



**UCLA** Sustainability Action Research



# ECE Sustainable Gardening

## FINAL REPORT

**Stakeholder:** Dr. Tashon McKeithan

**Team Leads:** Mia James, Joseph Serafino

**Team Members:** Emma Carey, Ben Grieder, Grace Miller,  
Yvette Lee, Faith Shortridge

**SUSTAINABILITY ACTION RESEARCH 2024**





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# Team Leads



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# Introduction



## Abstract

School gardens provide opportunities for environmental education and promote connections with nature, especially for younger children. This project addresses the need for a dedicated garden space and curriculum at the Krieger Center, an Early Care and Education Center at UCLA. Our team developed a report outlining the construction and maintenance of a sustainable garden at the Krieger Center, alongside a curriculum for teachers to utilize the garden for educational purposes. The team reviewed articles on sustainable gardening practices, including irrigation, soil health, and drought-resistant plants. In initial informational interviews, our team gained insight on the link between garden construction and principles of Equity, Diversity, and Inclusion (EDI). Additionally, we conducted interviews with Krieger Center faculty and families to understand their needs and incorporate them into the curriculum design. Challenges included limited response rates from gardening education non-profits and leaders. We had communication hardships amongst the bureaucracy of UCLA and a big limitation of our project was time because we initially hoped to see a garden constructed and in place. The accumulated knowledge is compiled into a structured report including a garden construction plan and a teacher-friendly curriculum tailored for the preschool age group (linked below). This project, being the first of its kind for the SAR program, will hopefully result in a safe and sustainable garden in the Krieger Center in the near future.



## Background

UCLA's Early Care and Education is a nationally recognized program that aims to provide child care and education that evolves with the most recent brain development research (UCLA, 2024). We have been asked to help UCLA ECE develop a sustainable learning garden at one of their three childcare centers- the Krieger Center. During our audit, we observed the way the Krieger Center fosters a conducive environment for early development by keeping curriculum flexible and largely based on student interest. A learning garden will expand the options child care staff have with this flexible curriculum, allowing for sensory exploration and age-appropriate lessons on nature, nutrition, and sustainability. Outdoor garden lessons have been proven to be optimal for young children's cognitive development, and it is important to be mindful of sustainability in the construction and maintenance of a school garden. So our question for this interdisciplinary research was:

## What are the best practices for establishing a sustainable learning garden at the Krieger Center?

The purpose of this project is to develop a comprehensive plan for this garden consisting of two components: a garden plan and a curriculum plan.





### **Garden Plan**

The garden plan component will detail the necessities of building and maintaining a garden while prioritizing sustainability. It includes a sample layout and relevant data around sustainability and gardening practices. It will address variables like the height of garden beds, safety for young children, irrigation methods, and cost.

### **Curriculum Plan**

Since the Krieger Center uses a student-initiated approach, the curriculum plan will be comprised of suggestions for teachers to utilize in the garden if students are intrigued. We will incorporate activities for groups of various sizes and lessons that can take place in the garden and also incorporate indoor classroom space.

## **Methods**

We determined the proper methods for this project would be literature review and informational interviews for the time and resources available to us. Literature reviews were conducted using peer reviewed scientific articles or from visiting organizations websites for garden curriculum suggestions. Most interviews were conducted via Zoom and in person, while some supplemental information was collected via Google Form or by email.

### **Literature Review**

The literature review for this project was conducted individually, compared and vetted by team members, and subsequently filtered through our interview suggestions so that both were taken into consideration while sustainability and safety was prioritized. Literature review aligned with interviewee suggestions to contextualize and expand upon their expertise. We searched for relevant information on garden sustainability, education, and construction in peer reviewed sources and recent articles written within the last few years.

### **Informational Interviews**

We formulated interview questions based on the groups of experts we would interview: garden educators, sustainability experts, and Krieger Center staff. To prevent bias and respect the time of our interviewees, our questions were succinct and not leading. The questions were then vetted through Sustainable Action Research directors and advisors to ensure professionalism. Most interviewees contacted were community members, Krieger Center faculty contacted through Alicia Minor, and local sustainability organizations.

# Interviewees



## Garden Educators



**Colleen Parenteau**

Science Teacher and Garden Manager

This interview focused on the logistics of constructing a sustainable garden, as well as the curriculum associated with the garden. Colleen provided us with diagrams of garden beds, and discussed different irrigation methods, ideal garden design, and how to select sustainable native plants. We also touched upon constructing the garden in a way that was inclusive to those with physical disabilities, and designing a curriculum that acknowledges native people and their relation to the land. Colleen also shared lesson plans that focused both on teaching subjects such as science and math, as well as engaging students with sensory gardening experiences and hands-on learning.

