District Sustainability Award Nominee Presentation Form

CERTIFICATIONS

District’s Certifications
The signatures of the district superintendent on the next page certify that each of the statements below concerning the district’s eligibility and compliance with the following requirements is true and correct to the best of the superintendent’s knowledge.

1. The district has been evaluated and selected from among districts within the Nominating Authority’s jurisdiction, based on high achievement in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental and sustainability education.

2. The district is providing the U.S. Department of Education Office of Civil Rights (OCR) access to information necessary to investigate a civil rights complaint or to conduct a district wide compliance review.

3. OCR has not issued a violation letter of findings to the school district concluding that the nominated school district has violated one or more of the civil rights statutes. A violation letter of findings will not be considered outstanding if OCR has accepted a corrective action plan to remedy the violation.

4. The U.S. Department of Justice does not have a pending suit alleging that the school district has violated one or more of the civil rights statutes or the Constitution’s equal protection clause.

5. There are no findings of violations of the Individuals with Disabilities Education Act in a U.S. Department of Education monitoring report that apply to the school district in question; or if there are such findings, the state or school district has corrected, or agreed to correct, the findings.

6. The district meets all applicable federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

U.S. Department of Education Green Ribbon Schools District Sustainability Award 2019-2021

Name of Superintendent: Dr. Laura Jacob
(Specify: Ms., Miss, Mrs., Dr., Mr., etc.) (As it should appear in the official records)

District Name: California Area School District
(As it should appear on an award)

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate.

(Superintendent’s Signature)  Date: 1/08/23
Nominating Authority’s Certifications

The signature by the Nominating Authority on this page certifies that each of the statements below concerning the district’s eligibility and compliance with the following requirements is true and correct to the best of the Authority’s knowledge.

1. The district is one of those overseen by the Nominating Authority which is highest achieving in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental education.

2. The district meets all applicable federal civil rights and federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

Name of Nominating Agency: Pennsylvania Department of Education

Name of Nominating Authority: Tamara E. Peffer, M.S.
(Specify: Ms., Miss, Mrs., Dr., Mr., Other)

I have reviewed the information in this application and certify to the best of my knowledge that the school meets the provisions above.

[Signature]

Date: February 2, 2023

(Nominating Authority’s Signature)

SUBMISSION

The nomination package, including the signed certifications, narrative summary, documentation of evaluation in the three Pillars, and photos should be submitted online according to the instructions in the Nominee Submission Procedure.

OMB Control Number: 1860-0509
Expiration Date: December 31, 2023

Public Burden Statement

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless such collection displays a valid OMB control number. The valid OMB control number for this information collection is 1860-0509. Public reporting burden for this collection of information is estimated to average 37 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The obligation to respond to this collection is required to obtain or retain benefit P.L. 107-110, Sec. 501, Innovative Programs and Parental Choice Provisions. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the U.S. Department of Education, 400 Maryland Ave., SW, Washington, DC 20202-4536 or email ICDocketMgr@ed.gov and reference the OMB Control Number 1860-0509. Note: Please do not return the completed ED-Green Ribbon Schools application to this address.
Summary Narrative: An Overview of Your Work Encompassing All Three Pillars (2-3 pages):

California Area School District was awarded numerous grants and awards since 2020 to develop and sustain their environmental and educational efforts. The District coordinates activities within the district and the local partners that reduce environmental impact, energy use and food waste, conserve water, introduce environmentally friendly transportation, and increase recycling. Identified as a Department of Environmental Protection PA Environmental Justice Area, California Area School District reduces their environmental impact using a multi-tiered system of progressive educational approaches that teach and apply the strategies to reduce impact. The strategies used by the District include k-12 recycling instruction; installation of an apiary, hen coops, and aquaponics units on campus; a farm to school collaboration, teaching food preparation using local ingredients; incorporating AI to solve glocal problems; building edible gardens; purchasing solar powered transportation for campus use; investing in mental health through dog therapy; eliminating pesticides and herbicides with goat-scaping, and incorporating outdoor year-round play with water-saving design.

