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## Courses

### Title

The Buzz Studio: Planning Equitable Cities for People and Pollinators | Spring 2022 Studio Course

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# **THE BUZZ STUDIO: PLANNING EQUITABLE CITIES FOR PEOPLE AND POLLINATORS**

**GLOBAL URBAN HUMANITIES  
INTERDISCIPLINARY  
GRADUATE STUDIO  
CASE STUDY**

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## WHY READ THIS CASE STUDY?

Many graduate students are keenly interested in urban communities, but many of them miss the opportunity to work directly with community-based partners and/or learn as part of a team working in a studio-based setting.

In this graduate research studio, **Buzz Studio: Planning Equitable Cities for People and Pollinators**, led by urban planner and geographer Jennifer Wolch and botanist and landscape architect Maria Fernandez Gonzalez, students from a variety of disciplines worked with Friends of Peralta Hacienda Historical Park (PHHP), located in Oakland's Fruitvale District, on making the neighborhood greener and more pollinator-friendly.

Students studied the research literature on pollinators – bees, birds, butterflies, bats, and many more – and how to design urban neighborhoods to support them. They also delved into indigenous, colonial, and contemporary social and landscape history of Oakland, the Fruitvale District, and Peralta Hacienda Park itself. Looking to the future, students also proposed a walking tour; designs to make Fruitvale more pollinator friendly; and pollinator-centric curricula for local schools and PHHP's youth education programs.

Enjoying dedicated studio space, student teams studied historical as well as contemporary maps and plans, and pinned up maps and schematic designs for critique by instructors, students, and visiting experts. This studio-based pedagogy, unfamiliar to many students, exposed them to a learning model based on teamwork, frequent iteration of ideas and interim work products, and continuous feedback from PHHP leadership as well as instructors and fellow students.

One of the last research studios in the Global Urban Humanities/Future Histories Lab, Buzz Studio challenged students from diverse disciplines to not only study the city but also to propose strategies in the context of a lively community-university partnership.

**Keywords:** **Interdisciplinary studio-based pedagogy, nonprofit-university partnership, urban planning and design, landscape ecology, urban pollinators, equity mapping, social history, augmented reality podcasts, StoryMaps, curriculum design, community engagement.**

*This case study is part of an archive of the UC Berkeley Global Urban Humanities Initiative and its Future Histories Lab, supported by the Mellon Foundation. The entire archive, including course case studies, faculty and student reflections, digital projects, symposia, exhibitions, and publications, is available at [https://escholarship.org/uc/ucb\\_guh\\_fhl](https://escholarship.org/uc/ucb_guh_fhl).*

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# COURSE DESCRIPTION

## THE BUZZ STUDIO: PLANNING EQUITABLE CITIES FOR PEOPLE AND POLLINATORS



*A GLOBAL URBAN HUMANITIES RESEARCH STUDIO*

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**City Planning 291**

**4 Units, Spring 2022**

**Instructor:**

**Jennifer Wolch** (City Planning)

**MaFe Gonzalez** (Landscape Architecture & Environmental Planning)

The world's people and ecosystems depend on pollinators such as bees, butterflies, insects, and fruit bats. Three-fourths of all flowering plants and 35% of all food crops worldwide need pollinators in order to reproduce. Yet many native pollinator populations are shrinking, and many are threatened or endangered due to habitat loss, pollution, agricultural insecticides, and competition from non-native species. Growing awareness of the plight of pollinators have catalyzed 'pollinator city' programs, employing a rich array of participatory strategies. They range from small scale community garden and green space efforts to city-wide efforts such Toronto's Pollinator Protection Strategy and Oslo's Bee Highway, from private developments such as Baseline, Colorado that feature a 'pollinator district' to Auckland's 'For the Love of Bees' project led by artists, and 'Ciudad Dulce', Curridabat, Costa Rica's urban plan that declares pollinators citizens of the city.

The Buzz Studio partnered with local environmental justice/community garden NGOs to co-create a pollinator cities program that simultaneously addresses environmental and ecological justice. The studio developed strategies to increase food security and supports native pollinator populations. After an introduction to the challenges facing pollinator species and the variety of pollinator programs being undertaken around the world, the studio's work included research on the history of urban agriculture and community gardens in the Bay Area, documentation of loss of native pollinator habitat and populations over time, and assessment of current local pollinator-related projects. In collaboration with partners, students developed community pollinator education

and engagement strategies (including public art); design outreach tools to encourage planting native species that support food security as well as pollinators; propose urban design interventions to increase green space equity as well as support pollinator diversity; and build an online citizen-science program to monitor program impacts on residents and pollinators.