**Elsa Gallazzini and Sam Starnes**

ECE Staff at the Krieger Center

Elsa and Sam, both of whom have backgrounds in education and a thorough understanding of the Krieger Center's curriculum, have been working with students at the center firsthand. Our goal was to learn more about their classroom dynamics and what their primary concerns were about implementing a new curriculum. In addition, we discussed how garden lessons could be incorporated into classrooms.



## Garden Education Researchers



**Chris Jadallah Ed.D**

Assistant Professor in the UCLA Education Department

Chris has years of experience teaching garden education lessons as well as writing curriculum for garden education programs. He is conducting ongoing research about garden education programs and how they can become more equitable for both students and educators. We asked him for advice on how we can ensure our garden and its accompanying curriculum can incorporate DEIB and be an accessible and accepting space for everyone.



# Interviewees



## Valerie Bang-Jensen, Ed.D

Professor of Education at Saint Michael's College

Valerie specializes in garden-based curriculums, so much of our discussion centered upon the academic aspect of our research. She walked us through various themed gardens, such as word gardens for literary learning, native plant gardens, sensory gardens, and library gardens that centered around a particular story. Valerie provided many resources such as books and conferences that went into further depth on garden-based curriculum.



## Gardeners

### Abudu Nininger:

Carpenter & Permaculture Expert



Abudu is a forester at Mama Tree, an orchard with goals to become an ecological safehaven through permaculture designs. He also created and runs his own community garden, the Akwaaba Urban Food Forest Project. This food forest is community driven and allows community members to learn how to garden and increases their access to fresh produce while helping to prevent food insecurity in the broader LA region.

### DIG at UCLA - Garden Club Leadership

Student run gardening club that was founded in 2012

DIG's garden rests at the top of Sunset Recreation Center which is very close to the Krieger Center. This garden is the closest in distance and in size to what we expect to see at the Krieger Center so their information is valuable for scaling and UCLA climate based gardening. They also have similar problems with soil health, sustainability, and pests. These students are experts in UCLA gardening and are familiar with the problems that UCLA has in creating and maintaining gardens.



# Interviewees



## Krieger Center Community



### Kenji Ono

UCLA Facilities Mechanic - AX

Kenji is the handyman for a few properties on the UCLA campus including the Krieger Center. He has a lot of experience in different trades, but has recently been appointed as the facilities worker for the Krieger Center. He handles both indoor and outdoor facilities and he would be the main person setting up the beds, planters and irrigation system for our garden. He was useful for understanding the timeline and feasibility of setting up different types of beds and also told us about making Field Service Requests (FSRs) to the Krieger Center management team for equipment needed to build the garden.

### Alicia Minor and Rosie Castillo

Former Director and Interim Director of the Krieger Center

Alicia is an experienced administrator with intimate knowledge of the facility and its community. She was able to advise us on possible locations for the garden as well as the Krieger Center's values and curricular approach. Rosie was Assistant Director during winter quarter and served as Interim Director during spring quarter, heading communications with our team. She was invaluable in connecting us to the people and resources we used during our research of the Krieger Center.





# Challenges and Limitations

## Challenges

We faced many challenges early on in this project. We suffered from lack of responses to cold email outreaches. Our first successful interviews came through personal contacts, so we altered our approach by working closely with the SAR Faculty Advisor, Carl Maida, and our stakeholder, Tashon McKeithan, to be connected to people that they know in the field.

The Krieger Center is a challenging place to establish a garden. They had tried a few times to establish gardens there, but multiple factors led to their disuse. The soil is not productive enough to plant into the ground, and squirrels are known to destroy the center's plants. Additionally, many sources recommended a greenhouse, a garden in the ground, or including trees and shrubs. Although this would be more sustainable, the amount of space does not allow for this to come to fruition.

A major challenge was the large amount of internal reorganization in UCLA ECE at the Krieger Center during the months of our research. This made communications and collecting data from teachers and parents quite difficult, which pushed our timeline back during spring quarter.