This involves teaching five phases of recycling lessons in 100% of the K-12 science classes and integrating a paper recycling program in 100% of classrooms and offices. The five phases of recycling lessons include a progressive food sorting program to reduce food waste; Phase 1: meat and dairy, Phase 2: Food scraps and soiled paper, Phase 3: Liquids, Phase 4: recyclables, and Phase 5: non-compostable wastes. Compostable materials are composted on-site. Pre- and post-evaluations on the program indicate a 50% increase in student learning in recycling, conservation and limiting environmental impact. The program involves teaching five phases of recycling lessons in 100% of the K-12 science classes and integrating a paper recycling program in 100% of classrooms and offices. The professional learning involved for this project includes professional learning on recycling and STEAM integration in the curriculum.

The school district currently has an apiary with four hives on campus, two six-hen coops, and an indoor aquaponics unit. The district firmly believes that children need to learn about agriculture and have hands-on science experiences. The current farm to school district initiatives include working with the local farm to raise chickens from eggs to supply the farmer. The District students also work with the local apiary to supplement beehives on our property to additional hives around the community and in other nearby schools. This farm to school project reflects the needs of the community because our social demographics show a significant need for food sustainability, with the need for local, quality, fresh produce. By engaging in this project, the community will have the ability to grow local food and eat with a higher quality of produce.

The Moonshot Project works to provide students with nutrition and improved access to healthy foods in and out of school. Using the on-site District chickens for eggs, honey from our apiary, and aquaponics facility for healthy greens and fish, the Moonshot project combines the expertise of our para-educator and cafeteria staff with the healthy eating educational needs of our students. Once a week, students train on safe practices in the kitchen and learn basic cooking skills. The students prepare a family-style lunch experience. The students learn how to cook healthy foods using local and district-available ingredients. Our students in the Life Skills program, after learning how to harvest eggs from our chickens, now make an omelet each morning in their classroom. Their new confidence in preparing food transfers home where they see they can prepare healthy food using local ingredients. Students across the district work to solve the 21st Century problem of sustainable agriculture through breeding and growing their own organic food. The elementary school is equipped with an aquaponic growing system for leaf lettuce and Tilapia. Students complete comprehensive data analysis, a germination program, and a Tilapia breeding program that integrates STEM (science, technology, engineering and mathematics) subjects K-12. The District’s “Chicks Dig Egg-onomics” project embodies STEAM and student skill levels by creating a K-12 collaborative project where students plan, design, raise and harvest their own egg-laying chickens using sustainable energy sources. Students research and design their chicken coop and collaborate with high school CTC students to build their ideal building.

Equipped with solar-powered Raspberry Pi computers and high quality outdoor cameras, students “teach” the computer to identify bees entering and exiting a hive and analyze the data to monitor and make predictions on beehive health out in the field. Students develop their system to support their school beehive

ED-GRS (2022-2024)
and beehives at a local farm for big data comparisons. The entire project is documented utilizing video, audio, and data-sharing programs and provided as an open-source project for others to replicate. We also saw with our recent cross-grade and cross-curricular projects how students at a variety of grade levels can participate, from elementary school to high school. For science, students study pollinators and the effects of pesticides on colony collapse disorder. For technology, students learn how to teach a computer the difference between a bee and “not a bee” and how to count the number of bees entering a beehive. This project shows students that artificial intelligence is approachable and that students are capable of developing their own AI programs. Elementary students research and install solar power to run entirely on sustainable energy sources. We engineer a Raspberry Pi AI system that is solar-powered and waterproof. Students learn how to work within our means of budget and sustainability. For mathematics, students learn how to make scientific predictions with big-data sources. Our primary outcome is to integrate STEM skills to develop a big-data project using in-the-field technology to support a natural ecosystem. The more we work on this project, the more we see the integration of science, technology, engineering, arts, and mathematics. We also saw how students at a variety of grade levels can participate in the project to contribute, from kindergarten to twelfth grade.

The District creates learning opportunities for all students that have global impacts. By creating their own edible gardens, students will create a visually more beautiful learning space that also reduces the global food impact. Short-term food shortages and long-term increases in food prices are global concerns and this project will teach students how to design creatively and functionally meet a global need. The District combines the STEAM content areas for students in all elementary grades and research projects to solve the 21st Century problems of sustainable agriculture. Students explore art inspired by nature and create outdoor gardens for aesthetic and functional purposes. The school-based project partners include the Parent-Teacher Organizations (PTO), the Vocational Agriculture program, and the local food bank. The community-based partners include the local Business Association and the community Food Banks.