## THE TEACHING TEAM

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**Jennifer Wolch,  
Professor & Dean Emerita**

Jennifer Wolch is a scholar of urban analysis and planning. Her past work focused on urban homelessness and the delivery of affordable housing and human services for poor people. She has also studied urban sprawl and alternative approaches to city-building such as smart growth and new urbanism. An early investigator of animal-society relations in cities, she has proposed strategies for human-animal co-existence in an urbanizing world. Her most recent work analyzes connections between city form, physical activity, and public health, and develops strategies to address environmental justice issues by improving access to urban parks and recreational resources.

Wolch has authored or co-authored over 125 academic journal articles and book chapters. She was also a recipient of fellowships from the Guggenheim Foundation, Center for Advanced Study in the Behavioral Sciences, the Rockefeller Foundation's Bellagio Study Center, and other prestigious honors.

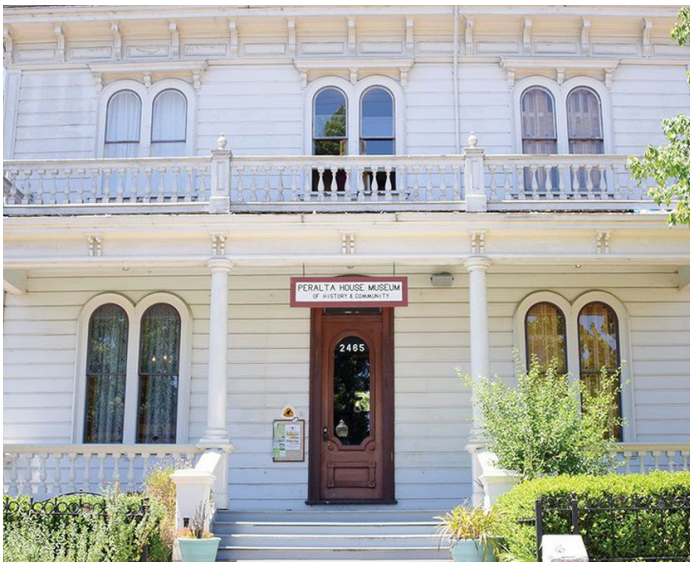
Wolch led CED as William W. Wurster Dean from 2009 to 2019.



**MaFe Gonzalez,  
Graduate Student  
Instructor**

MaFe is a botanist with a strong interest in taxonomy, ecology and conservation of forests. She has participated in several research projects organized by the Institute of Natural Sciences of the National University of Colombia, Humboldt Research Institute, Amazonian Institute of Scientific Research (SINCHI) and Chingaza National Natural Park (Colombia). She participated in research internships at the South African National Biodiversity Institute (SANBI) on participatory monitoring of endangered flora species, at Muséum National d'Histoire Naturelle (Paris) identifying historical plant collections of the Neotropics and at the Ulu Temburong National Park (Brunei) identifying tree species with the greatest food supply for wildlife.

MaFe's journey into landscape architecture began relatively recently, when from botany she began to feel the need to participate in the world-making and to propose, through design, spaces to re-establish reciprocal relationships between people and the environment. Her work's approach is basically defined in 3 steps: 1) See the environment in which she is working and try to understand its complexities, 2) Follow her environmental and social philosophies and ethics: each design is a statement of values, 3) Propose alternatives to grow livable dreamed worlds. Her biggest inspiration are plants! MaFe's life goals are to feel like plants and think like mountains.



Buzz Studio was a partnership between Peralta Hacienda Historical Park and UC Berkeley's Department of City & Regional Planning/Future Histories Lab. The goal was to develop pollinator-friendly park and neighborhood planning strategies that could also enhance access to greenspace for local residents living in an area with few parks or open spaces.

# COURSE SUMMARY

## CONTEXT

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Pollinators are small but mighty creatures. More than 85% of the world's flowering plants rely on bees, birds, butterflies, bats, and many kinds of insects to reproduce. In turn, people rely on them to pollinate one-third of the food crops that feed the world. Because of rapid urbanization, habitat loss and degradation, and widespread pesticide use in industrial agriculture, pollinators in many parts of the world are threatened. At the same time, pollinators can thrive in cities - transforming them into pollinator 'hotspots' if we take steps to accommodate and support them.