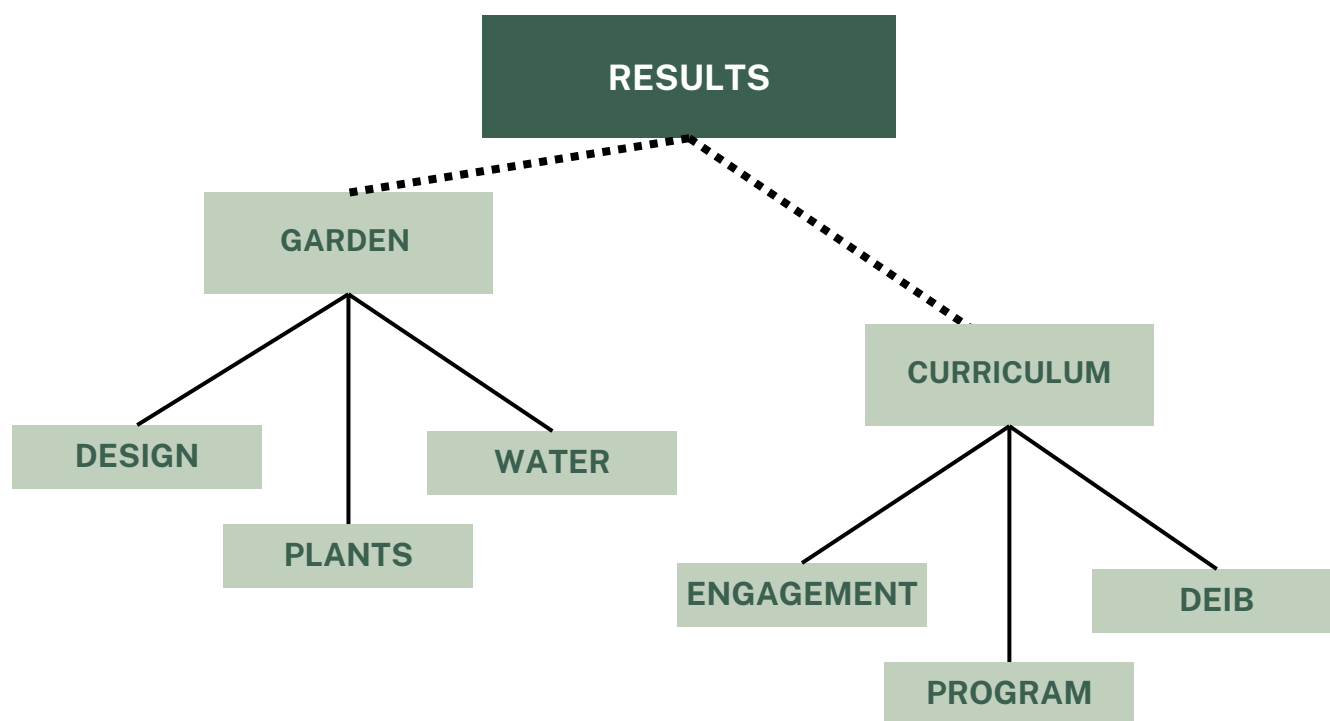
Further, there was a sudden switch to online classes in the middle of spring quarter. Many meetings and interviews had to be rescheduled or canceled as well, decreasing the amount of information we were obtaining. Furthermore, these cancellations dragged out the project schedule, so our team was unable to get as much done as we originally planned on. While classes eventually returned to in-person and our regularly scheduled meetings returned, this challenge definitely set our team back further in the research timeline.

## Limitations

The scope of our project was limited by several factors. The Sustainability Action Research program runs on a short timeframe, from January to June. We were initially tasked to both plan and construct a garden, but this proved to be impossible in the time frame. Discussions with Tashon, Alicia and Rosie, led to the decision to create a report outlining plans for the garden as our final deliverable. This project was also limited by our access to the physical facility. The safety of children at the center necessitates that visitors must be escorted through the center, but if SAR had had a closer connection with UCLA ECE, we would have been able to visit the Krieger Center more and speak with parents and teachers directly.



# Results



We have combined the results from our literature review and our informational interviews and organized them into six themes: design, plants, water, curriculum, engagement, and DEIB. The former three themes will inform our garden plan, and the latter three will inform the curriculum plan.





# Design

## Location

When we took a tour of the Krieger Center guided by Director Alicia Minor, she showed us multiple possible locations for a learning garden. There were a few places she suggested, but she highlighted one location in particular. The location has a slatted wooden pergola to provide partial shade as well as easy access to a water spigot and outdoor storage for gardening tools. The space is about 10x10, flat, paved with cobblestones, and has a paved pathway leading to it. The location is situated right outside of the office, in an underutilized corner of the outdoor play area that serves three of the five classrooms. She added that the garden would be easily accessible to those 60 students during playtime as well as class time, and the other two classes are free to schedule a time to visit the garden.

## Soil

Given the unknown conditions of the existing soil and the treatment of current grass and weeds at the Krieger Center, using new soil was recommended (Nininger, 2024). The soil provided should be rich in bacteria for most of the vegetable plants because annual plants typically grow better in that soil environment. Furthermore, to ensure the soil is rich, it is recommended to add compost, mineral matter, bone meal, and green sand each year. This keeps the soil nutrient-filled and manages phosphorus and potassium levels (Nininger, 2024).