The District was able to identify means to reduce use of non-sustainable energy sources for transportation. Excessive pollution transportation methods between schools are eliminated and the District utilizes 100% solar energy. The school district purchased 20 solar-powered scooters to eliminate traditional bus and van transportation methods around campus. By utilizing the personal solar-powered scooters, the District was able to eliminate 100% of the non-renewable transportation energy and move to 100% renewable energy usage on campus.

California Area School District focuses on the health and wellness of students and staff through their MTSS program, Dog Therapy Program, Chill Project, Goat-scaping Project, Moonshot Project, and outdoor fitness after school and summer school opportunities. The Dog Therapy program is a focused mental health across the district where 12 certified dogs are available on campus in both buildings. The therapy dogs reduce explosive behaviors, reduce student and staff stress, work to provide comfort to struggling students, and work to assist students with disabilities.

The Chill Project created two Chill Rooms in the district to serve all students and employees in both buildings. This program has been significantly successful at reducing stress for the universal school population through student surveys and staff morale identification. In order to measure the effectiveness of the Chill Rooms, the District engages in four tiers of evaluation: self-reporting, attendance, discipline, and pre- and post- surveys. The integrated stress-management lessons with the Chill Rooms show a reduction of the student identified stress levels from the beginning of the year to the end of the school year.

The Goat-scaping Project in the district is part of the integrated pest management and preventative protocol with cleaning and maintenance. The district has two goats on camps that are rotated around the campus to eat overgrown spaces, spaces with poison ivy or other dangerous plants, and spaces that would traditionally be managed through herbicides and pesticides. Giving goats access to intentional properties removes vegetation in an eco-friendly and efficient manner, setting the stage for additional land management and restoration. Goats clearing an overgrown space creates positive school community conversation, provides volunteer opportunities to increase student engagement, and paves the way to new opportunities in shared spaces.
Environmental health is a cornerstone to the use of the facility. Post-COVID improvements in air quality, use of outdoor learning spaces, remediation of any moisture, and a clear cleaning and maintenance schedule were developed as part of our Return to School Plan and are now consistent procedures in our day-to-day operations. The facility director ensures that cleaning and maintenance of the buildings is well-documented and we complete a one-year, five-year, and ten-year facility plans. Each classroom has a renovation schedule where the maintenance of the room is improved from year to year. Mold and moisture prevention is completed through the proper purchasing of building materials and through computerized facility HVAC units. The reduction of staff and students to chemical or environmental components is completed through our goat-scaping program and pledge to ensure our gardens are organic. Ventilation was improved through air vents, higher-quality filters, and dedicated monitoring of air quality. The use of pesticides has been eliminated on the campus.

The Outdoor fitness after school and summer school opportunities include after school fitness programs for elementary beyond the traditional school day. Using the outdoors, our Crush-It program for students teaches and celebrates physical fitness for all students interested in staying after school. Student participation in this after school program has increased each year by 50%. By installing permeable flooring surfaces outside in child play spaces, the District is able to help reestablish a more natural hydraulic balance and reduce runoff volume by trapping and slowly releasing precipitation into the ground. By controlling runoff from the source, we are able to make better use of the runoff water and reuse it for agriculture. Water conservation is integrated in the playground space and conserve water by 15%.

**Narrative for Pillar I: Your Efforts to Reduce Environmental Impact and Costs (1-4 pages)**

California Area School District was awarded a 2022 Environmental Education Grant to coordinate school district programs to develop green, sustainable K-12 schools. The District coordinates activities within the district and the local partners that reduce environmental impact, energy use and food waste, conserve water, introduce environmentally friendly transportation, and increase recycling. California Area School District is a DEP Environmental Justice Area. California Area School District plans to reduce their environmental impact using a multi-tiered system of progressive educational approaches that teach and apply the strategies to reduce impact. California Area School District reduces their environmental impact using a multi-tiered system of progressive educational approaches that teach and apply the strategies to reduce impact. This involves teaching five phases of recycling lessons in 100% of the K-12 science classes and integrating a paper recycling program in 100% of classrooms and offices. The five phases of recycling lessons include a progressive food sorting program to reduce food waste: Phase 1: meat and dairy, Phase 2: Food scraps and soiled paper, Phase 3: Liquids, Phase 4: recyclables, and Phase 5: non-compostable wastes. Compostable materials are composted on-site. Pre- and post-evaluations on the program indicate a 50% increase in student learning in recycling, conservation and limiting environmental impact.