Growing awareness of the plight of pollinators has shifted attitudes toward pollinators; many urban residents now see pollinators, especially bees, as 'charismatic microfauna' rather than stinging backyard pests. Heightened awareness and changing attitudes have catalyzed 'pollinator city' programs, employing a rich array of participatory strategies. They range from small-scale community garden and green space efforts such as Philadelphia's vacant lot program and Auckland's 'For the Love of Bees' project led by artists, to city-wide efforts such as Toronto's Pollinator Protection Strategy, Oslo's Bee Highway, and 'Ciudad Dulce', Curridabat, Costa Rica's urban plan that declares pollinators citizens of the city. They also involve international and national umbrella organizations dedicated to pollinator protection such as the Pollinator Partnership, the World Bee Project, Bee City USA, and Britain's L-Line. Not to be left behind are a small number of private developments such as Baseline, Colorado that features a 'pollinator district' with guidelines and regulations designed to support pollinators.

In Spring of 2022, the University of California's College of Environmental Design and its Department of City & Regional Planning partnered with the nonprofit organization Friends of Peralta Hacienda Historical Park, which manages this City of Oakland public park and mounts its many community programs. The 6-acre park, opened in 1996, is a major historical site in the city, occupied over time by the Ohlone people, a Spanish land grant holders, and after the Mexican Revolution, Californios. Through a graduate course - nicknamed 'Buzz Studio' - we sought to explore the ways in which Peralta Hacienda Historical Park and its mostly hardscaped neighborhood in the Fruitvale District might create more green space for both people and pollinators. The Buzz Studio asked the question: working with the park and its neighbors, how could a focus on pollinators and their habitat support a larger and more diverse population of pollinators while simultaneously making the park and its adjacent streets greener, cooler, and more walkable?

Buzz Studio students conducted research about the park, its neighborhood, and the larger Fruitvale District, to understand the context for planning to protect pollinators and increase neighborhood greenspace, and to offer possibilities for the future. This [website](#) presents the results of this research.

**Part I** narrates key aspects of Peralta Hacienda Historical Park and Fruitvale District's social history and contemporary context; the multiple and cross-cutting equity and environmental justice issues that characterize the Fruitvale and park neighborhood; and the transformation of the area's ecology given the growth of Oakland. Part I also explores possibilities to enhance greenspace for people and pollinators, from expanding the park's existing pollinator-friendly plantings to identifying opportunities - large and small - for providing greenspace for both pollinators and people in the park's neighborhood.

**Part II** offers ideas for the future, including the creation of 'Pollinator Districts' in the Peralta Hacienda Historical Park neighborhood and local schools; educational programs for middle school students on pollinator ecology and human impacts on pollinator biodiversity; community science programs for high school students, enabling them to monitor the park's pollinator populations; and prototype designs for a "Fruitvale Bart to Peralta Hacienda Historical Park Trail." This trail could introduce residents and visitors alike to the social histories and diverse cultures of the Fruitvale District; the social and environmental justice challenges faced by residents and the community organizations that work to address them; the District's historical ecology and in particular its pollinator ecology; and how - even in a dense city - communities can nurture native pollinators upon which we all depend.



# SEMESTER MAP

## ARC OF THE SEMESTER

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### Statement of studio goals/objectives

In collaboration with PHHP partners, Buzz Studio aimed to:

- Design/build a pilot youth ‘resident science’ science program for PHHP’s Water Keepers, to allow community youth to monitor pollinator populations over time as pollinator friendly plantings are installed
- Solicit insight from community residents and institutions about their attitudes toward pollinator friendly gardens, and their advice on how to design/pilot a community pollinator garden education and engagement strategy
- Propose urban design interventions associated with the 34th Avenue Slow Street to increase green space equity as well as support pollinator diversity and food security
- Based on this collaborative work, propose design principles for a basic “neighborhood pollinator district” program, that address both environmental and ecological justice
- Design a limited number of sample ‘street information stations’ related to studio themes, for an envisioned ‘BART-to-Peralta Hacienda’ Walk up 34th Avenue
- Collaborate with/share findings and recommendations with the City of Oakland

### General work program

- Weekly class meetings (4 hours) for seminars, guest speakers, team report-outs
- Seminar weeks: discussion and presentation of assigned readings
- Weekly/as needed team meetings
- Weekly team check-ins with instructor (via Zoom or during class periods)