## Raised Beds

In designing a larger garden, Abudu Niniger recommended it would be beneficial to use polyculture to promote nutrient restoration of the soil and biodiversity. However, with less space, creating different beds for different water levels that plants need is beneficial because we can decrease the amount of water one planter gets if they are drought tolerant (Nininger 2024). Abudu helped us with design and sustainability questions related to the garden. As a carpenter by training, he understands the impact of resource extraction and aims to limit that in his own work through reusing materials and using wood that is easily replaced and grows fast. He discussed in detail the prioritization of sustainability in every step of the garden from sourcing materials to building the garden all the way to harvesting the edible plants and management of other plants (Nininger 2024). This includes buying soil in bulk to prevent plastic bag waste from smaller retailers. Another suggestion was separating the plants by water requirements so that the drip irrigation system could be even more water efficient by delivering optimal amounts of water to each type of plant (Nininger 2024).



Raised bed ornamental vegetable gardens are a popular method with an appropriate design, especially beneficial for those with limited outdoor space such as private gardens, schools, and kindergartens. They also serve as educational tools for younger generations and inexperienced gardeners (Hangan et al., 2021; Wells et al., 2018; Graham et al., 2005). In landscape design, raised garden beds merge aesthetics with practicality, providing benefits that enhance both functionality and visual appeal. This approach offers easier plant maintenance due to fewer weeds and better drainage, quicker heating of the soil in spring, loose substrate, and the ability to maximize space through intercropping systems (Hangan et al., 2023). Furthermore, they improve control over soil quality, facilitate healthier plant growth, and increase crop yields. Using wood, particularly redwood or oak, is a cost-effective solution for constructing these beds, offering durability and a natural look. Eastern cedar is another solid option due to its ability to resist rot (Parenteau, 2024). When designing and implementing urban agricultural gardens, it is crucial to consider factors like pollution, absorption capacity, and potential sources of contamination to ensure a sustainable and healthy environment.



It is suggested to include wire mesh on the bottom of the beds to prevent rodents from burrowing into the garden (Parenteau, 2024). The composting can be interlaced with the curriculum by partnering with a compost company; students can put their compost into bins, and the vendor collects these bins and in turn offers some of the compost back. Additionally, to ensure soil health, crop rotation is suggested. This method prevents pests because changing crops kills pests as they will not have consistent access to their preferred food source. Our plan for three raised beds allows for crop rotation (Parenteau, 2024). The gardening club at UCLA also gave us tips to prevent squirrels from taking plants and ruining the garden. They suggested chicken wire cages to prevent squirrels from digging up seeds from the garden or buying developed plants so that the squirrels have no seeds to attack (DIG, 2024).

# Plants

## Plant Selection

Through our plant research we discovered that sustainable plants for California would be those that inhabit a drought-tolerant or Mediterranean climate. For these plants, it is helpful to add organic matter to soil to increase its ability to hold water and nutrients, as well as improve structure. Native Californian drought-tolerant plants include Agave, Echeria, Sedum, Lavender, and Russian Sage. These should be planted in maximum sun in soil that drains easily (Gardenia, 2024).



In terms of edible native Californian plants, there are acorns, Pinyon Pine, Manzanita berries, white sage, mesquite, prickly pear cactus, wild cherries, chia seeds, and grapes (Wei, 2016). Other edible plants we researched were drought-tolerant, but not native. These include sweet potatoes, ("Water for Sustainable Agriculture in Developing Regions," 2001) chickpeas, and black-eyed peas (Temple, Steve, et al., 2010) as discussed in literature review.

While researching potential sensory plants for a stimulating curriculum, Valerie Bang-Jansen suggested carrots due to their root system, stating she found that young children loved to pull them out of the ground (Bang-Jensen, 2024). We found that carrots grow well alongside beans, broccoli, peppers, radish, rosemary, lettuce, onions, and peas (Stone Pier Press, 2024). The research showed that Lamb's Ear, a fuzzy plant with purple flowers, is considered a sensory plant. Although native to Turkey, Armenia, and Iran, it still grows well in California, requiring moisture and a sunny location (Waterwise Garden Planner for Southern California, 2024). Additionally, Colleen Parenteau mentioned mint as a sensory plant due to its distinct taste and smell. Additionally, it is safe for children, drought-tolerant, and resilient (Parenteau, 2024).

# Water

## Drip Irrigation

Conventional irrigation forms tend to waste water and input unnecessary stress on plants (Shoji, 1977). Drip irrigation is the most water efficient way of bringing water to the individual garden beds, however it does have problems of its own. It uses plastic and usually needs to be replaced after ten years (A. Nininger, 2024). Burying it under mulch is needed to diminish the sun's impact on the deterioration of the drip irrigation. The ideal time to water the plants is early morning or afternoon just before dusk, and it is important to water the ground surrounding the plant rather than watering the plant (Parenteau, 2024).