After experiencing shortages of toilet paper, hand sanitizer, gasoline, and even chicken, post-COVID learning has evolved to return to teaching local sustainability. This project addresses the need for children to learn where their food comes from and how we can ethically sustain energy needs. By teaching children about reducing food waste and using food scraps for composting, we show them the ability to locally make a positive impact. Compostable materials will be composted on-site.

The program involves teaching five phases of recycling lessons in 100% of the K-12 science classes and integrating a paper recycling program in 100% of classrooms and offices. The professional learning involved for this project includes professional learning on recycling and STEAM integration in the curriculum. The professional learning on the STEAM integration in the curriculum utilizes the Understanding By Design framework and is conducted as part of the scheduled professional learning time for teachers. The professional learning is provided by the Superintendent. The District’s mission is to create a sustained recycling program and in order to achieve this program, the change in human behavior must be incremental.
The recycling program begins with one item and then increases every two months district-wide. Paper recycling is integrated in the classroom and the offices using blue bins. The five phases of recycling lessons will include a progressive food sorting program to reduce food waste; Phase 1: meat and dairy, Phase 2: Food scraps and soiled paper, Phase 3: Liquids, Phase 4: recyclables, and Phase 5: non-compostable wastes. Using separate bins to collect the materials allows students to weigh and record both volume and weight after each lunch period for data collection. Our school staff and students take the waste to the on-site composting bins. Smaller food scraps are used in primary classrooms for vermicomposting.

The school district currently has an apiary with four hives on campus, two six-hen coops, and an indoor aquaponics unit. Our inspiration for this component of the project comes from our post-COVID agriculture focus in our science classes. During these classes, we learned how much of the United States’ agricultural productivity is dependent on the honey bee. Since 2010, colony collapse disorder has destroyed hives by as much as 30%. We hope to take on a real-world STEM challenge and work to solve a global problem to support pollinators and plant pollinator gardens around the school property. Pre- and post-evaluations on the program indicate a 50% increase in student learning in recycling, conservation and limiting environmental impact. The district firmly believes that children need to learn about agriculture and have hands-on science experiences. The current farm to school district initiatives include working with the local farm to raise chickens from eggs to supply the farmer. The District students also work with the local apiary to supplement beehives on our property to additional hives around the community and in other nearby schools. This farm to school project reflects the needs of the community because our social demographics show a significant need for food sustainability, with the need for local, quality, fresh produce. By engaging in this project, the community will have the ability to grow local food and eat with a higher quality of produce. Our previous farm to school initiatives with the chickens and the apiary were successful and showcase our ability to continue this work. We will have the local funding and manpower available to continue the project activities beyond the grant period.

The District’s primary goal is to establish integrated learning projects around the STEAM curricula that not only allow students to apply their knowledge, but also to make their world a better place. In Upgrade Your Curriculum (2013), Hale and Fisher identify the term global impact to mean “acting locally to effect change for the better somewhere else in the world” (pg. 23). We seek to create learning opportunities for all students that have global impacts. By creating their own edible gardens, students will create a visually more beautiful learning space that also reduces the global food impact. Short-term food shortages and long-term increases in food prices are global concerns and this project will teach students how to design creatively and functionally meet a global need. The research component of the project is interdisciplinary and gives students insight on solving problems using knowledge and skills across disciplines. The outcomes we seek for our students are: to solve context-based problems creatively that improve the environment and sustain human food needs; to design visually pleasing spaces that also serve a glocal purpose; to explore roles as landscape architects, garden designers, environmental planners, and agriculture gardeners; to build lifelong relationships with nature; to develop entrepreneurial skills and contribute to the community. Students create their own community-based landscapes that serve as indoor and outdoor learning spaces with edible gardens. The District combines the STEAM content areas for students in all elementary grades and research projects to solve the 21st Century problems of sustainable agriculture. Students explore art inspired by nature and create outdoor gardens for aesthetic and functional purposes. Students apply their mathematics, health and life science curricula to a functional, beautiful learning space for all children. After researching and creating the spaces, students learn to be citizens in their community by establishing a student-led Food Market to sell their produce and donate food to the local food bank. The school-based project partners include the Parent-Teacher Organizations (PTO), the Vocational Agriculture program, and the local food bank. The community-based partners include the local Business Association and the community Food Banks.

