroom to read and discuss a class novel.
- Sixth-grade students used traditional film cameras to photograph elements of the schoolyard and gardens artistically. In addition, they learned the chemistry and techniques of film development.
- Winners of the school-wide “Haiku in the Gardens” contest were announced and awarded a packet of organic vegetable seeds; all participants received a biodegradable nature craft kit donated by the local branch of the public library.
- A 50-year celebration contest was held, for which students designed a number “50,” utilizing at least one upcycled, reclaimed, or natural element.
- Santiago STEAM has been operating with limited fundraising abilities and a smaller-than-average pool of available volunteers for the last 30-plus years. However, despite these challenges, the school has established the following partnerships across sectors to advance the school and become a leader in sustainability and STEAM education:
 - The school established a multi-year collaboration with Cal Poly, Pomona College of Environmental Design to design outdoor spaces and discover careers related to sustainability and landscape design. Through the partnership, Santiago STEAM provides university students with real-world experience, and the school gains access to designs, plans, and instruction on water conservation.
 - Santiago also has a close working relationship with the Master Gardeners of Orange County, UCANR Santa Clara Master Composters, California Native Plant Society, The Xerces Society, Lake Forest STEAMGREEN Team, Bee City USA, and the Irvine Ranch Water District, who each work in an advisory role - to both the garden program and as subject matter experts for students.
 - The school partners with the City of Lake Forest, CR&R Incorporated Environmental Services Waste Management Solutions, Teens Against E-waste, Global Inheritance, Rubicon, and Orange County Recycles to support expanding recycling initiatives.
 - Santiago STEAM partners with the Senior Clubhouse at the City of Lake Forest for artistic endeavors that bridge generations.
 - The school partners with Orange County Public Libraries to promote literacy in the gardens and enhanced options for summer reading.
- The STEAMGREEN Team, via an active Instagram account, shares information with the public, including ecological projects and actions taken in the school's habitat restoration initiatives - and the reasoning, science, and history behind each action. STEAMGREEN Team also meets with and supports fellow and aspiring leaders from area schools as they plan, launch, or improve their garden or green initiatives.
- In the business community, Santiago PTA inaugurated the first-ever partnership between the NASA Jet Propulsion Laboratory and an elementary school. This program included a biomimicry STEAM challenge where students engineered a Mars Rover with characteristics inspired by living things on Earth.
- Santiago students also give back to the community by supporting events from the Surfrider Foundation and The City of Lake Forest, the Scholastic Pajama Program, completing an annual kindness challenge, and fundraising for the American Heart Association.