# Programming

## Krieger Pedagogy

The tour of the Krieger Center with Alicia Minor provided important logistical details, including the number of students and teachers at the center. There were 60 students divided into three classes on one side and 48 students with 8-9 teachers on the other side, totaling 12 teachers overall. The student demographic was primarily aged 2-5 years. The school operated year-round, which was crucial for garden upkeep. We also discussed the frequency and availability of groundskeepers or other gardeners, who were scheduled every 2-3 months.

In terms of programming, Alicia explained that they prefer not to follow strict curriculum planning, allowing teachers to gauge student interest when exploring topics. In order to learn more about how the different classrooms operate and what would work best for them in designing the curriculum, she suggested that we interview Kreiger teachers and room parents. Discussions included incorporating keywords and themes for each classroom to build upon. To help the students become more familiar with us, Krieger Center teachers, Elsa and Sam suggested that we schedule more consistent trips so that the center can plan around finding times when the kids are more attentive and can prepare more staff to help us out.

## Books

Several books were suggested to help build a curriculum. Leah Penniman's *Farming While Black* connects children of color to the land in a way that reframes and helps process history. *Fry Bread* by Kevin Noble Maillard is a picture book about Native Americans sharing and harvesting food from the land.

Both of these books would contribute to a diverse and inclusive curriculum (Bang-Jensen, 2024). *Rainwater Harvesting* by Brad Lancaster delves into xeriscaping and managing drought (Parenteau, 2024). Additionally, Bang-Jensen's own work, *Books in Bloom*, delves into 17 children's books, with specific garden-related lessons for each one (Bang-Jensen, 2024).

# Engagement

## Classroom Structure

From the Krieger Center interviews, both Elsa and Sam stated that the maximum amount of time that they can expect their students to stay focused and engaged in a lesson is around 15 minutes. Sam added that this fluctuates day to day, but added that there should be a 15-minute cap on all lessons. Both teachers explained that they would pair a book and a song that fit within a 10-minute circle time, and then move on to a new activity. Both teachers brought up that they use small groups for many of their lessons.

## Lessons in the Garden

We can do possible lessons in the garden involving the layers of soil and the difference between grasses, shrubs, and trees. These are easier lessons that broaden a child's understanding of the Earth and teach important vocabulary in an outdoor setting (A. Nining April 2024).

Elsa Gallazzini, one of the Krieger Center teachers we interviewed mentioned that the younger students at the center do a lot of gardening because of the tangibility of the concept and development of motor skills. Elsa's class, the Eagles, have had exposure to gardening at the center in the past. The students worked on planting, seeds, potatoes, and corn. The kids would water on Thursdays and Mondays, and at the end of the season, they got to pick and eat them.

Sam Starnes, who teaches another class called the Koala suggested that we include new concepts to introduce as the students are familiar with some parts of gardening. For example, Sam was interested in introducing topics such as hydroponics and cross-pollination into the curriculum.

## Songs

The SAGE curriculum structure offers simple garden songs will reinforce key concepts. These songs, sourced from various early childhood education websites, include interactive elements and movements to enhance engagement.