After a recent (2021) energy audit of our buildings, the District committed to reducing and eliminating greenhouse gas emissions. The first step in this plan included installing energy efficient lighting, remote
temperature controls, and the purchase of on-site renewable energy. By teaching children about solar power and how to design a lifestyle that includes solar power, our post-COVID learning addresses a permanent classroom need of addressing energy use and conservation. In meeting with local transportation, the District was able to identify means to reduce use of non-sustainable energy sources for transportation. Excessive pollution transportation methods between schools are eliminated and utilize 100% solar energy. The school district purchased 20 solar-powered scooters to eliminate traditional bus and van transportation methods around campus. By utilizing the personal solar-powered scooters, the District was able to eliminate 100% of the non-renewable transportation energy and move to 100% renewable energy usage on campus. The on-site green power allowed the District to eliminate gas emissions by 100% on campus.

Water efficiency is achieved through installing rain water collection barrels for all the animals on campus. Students participated in a project to decorate the rain-water barrels and then installed them next to the animals. This allows all of our animal programs to run entirely off the grid and improve water efficiency. By installing permeable flooring surfaces outside in child play spaces, the District is able to help reestablish a more natural hydraulic balance and reduce runoff volume by trapping and slowly releasing precipitation into the ground. By controlling runoff from the source, we are able to make better use of the runoff water and reuse it for agriculture. Water conservation will be integrated in the playground space and conserve water by 15%. Water conservation is taught in the integrated science classes and students learn water conservation measures on campus with the water collection barrels and their use.

The school district measures success through student designs, research, and implementation of their projects. Students will contribute to reflective blogs to measure the progress of their learning. The research projects will be measured through literacy rubrics in each grade level. To measure the implementation of the edible landscapes, we will involve all STEAM subject areas to collaborate on an integrated rubric that measures students’ problem solving, collaboration, creativity, communication and critical thinking skills. Developing a prototype from concept to digital and physical representations requires creativity. Students’ creativity to solve a problem with an artistic mode will be measured through the design and implementation phases of the projects in teacher-created rubrics.

Narrative for Pillar 2: Your Efforts to Improve the Health and Wellness of Students and Staff (1-4 Pages)

Environmental health is a cornerstone to the use of the facility. Post-COVID improvements in air quality, use of outdoor learning spaces, remediation of any moisture, and a clear cleaning and maintenance schedule were developed as part of our Return to School Plan and are now consistent procedures in our day-to-day operations. The facility director ensures that cleaning and maintenance of the buildings is well-documented and we complete a one-year, five-year, and ten-year facility plans. Each classroom has a renovation schedule where the maintenance of the room is improved from year to year. Mold and moisture prevention is completed through the proper purchasing of building materials and through computerized facility HVAC units. The reduction of staff and students to chemical or environmental components is completed through our goat-scaping program and pledge to ensure our gardens are organic. Ventilation was improved through air vents, higher-quality filters, and dedicated monitoring of air quality. The use of pesticides has been eliminated on the campus.

California Area School District focuses on the health and wellness of students and staff through their MTSS program, Dog Therapy Program, Chill Project, Goat-scaping Project, Moonshot Project, and outdoor fitness after school and summer school opportunities. As a result of the COVID-19 pandemic, the school-based school counselors and the administration have had to provide a variety of support services for students and staff around mental health. This includes providing staff professional learning on child social-emotional learning and mental health needs as a result of the pandemic; staff social-emotional awareness;
student connections with mental health providers; student hotspots and computers for virtual mental health visits; Tier 1, 2, and 3 supports in the school building; and additional PBIS and restorative practice strategies. The school counselors work with all needs of the students in the classroom, both face-to-face and virtually. Their expertise and continued learning with mental health and pro-social supports for youth impact not just the students individually, but also the staff and the larger school community. They continue to make themselves available during the school day and during the evening virtually to support all groups. They provide face-to-face sessions and dog therapy sessions. They provided virtual support for mental health during the pandemic via Google Classroom, Zoom, and other text-based means. They provide Parent University sessions for our parents and guardians both face-to-face and via Facebook Live to reach a broad audience.