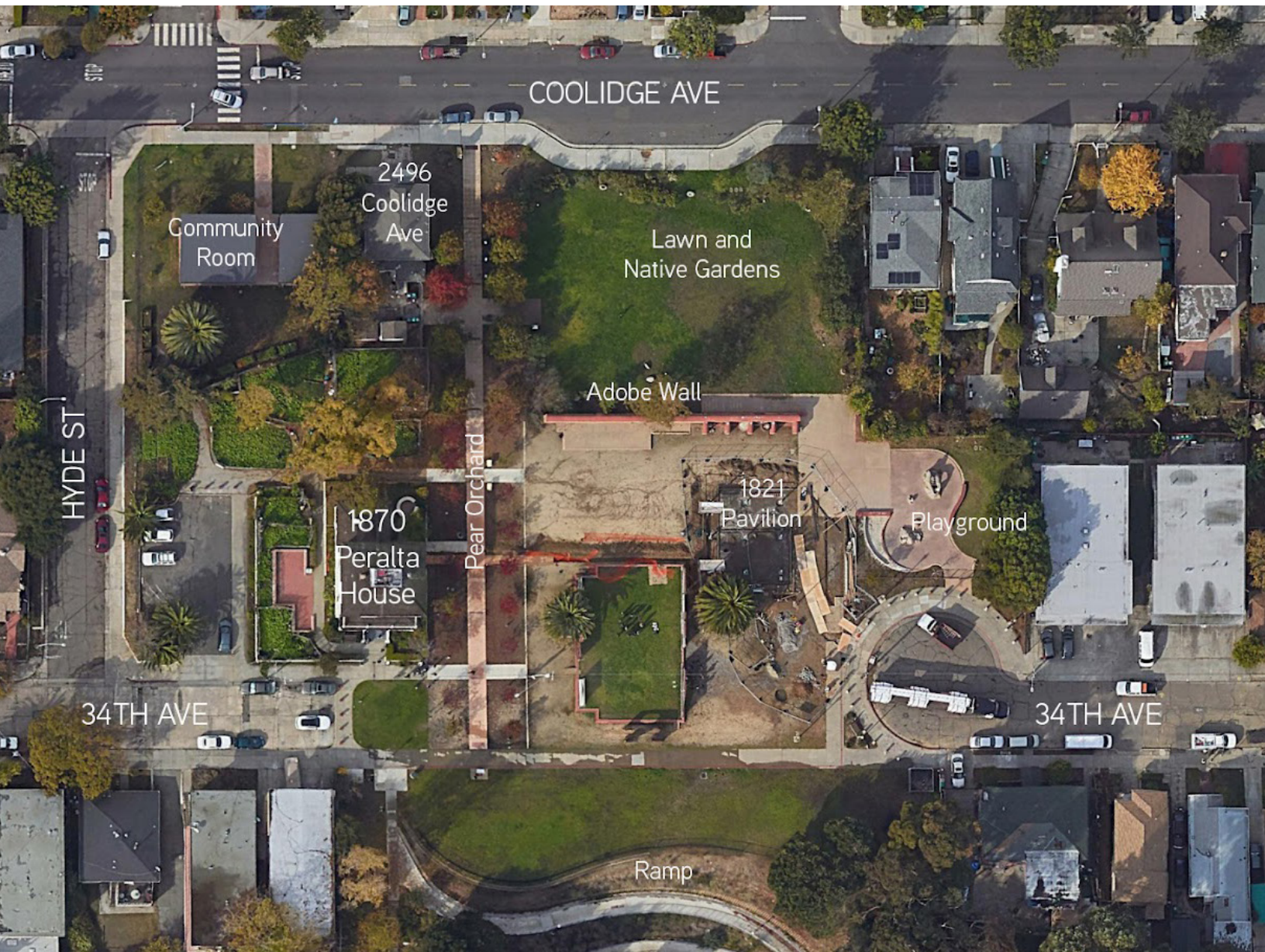
### Teams

#### Part 1

- Social Research Team: history, demographics, politics and economy of Fruitvale District
- Fruitvale District Historical Ecology: evolution of landscape and biodiversity of the district and implications for local pollinator species/populations
- Equity Mapping Team: Oakland context plus social, economic, environmental equity maps
- Site and Urban Design Team: site evolution and current opportunities; Oakland’s Slow Streets program history, politics and design

#### Part 2

- BART-to-Peralta Hacienda Walking Tour Team: create a multimedia walking tour that highlights local history, ecology, social movements, and pollinator-friendly action.
- Neighborhood Pollinator Support Team: engage community members, plan a Pollinator District’ and design a Neighborhood Certification program
- School-based Pollinator Education Team: highlight ways neighborhood schools can offer pollinator education while also greening school campuses and communities
- Youth Education Team: develop youth ‘resident science’ program in collaboration with PHHP for grade school age and high school student interns (‘Water Keepers’)



Peralta Hacienda Historical Park and surrounding neighborhood of the Fruitvale, in Oakland, California.