## Eating Produce

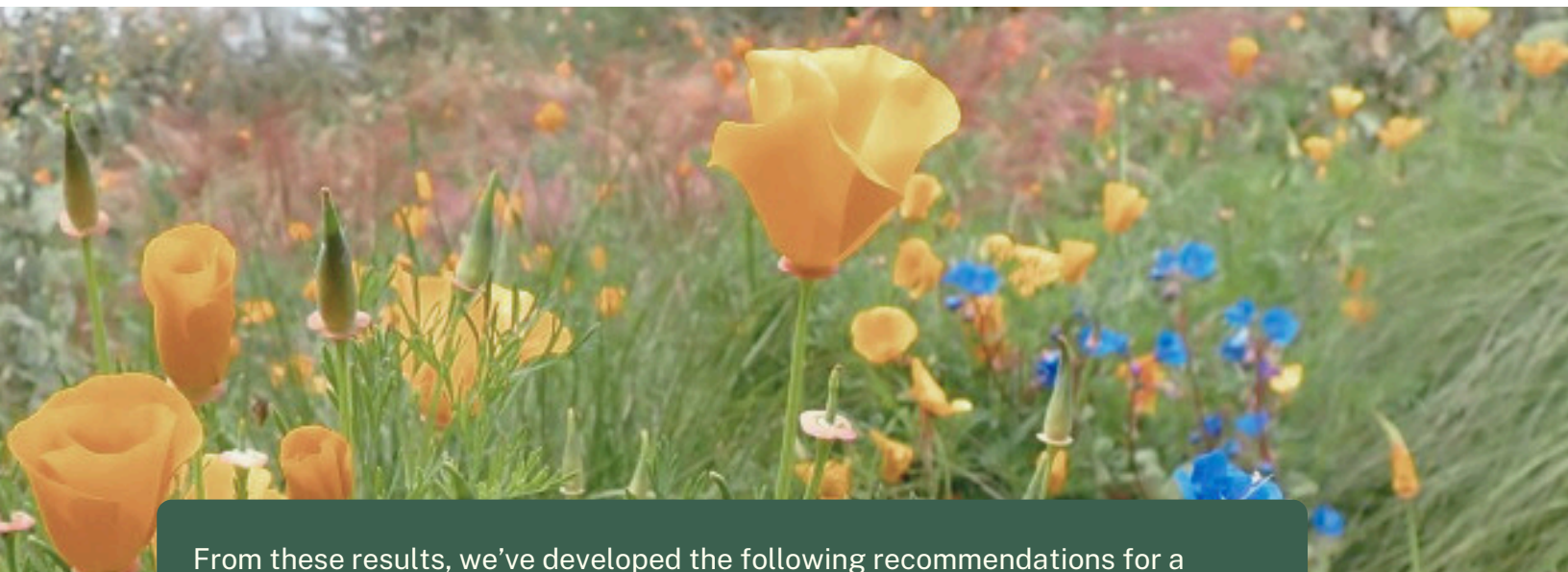
One curriculum topic will focus on nutrition, teaching students how gardens can sustain humans. The lessons will emphasize balanced nutrition rather than categorizing foods as good or bad. Additionally, they will cover the differences between edible and non-edible plants, providing a comprehensive understanding of garden produce. Discussions will also include how produce and eating habits vary across cultures. Books such as Fry Bread will be incorporated to educate students about Native American harvests and recognize the land we inhabit. This approach aims to foster an appreciation of cultural diversity and the significance of different dietary practices.

# DEIB

## Intentionality

When it comes to gardening with children this young, one of the practices we were advised to use was moving with intentionality (Jadallah, 2024). Dr. Jadallah explained how it affords learners more opportunities to build and deepen their relationships with nature in a way that's open ended, free form, and play based, which is important to young children. Children see organisms in nature as their friends, and that is something garden educators can learn from. In many garden education programs, there's pressure to move fast and get the work done. That emphasis on productivity was damaging for the teachers Dr. Jadallah has worked with in his research. Communities of color have different traumas around land, and emphasizing hard work was bringing up and reinforcing problematic ways of relating to land. By moving with slowness and allowing for just more exploration, students of all backgrounds can make relationships with land instead of perpetuating these. Additionally, we were advised to honor and build from learners' cultural knowledge by getting to know our audience. If we knew more about the plants and the food crops families found culturally important, children would more easily find belonging and a sense of ownership of the garden.

# Discussion



From these results, we've developed the following recommendations for a future team to utilize when building a learning garden at the Krieger Center.

## Garden Plan

### Design

At the Krieger Center, although in-ground planting is generally more sustainable, raised beds were chosen for their ease of use and suitability for students. The location already has a level, wooden base, allowing raised beds to be placed without altering the ground beneath. This designated space will concentrate on the garden area, facilitating learning and protecting it from being trampled during playtime. Three beds were deemed ideal to accommodate a variety of plants: sustainable native plants, edible plants, and sensory plants used for lessons. A three-foot width is suggested for the garden beds, as this is long enough to allow plant growth but short enough to ensure preschoolers can reach across and access the plants.

While raised beds do not retain water as well as in-ground gardens, prioritizing safety and practicality is essential. Future evaluations by SAR teams to test soil viability could potentially support a transition to in-ground gardening if the soil is found suitable for food production and gardening.



In designing and creating the initial garden, we hope to mitigate waste and consumption first and foremost. Some of these items may not be possible because of financial or administrative restrictions on items that we recommend. Sourcing soil is the first step in creating this garden. Typically soil can be bought at stores but it comes in a plastic bag that is contributing to waste. Therefore, we thought it would be beneficial to order soil in bulk from companies that deliver directly to locations or that sell in reusable containers.

## Plants

Our plant selection focused on including a mix of plants that were sustainable, edible, and useful for educational purposes. For Southern California sustainable plants, we chose succulents as they are both native and sustainable. Their leaves hold a lot of water, which means low water usage. Additionally, the intriguing shapes and textures will be engaging to students during lessons. Lavender is another native drought tolerant plant which we chose for the garden. It has a distinct smell and although bitter, it can be consumed. Therefore, it could be a stimulating, non-toxic option for preschoolers. Additionally, Russian Sage is a drought-tolerant perennial with striking blue flowers which we decided to incorporate into the garden (Gardenia, 2024).