The Dog Therapy program is a focused mental health across the district where 12 certified dogs are available on campus in both buildings. Using school staff to serve as the handlers of the dogs, the Dog Therapy program began with a pilot year of one dog. Because of the significant success of Charlie, the pilot dog, the District expanded the program to certify 12 staff-owned dogs to be therapy dogs. Animal assisted therapy (AAT) has been shown to improve mood in children and adults with physical or mental health problems. There are also a number of studies demonstrating various effects of animals on reducing self-reported anxiety in humans. This program ensures that at least one dog is “on staff” each day in each building. The therapy dogs reduce explosive behaviors, reduce student and staff stress, work to provide comfort to struggling students, and work to assist students with disabilities. The District presented their Dog Therapy program at the annual PDE SAS conference.

The Chill Project created two Chill Rooms in the district to serve all students and employees in both buildings. The project involves multiple tiers of support and education for mental health. The project establishes a Chill Room in each building, as well as provides educational strategies for students and staff to manage stress. The Chill Room is professionally staffed during school hours during the school year. The Chill Room is equipped with our district therapy dog at least one day per week. Self regulation strategies and stress-management strategies are taught on a bi-weekly basis by district personnel. The evaluation and use of these strategies will be conducted on a quarterly basis. The project fits with the existing practices and services already in place in the community. The three most common psychological issues faced by students are anxiety (62.2%), depression (49.7%), and stress (45.5%). Stress is the most commonly reported barrier to students’ academic success. Students report that within the past year, 58.4% felt overwhelming anxiety, 59% felt very lonely, 65% felt very sad, 37% felt so depressed that they found it difficult to function and 9.8% seriously considered suicide. This program has been significantly successful at reducing stress for the universal school population through student surveys and staff morale identification. In order to measure the effectiveness of the Chill Rooms, the District engages in four tiers of evaluation: self-reporting, attendance, discipline, and pre- and post-surveys. First, students report quarterly the self-regulation strategies they learned for that quarter, with the expectation the district sees an increase of 25% each quarter. Secondly, the district evaluates the effectiveness of the Chill Rooms by monitoring daily attendance to the Chill Rooms. Students sign in and attendance will be tracked by gender, age, grade, and building. Thirdly, discipline data by building is monitored, with the goal of reducing overall discipline referrals by 20% per building. Finally, students complete pre- and post-surveys on stress levels. The integrated stress-management lessons with the Chill Rooms show a reduction of the student identified stress levels from the beginning of the year to the end of the school year.

The Goat-scaping Project in the district is part of the integrated pest management and preventative protocol with cleaning and maintenance. The district has two goats on camps that are rotated around the campus to eat overgrown spaces, spaces with poison ivy or other dangerous plants, and spaces that would traditionally be managed through herbicides and pesticides. Giving goats access to intentional properties removes vegetation in an eco-friendly and efficient manner, setting the stage for additional land management and restoration. Dangerous plants like poison ivy, poison sumac, and invasive species like kudzu, which grow rapidly and can smother native plants, are no match for a goat’s appetite. Steep and hard-to-mow areas are no match for the goat as they are agile and hard-working creatures that can get into rough and narrow
spots. This project reduces the student and staff exposure to chemical and environmental contaminants. By clearing unwanted vegetation with goats rather than using management products like herbicides, the district gains a number of benefits. Goats can traverse terrain that is difficult or impossible for maintenance and machinery. Goats clearing an overgrown space creates positive school community conversation, provides volunteer opportunities to increase student engagement, and paves the way to new opportunities in shared spaces.

The Moonshot Project works to provide students with nutrition and improved access to healthy foods in and out of school. Using the on-site District chickens for eggs, honey from our apiary, and aquaponics facility for healthy greens and fish, the Moonshot project combines the expertise of our para-educator and cafeteria staff with the healthy eating educational needs of our students. Once a week, students train on safe practices in the kitchen and learn basic cooking skills. The students prepare a family-style lunch experience. The students learn how to cook healthy foods using local and district-available ingredients. Our students in the Life Skills program, after learning how to harvest eggs from our chickens, now make an omelet each morning in their classroom. Both in and out of school, students learn how to cook with fresh foods that are easily accessible. For example, on a daily basis, out students in the life skills classroom harvests eggs from their chicken coop each morning and they cook omelets and eggs each morning in their classroom kitchen. The students learn valuable life skills and learn how to use local ingredients for a healthy meal. Their new confidence in preparing food transfers home where they see they can prepare healthy food using local ingredients.

The Outdoor fitness after school and summer school opportunities include after school fitness programs for elementary beyond the traditional school day. Using the outdoors, our Crush-It program for students teaches and celebrates physical fitness for all students interested in staying after school. Student participation in this after school program has increased each year by 50%. As an Environmental Justice Area, California Area School District works to integrate daily fitness and outdoor fitness for overall student health.