# PART 1

## WEEK 1- INTRODUCTION TO BUZZ STUDIO

Introduction to Buzz Studio; participant introductions; studio organization and Team assignments; discussion of assigned readings; design of self-guided tour.

## WEEK 2- MEETING THE COMMUNITY PARTNER

Field trip to PHHP: meet at Hasta Muerte Coffee in the Fruitvale. We met with Holly Alonso and PHHP staff and had a site tour with Alma du Solier from Hood Design. Students formed their Part 1 Teams-

- Social Research Team
- Fruitvale District Historical Ecology
- Equity Mapping Team
- Site and Urban Design Team

## WEEK 3- BACKGROUND READINGS- SITE HISTORY & DESIGN OPPORTUNITIES

Seminar/readings on site history, landscape and design opportunities; green equity; slow streets. Selected readings from list will be assigned to all students, others will be presented by individual students. We were also joined by guest speaker Warren Logan from Lighthouse Public Affairs.

### Group Reading Presentations-

- Parks, Open Space & Environmental Justice
- Urban Tree Equity Projects/Tools
- Green Gentrification
- California/Oakland Park Equity Policy Reports
- COVID, 'Slow Streets' Programs, and their Future

## WEEK 4- BACKGROUND READINGS- URBAN POLLINATOR ECOLOGY AND PRACTICE

Seminar/readings on urban pollinator ecology and practice. Selected readings from list will be assigned to all students, others will be presented by individual students. We were also joined by guest speaker Vicki Wojcik of Pollinator Partnership.

### Group Reading Presentations-

- Urban Landscape Features & Pollinators
- Attitudes Toward Pollinators
- Pollinator-friendly Gardens
- Citizen Science & Pollinators
- Pollinators, Law and Policy

## WEEK 5- PREPARING FOR PART 1 TEAM REVIEWS

Part 1 teams started thinking about the design of a Multi-Media Walking Tours; Teams report out, critique, revision planning. We were joined by guest speaker Susan Moffat of Global Urban Humanities/Future Histories Lab. Students examined the 'Monuments to Extraction' walking tour (with podcast and Artivive VR); see <https://monumenttoextraction.org/>

## **WEEK 6- PART 1 MID-REVIEW**

Mid-review with deliverables (Part 1 Team Interim Report - webpages with relevant background, description of research, data, visualizations, conclusions).

## **WEEK 7- PHHP SITE VISIT**

PHHP site visit to report out Team findings, get direction/feedback from our community partner.

## **PART 2**

## **WEEK 8- DISCUSS WORK PROGRAM FOR THE REST OF THE SEMESTER**

Part 2 Teams report out, work program discussions

## **WEEK 9- FURTHER PROJECT DEVELOPMENT**

Partner/stakeholder meetings to inform the various team projects.

## **WEEK 10- CONSTRUCTING DRAFTS FOR THE FINAL PROJECT**

Draft plans/designs for final work products and program due; group feedback/discussion.

## **WEEK 11- LAST MEETING WITH PHHP**

Final program/exhibit planning meetings at PHHP.

## **WEEK 12 & WEEK 13- FINAL REVIEW**

Final review with PHHP, UC Berkeley Instructors, Professional Practitioners, and various pollinator organizations. Final report/consolidated website.



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# STUDENT WORK

## Peralta Hacienda Historical Park and Fruitvale: *Past to Present*

### *PART 1: SOCIAL RESEARCH TEAM*



Whether it's the adobe walls, the meandering creek, or Peralta House itself, visitors of Peralta Hacienda Historical Park (PHHP) will encounter the region's history embedded within the park.

It is undoubtedly an historically significant public space that reflects broader changes in the Fruitvale neighborhood and across the City of Oakland.

To learn more about these changes and how the park became the community space it is today, we first explore the park's history and the land on which it sits.