The next type of plants were those that were edible, as our stakeholder requested plants that could be consumed. Keeping in line with the sustainability aspect, we hoped to include only native edible plants, but most of California's indigenous species are not commonly consumed. However, chia seeds and native California black-eyed peas are native and commonly eaten, so they emerge as a solid option (Wei, 2016). We selected these to make up our "edible plants" portion of the garden.

The final category included plants that were stimulating to the senses, as these are more likely to engage preschoolers during lessons. Lamb's Ear is a good option for this group, as it is very fuzzy to the touch, can grow purple flowers, and grows well in California (Waterwise Garden Planner for Southern California, 2024). Mint is a somewhat sustainable plant that requires water every 2-4 days. It is both engaging to smell and taste, and is drought tolerant and resilient. However, mint should be cautiously planted as it can easily spread and is an invasive species in California. Finally, we chose carrots as they were mentioned by education professor Valerie Bang-Jensen as a very good plant for sensory gardening (Bang-Jensen, 2024). It is relatively drought-tolerant but needs lots of water early on and is non-native (Stone Pier Press, 2024).



## Water

When looking at a possible irrigation system, it was important that it was drip irrigation and that it would fit the size of the proposed gardening beds. We chose drip irrigation because it is most efficient in watering our proposed crops, meaning it uses the least amount of water. The garden beds altogether are going to be less than 200 square feet which means we need an irrigation system that can span the length of this garden without buying too much in excess irrigation. Therefore our final recommendation is the Irri-Gator 100 Drip Irrigation Kit because of its size, adaptability, cost, water usage, and overall design. Additionally, covering the drip irrigation system with mulch will help prevent the tubing from being damaged.





# Curriculum Plan

Based on the results of our conversations with Alicia and the teachers from the Krieger Center, we developed a 10-week curriculum plan to be piloted over a future quarter. The Krieger Center does not follow a strict curriculum planning approach, so our plan outlines ten topics, each with a 45-minute lesson. Each topic outlines relevant keywords and core concepts. Since the students are already accustomed to circle time with a book and a song, we researched suitable books and songs for each week's topic. We also included 2-3 small-group activities per topic - at least one for the classroom and one for the garden. Based on our literature review, we added a take-home activity for children to complete with their parents, aiming to foster engagement both inside and outside the classroom.

## Large Group Activities

The teachers emphasized the importance of providing hands-on experiences that challenge students at all levels. Consequently, many of our classroom activities are interactive and involve engagement with the environment and each other. Each of our lessons follow a consistent structure, starting with a 10-15 minute circle time where children are introduced to the key concept and important vocabulary. This part of the lesson includes reading a relevant book or singing a song, followed by an interactive game to reinforce the concept and cater to different learning styles. For example, the first topic is the plant life cycle. Students will plant beans in a jar and observe their rapid growth. These activities can be done individually or in small groups, offering flexibility for teachers within each of their classrooms. Additionally, some of the topics have multiple activities to choose from, providing more options for the classrooms to pick from.





## Garden Activities

After circle time, the children participate in a hands-on garden activity. These activities are designed to be done in smaller groups to ensure each child gets ample opportunity to engage and learn. Elsa and Sam let us know that they do outside activities with smaller groups, as and when the children go outside to play, so we decided to mirror this format in our curriculum for the outdoor garden activities. Additionally, the small group format will allow us to gauge each student's understanding better than whole class activities and promote independent discovery. For example, the garden activity for our lesson on biodiversity includes going on a nature walk around the Krieger Center and talking about how the things you see (trees, squirrels, birds) are important for biodiversity and what their habitats are.

## Take Home Activities

To extend learning beyond the classroom, each lesson includes a take-home activity which encourages children to involve their parents and continue exploring sustainable gardening practices at home. For example, the take home activity for our lesson on sustainability is a "Sustainability Scavenger Hunt" where we provide them with a small checklist of sustainable practices to do at home before the lesson next week, including things like turning off the sink tap when brushing your teeth and bringing a reusable water bottle to school.