**Narrative for Pillar 3: Your Efforts to Ensure Effective Environmental and Sustainability Education (1-4 Pages):**

Students across the district work to solve the 21st Century problem of sustainable agriculture through breeding and growing their own organic food. The elementary school is equipped with an aquaponic growing system for leaf lettuce and Tilapia. Students complete comprehensive data analysis, a germination program, and a Tilapia breeding program that integrates STEM (science, technology, engineering and mathematics) subjects K-12. In science class, students use the Davis Vantage Vue systems to document hourly data on air temperature, humidity, barometric pressure and weather. In science and mathematics classes, students use the Sper Meter Kit to digitally measure and log pH, water temperature, and dissolved oxygen (DO) levels in the aquaponic tanks. Students electronically measure the levels and complete an analysis. The data compares crop yields, patterns across schools, performance, and reliability analysis. Students use Raspberry Pi boards in computer classes to develop their own computer program that collects the data from the two systems and populates it into a spreadsheet that they can access anytime. The students must program the computers to collect the data and put it in a useable format for their own scientific analysis. They use the serial camera with the boards to engineer and create a live-stream video monitoring system for their fish. They will program the camera to provide a live-stream on the District’s YouTube Channel. The Raspberry Pi Touchscreen Kits allow students to develop their own touch-based computer program. The touchscreen is installed in the greenhouses and students will develop a program in computer class to add anecdotal data from the aquaponic system. Because the students are the ones developing the program, they can make the touchscreen do what they need or collect what data they want. The students are in full control of the program and are not restricted to specific programming languages or services. The only limit is their imagination and creativity!

Our students grow hydroponic leaf lettuce and Tilapia as part of their integrated K-6 STEM curricula and the high school vocational agricultural program. Since they are creating a system that can produce 110 pounds of fish per year and 17-27 pounds of leafy greens per week, they want to be environmentally
responsible by growing their greens from seed and breeding their Tilapia through quality selection. It would not be economical, nor environmentally responsible if the students had to purchase and ship seeds or young fish each time they needed a new supply. The self-sustaining possibilities of aquaponics will create learning opportunities for children to see food from farm to table. The seedling heat mats and drip systems allow the students to properly grow greens from seedlings. Students learn to reinvent agriculture in order to produce food that is sustainable and highly productive. In the high school, students run their aquaponic system in conjunction with a selective Tilapia breeding program. The tank equipment provides the technology the students need in order to selectively breed their own Tilapia and provide fingerlings, young fish, to continually sustain the fish need for the aquaponic systems across the district. Students use the serial camera with the Raspberry Pi Boards to engineer and create a live-stream video monitoring system for their fish. They will program the camera to monitor their fish and provide a live-stream on the District’s YouTube Channel so they can check the condition of their fish anytime, anywhere with an Internet connection. This real-world application with technology, biology, and agriculture will create a truly hands-on learning experience while supporting the growing need for local produce.

Units in aquaponics enforce practical applications in biology, horticulture, chemistry, mathematics, physics, economics, technology and engineering. Students learn life cycles, nitrification, biology, fish anatomy, nutrition and technology-enhanced agriculture. Students solve real-world problems and make a positive impact on their community or world. By experiencing learning projects that are integrated across subject areas and grade levels, students begin to see a larger purpose for learning.