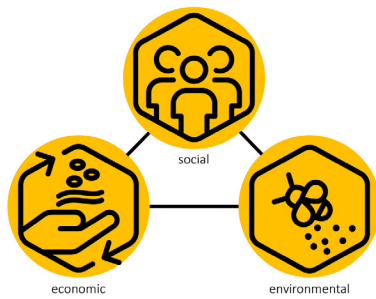
Next, we take a broader look at the historical evolution of the Fruitvale neighborhood, in which the park is located.

Finally, we take a deeper dive into modern community activism efforts and examine the environmental and social issues that Oakland and Fruitvale residents face today.





# Mapping (In)Equity in Fruitvale



## PART 1: EQUITY MAPPING TEAM

### Overview

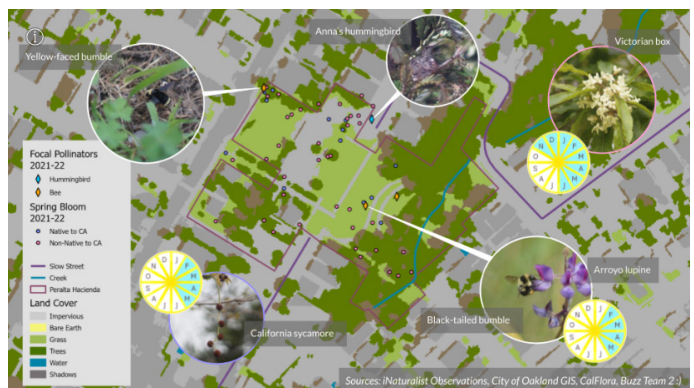
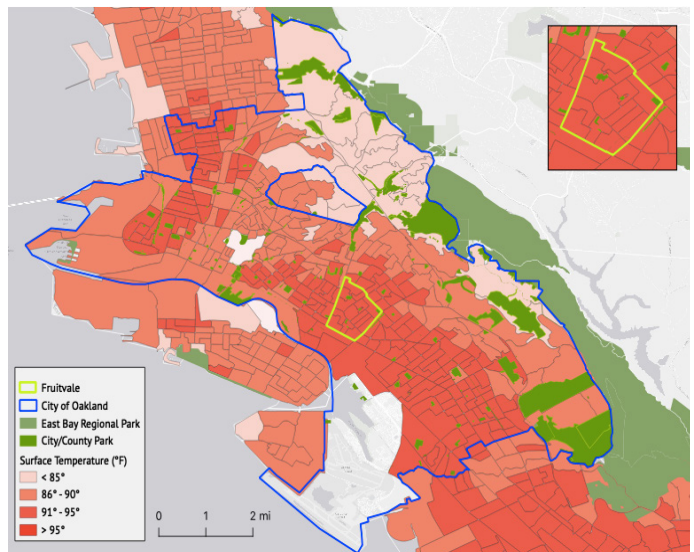
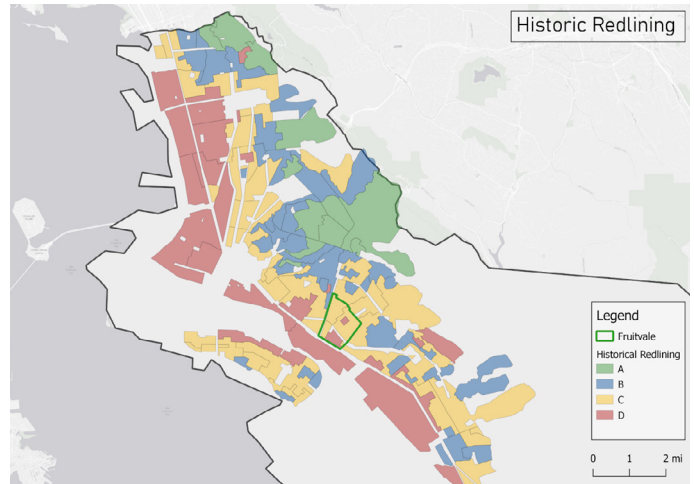
The Fruitvale neighborhood has been shaped by decades of government policies and non-governmental practices (e.g., redlining) that have left its residents some of the most marginalized in the City of Oakland. While residents have spent decades organizing together and advocating for policies to remedy these disparities, widespread inequities persist.