## Implementation

While we made sure to use the Kriger Center staff's advice for our lesson structure and what to include in the overall curriculum, we wanted to give them an opportunity to discuss their thoughts on the first template which would be updated in the future. We gathered feedback on our initial draft from teachers and parents at the Krieger center, and while it was overwhelmingly positive, we made slight changes to our final curriculum using their suggestions. They specifically liked how we highlighted the word or concept that they would be learning about through the book/sensory/song etc. and kept it as simple as possible, and also made use of sensory bins to support your plans for that week (Starnes, 2024) . The main suggestion was to reconsider making the growing aspect a competition/a class being the best. Sam mentioned that even when they play typical playground games it's not to have a winner/a child to be the fastest/strongest/1st, etc. The Krieger Center tries to curtail that, the goal of the game is just to run, exercise and play as a group and to learn about the process/skills of the game not the result. Therefore, we adapted our final curriculum to change the competition aspects and instead made it a crop rotation game where each class takes care of a specific plant and then swaps every week.





# Impact



## Sustainability

The use of a garden for educational purposes is not inherently sustainable. We are adding greenery to a space in which we must add water and soil of our own to grow the food. We did not formally research the impacts of children eating produce from the garden rather than food from home, and the environmental impacts of that, since it is so small scale. Another impact is the maintenance needed to prevent wood rotting and other problems. If the garden is not cared for, it would negatively impact the environment to replace the materials. Conversations on ethical consumption are vital and more research should be done to see the lifetime of these garden beds, maintenance to maximize the time the garden lasts, and overall minimization of our consumption of natural resources.

## Community

Our project fosters sustainability in the UCLA community, as most Krieger Center students are children of UCLA faculty, staff, or students. Beyond UCLA, our deliverables and reports will be available to the public on the UCLA Sustainability Action Research website. This is the first Sustainability Action Research project to handle sustainability in early childhood education and one of the first few to focus on gardening. A future SAR ECE Gardening team can implement our plans and curriculum. We have included in the Appendix A selection of charges to this future Team. We hope our work will have lasting impacts on sustainability education at the Krieger Center and inspire the next generation of sustainability leaders.



# Acknowledgements

## **Dr. Tashon McKeithan**

## **UCLA ECE Staff**

Alicia Minor, Rosie Castillo,  
Marcia Martinez

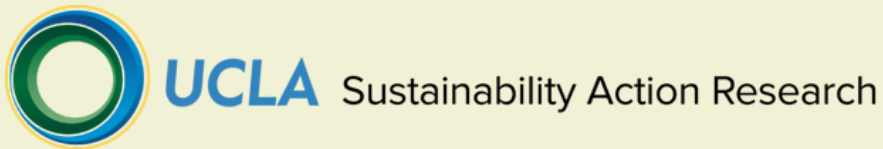
## **Krieger Center Students and Parents**

## **Our Interviewees**

Colleen Parenteau, Sam Starnes,  
Elsa Gallazzini, Valerie Bang-  
Jensen, Kenji Ono, Chris Jadallah,  
Abudu Nininger

## **SAR Advisors and Directors**

Carl Maida, Cully Nordby, Sam  
Trezona, Grace Salvestrin





# Appendix

## Final Deliverables

### Deliverables Location

The final presentation and final report for this project can be found on UCLA's Institute of the Environment and Sustainability website on the SAR projects page (<https://www.ioes.ucla.edu/sar/our-work/>). Our project is the "Early Care & Education Gardening" project, and the final deliverables will be linked at the bottom of the blurb on that project page.





# Appendix

## Recommendations to a Future SAR ECE Team

Future SAR teams can use our data collected to solidify plans and start implementing the actual garden construction. Using our recommendation a new SAR team can continue discussion with facilities to make sure that the garden is as sustainable as possible. This team can then receive feedback from educators on how the garden could be improved or if the curriculum needs to be changed for the following year.

The next SAR team will need to apply for funding so that the garden can be kept sustainable and the resources for building it is sustainably and ethically sourced. This money could be taken from TGIF or other sustainable or educator funding organizations. The team would need around two thousand dollars to pay for labor and purchase garden beds, irrigation, plants, and soil, that is sustainably and ethically sourced. The team can potentially research cheaper alternatives that sacrifice some sustainability for viability with costs.

After the garden is complete and the curriculum is taught, a new SAR team can then receive feedback from teachers that have been participating for several years. They could even try and find students that have moved on to elementary school to see if the garden in the care center changed their perspectives on sustainability or gardening.







# Appendix

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## Deliverables

Garden Plan:

[https://docs.google.com/document/d/153HAMaSlDqxpTtvxTn00V0XgF9lvxjAwI\\_SZL74ephA/edit?usp=sharing](https://docs.google.com/document/d/153HAMaSlDqxpTtvxTn00V0XgF9lvxjAwI_SZL74ephA/edit?usp=sharing)

Curriculum Plan:

<https://docs.google.com/document/d/15bLinj2J8CkCzly3IMscyqJMZbov47V9l45RroNUIAU/edit?usp=sharing>