The “Can artificial intelligence predict beehive health?” project creates an open-source program utilizing artificial intelligence to predict beehive health. Students learn about artificial intelligence in their computer classes. In their science classes, students learn about pollinators and colony collapse disorder in honeybees. Equipped with solar-powered Raspberry Pi computers and high quality outdoor cameras, students “teach” the computer to identify bees entering and exiting a hive and analyze the data to monitor and make predictions on beehive health out in the field. Students develop their system to support their school beehive and beehives at a local farm for big data comparisons. The entire project is documented utilizing video, audio, and data-sharing programs and provided as an open-source project for others to replicate. We also saw with our recent cross-grade and cross-curricular projects how students at a variety of grade levels can participate, from elementary school to high school. For science, students study pollinators and the effects of pesticides on colony collapse disorder. For technology, students learn how to teach a computer the difference between a bee and “not a bee” and how to count the number of bees entering a beehive. This project shows students that artificial intelligence is approachable and that students are capable of developing their own AI programs. Elementary students research and install solar power to run entirely on sustainable energy sources. We engineer a Raspberry Pi AI system that is solar-powered and waterproof. Students learn how to work within our means of budget and sustainability. For mathematics, students learn how to make scientific predictions with big-data sources. Our primary outcome is to integrate STEM skills to develop a big-data project using in-the-field technology to support a natural ecosystem. The expected outcomes for third grade are: to teach a computer to classify “bee” versus “not bee,” use data to make conclusions, and identify scientific patterns. The expected outcomes for fourth grade are: to develop a Python program to run independently outside in the field, use data to make conclusions, and identify scientific patterns. The expected outcomes for fifth grade are: to understand how scientific theories are developed, identify observable patterns, develop a solar power needs assessment, and install a solar power unit. The expected outcomes for our AP Computer Science Principles class is to program in Python for AI with cameras in using Raspberry Pi’s. Our second outcome is to collaborate as multiple grade levels and multiple schools, yet one cohesive unit in achieving a goal. This project will require each grade level to participate with their “part” in order to succeed toward the overarching goal. Each grade level will contribute to the project and will require cross-grade level collaboration in order to be successful.

The District’s “Chicks Dig Egg-onomics” project embodies STEAM and student skill levels by creating a K-12 collaborative project where students plan, design, raise and harvest their own egg-laying chickens using sustainable energy sources. Students research and design their chicken coop and collaborate with high
school CTC students to build their ideal building. Once built, the coop was installed in a designated area and students paint the building and install solar energy sources for lighting and monitoring devices. At the same time, students raise chickens from an egg using their incubators. Monitoring devices, such as temperature sensors, humidity sensors, security cameras, and automated doors are programmed by students in technology classes. Once the chickens were at the appropriate age, students added them to the designated building and harvest eggs daily for use with the family and consumer science classes, school cafeteria, and local sales. Our inspiration for this project comes from our successful implementation of an embryology project during the 2020-2021 school year. The more we work on this project, the more we see the integration of science, technology, engineering, arts, and mathematics. We also saw how students at a variety of grade levels can participate in the project to contribute, from kindergarten to twelfth grade. For science, we will study the biology of raising a chick from egg to adult. We will be able to differentiate the instruction in science for students based on age. Some students, kindergarten for example, will look at the life cycle of a chicken. Other students, high school biology for example, will explore poultry genetics and reproduction. For technology, we research and install solar power to run entirely on sustainable energy sources. We program sensors, an automatic door for the chicks, and a live stream for the chicken coop. We engineer a chicken-centered building that is designed for their needs and will learn how to work within our means of budget and sustainability. For the arts, we maintain an electronic journal of our progress via Google Sites and paint to make the building aesthetically pleasing for all, chickens and humans. Finally, the design of the building requires significant mathematics and we use what we have learned in math to develop a sound structure. Our primary outcome is to integrate STEAM skills to sustain life cycles. The expected outcomes for kindergarten are; describe the stages of the chicken life cycle, describe the behaviors of chickens, and plan a scientific investigation. The expected outcomes for first grade are; plan and conduct a scientific investigation with the fertilized eggs, describe a chicken's changing needs with habitat, and observe and record temperature. The expected outcomes for second grade are; use data to explain your egg scientific investigation and explain the needs chickens have to survive. The expected outcomes for third grade are; classify chickens in the animal kingdom, describe the basic needs of chickens to produce eggs, identify the food production cycle, and identify scientific patterns. The expected outcomes for fourth grade are; describe the different life cycles of chickens, use data to make conclusions in the fertilized egg experiment, and identify the characteristics of chickens to reproduce in greater numbers. The expected outcomes for fifth grade are; explain the concept of a cell, understand how scientific theories are developed, and identify observable patterns in chicken parents and their offspring. The expected outcomes for sixth-eighth grade are; program sensors in Python using Raspberry Pi’s, develop a solar power needs assessment, install a solar power unit. The expected outcomes for our high school CTC students are; build from an architectural building plan, communicate effectively with the customer, plan and produce a product according to specifications. Our second outcome is to collaborate as multiple grade levels, yet one cohesive unit in achieving a goal. This project requires each grade level to participate with their “part” in order to succeed toward the overarching goal. Each grade level contributes to the project and requires cross-grade level collaboration in order to be successful.