Mapping (In)Equity in Fruitvale investigates the impact of these historical policies, using maps to visualize social, economic, and environmental issues in Fruitvale today. These maps reveal inequities in both human, and more-than-human, experiences of the neighborhood. Human residents' experiences vary by race and income, including inequities in park access, public transit infrastructure, and experiences of COVID-19. More-than-human residents, such as pollinators, also face ecological injustices that inhibit their well-being, including limited floral resources, pesticide poisoning, and fragmented habitats.

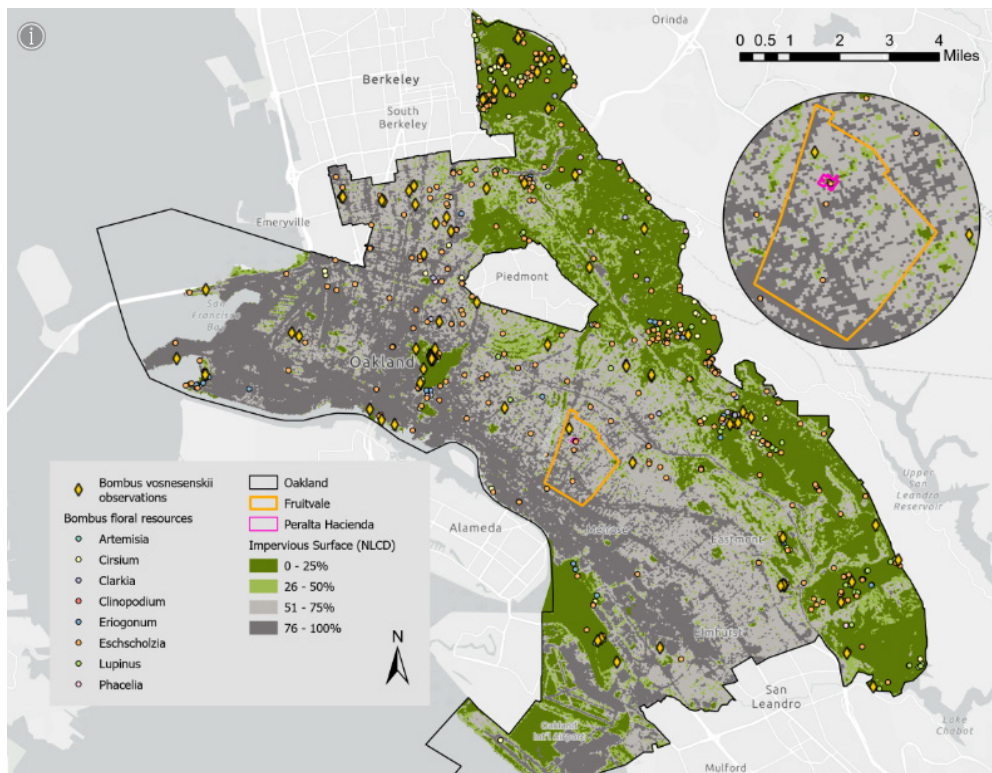
### Why Map (In)equity?

Mapping (in)equity helps visualize how certain populations are faced with often deliberate barriers to access, health, and success. These visualizations may be used to target resources to communities in most need.

Understanding the interconnections between social, economic, and environmental aspects of equity shows how these factors are intimately linked in the Fruitvale neighborhood, affecting the experiences of humans and more-than-human residents alike.



## Mapping Pollinator Habitats in Oakland and PPHP via Storymaps



Impervious surfaces (to represent habitat, data from 2019) x Yellow-faced bumble bee main floral resources (data from 2011-2022). There is a visible gradient of most impervious to least impervious from SW to NE Oakland similar to other patterns of inequities stemming from historical redlining.

In the Storymap, we follow one focal pollinator and imagine how they navigate through Oakland, California to find food and shelter. Click on the “access ‘pollinator habitats’ storymaps” button to get a better view.

Our approach to navigate through the diversity of pollinators and their unique needs for suitable habitat was to select one focal pollinator that is common in Oakland to study. The Yellow-faced bumble bee (*Bombus vosnesenskii*) is a common, native bumble bee that feeds from several plant genera and primarily nests underground.

To better understand where in Oakland the yellow-faced bumble bee might find suitable or unsuitable, we identified several genera of native plant species they are known to feed from and mapped their known occurrences. We used iNaturalist research grade observations from 2011-2022 for the city-wide map, and both casual and research grade observations captured between 2021-2022 for the Peralta-specific map. These points were placed over an impervious surfaces map (city-wide map used NLCD Impervious Cover Time Series 2019 data, Peralta-specific map used finer resolution USGS Earth Explorer 2020 data). In the absence of tree canopy data, the impervious surface data was used to show where yellow-faced bumble bees are more likely to find pervious, bare ground to build nests.

# Ecological History of Peralta Hacienda Park



## ***PART 1: HISTORICAL ECOLOGY TEAM***

Through an interactive timeline, you are invited to explore Peralta Hacienda Park’s ecological history through the eyes of the Peralta Creek. The Creek acts as a central witness to the ecological and cultural shifts of the Fruitvale district and helps to frame a temporally vast narrative. Throughout this exploration, we draw your attention to the shifting interactions between humans and nature in this riparian space, and the ways these actors have mutually co-constructed each another and the broader environment.

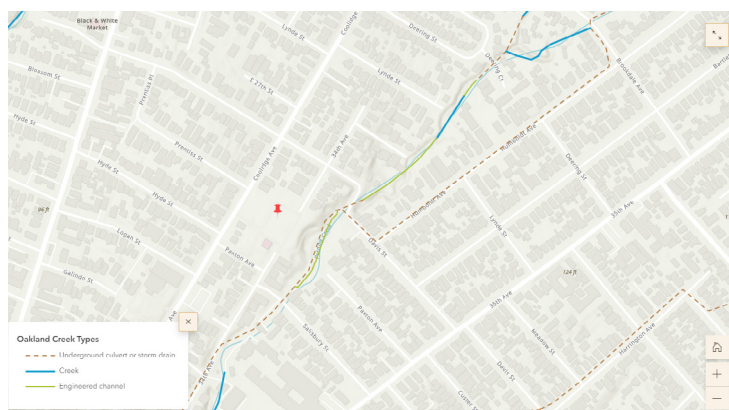
Walking East on Oakland’s Slow Street at 34th and Hyde, Peralta Hacienda Historical Park presents itself to you.

The Oakland hills disappear behind the unfurling Canary Island Palm at your nose and the thumps of student’s feet on pavement at the nearby Life Academy fade behind the Mien gentleman watering his mustard plants by the 1870 Italianate frame house to your left.

To your right, a Blue Gum Eucalyptus stretches its arms upwards. Standing at the top of a gully, you are eye-to-eye with its overstory. Down the hill, the roots intertwine with the Peralta Creek as it meanders quietly towards the San Leandro Bay.

The creek offers a refuge to the surrounding streets, and it beckons you to wonder, what has this creek seen? What is it hiding? Its story acts as both the foundation and the witness to the ecological and cultural shifts of Peralta Hacienda Historical Park.

This story map follows Peralta Creek through an ecological history of the site. These stories beckon us to ask, “What does it mean to be from here?” and allow us to peer into the future to what it may become.



The section of Peralta Creek that runs through Peralta Hacienda Park is one of the few sections that remains above ground. However, only five percent of Oakland’s streamside habitat remains. Biological surveys show that the creek system has the potential to support more biodiversity and can play a critical role in acting as a refuge from urbanization for plants, people, and animals.

# Land Formation

The process of California's land formation has been and continues to be, an iterative process spanning over 80 million years. A timelapse mimics that of the ocean tides: sedimentary rock formations moving in and out until a final wave reaches its culminating peak as the Sierra Nevada mountain range (Bartolome, 2014).

Jumping forward 4 million years, we watch as glaciers melt into the ocean, rising the sea level to swallow the mouth of the Sacramento River and forming what our maps now call the San Francisco Bay (Bartolome, 2014).

Deciduous and evergreen *Quercus* woodlands and savannas extend up and down the coastal areas, greeting the first wave of human migration into North America over 12,000 years ago (Bartolome, 2014).



Bay Checkerspot  
*Euphydryas editha bayensis*  
\*current conservation status:  
Critically Impaired & Endemic to CA

Monarch Butterfly  
*Danaus plexippus*  
\*current conservation status:  
Critically Low Population

Crotch's Bumble Bee  
*Bombus crotchii*  
\*current conservation status:  
Endangered Globally

Rufous Hummingbird  
*Selasphorus rufus*  
\*current conservation status:  
Near Threatened Globally

Anna's Hummingbird  
*Calypte anna*

California Pipevine Swallowtail  
*Battus philenor hirsuta*



A  
Purple Owl's Clover  
*Castilleja exserta*



B  
California Aster  
*Covethogyne filaginifolia*



C  
Narrow leaf milkweed  
*Asclepias fascicularis*



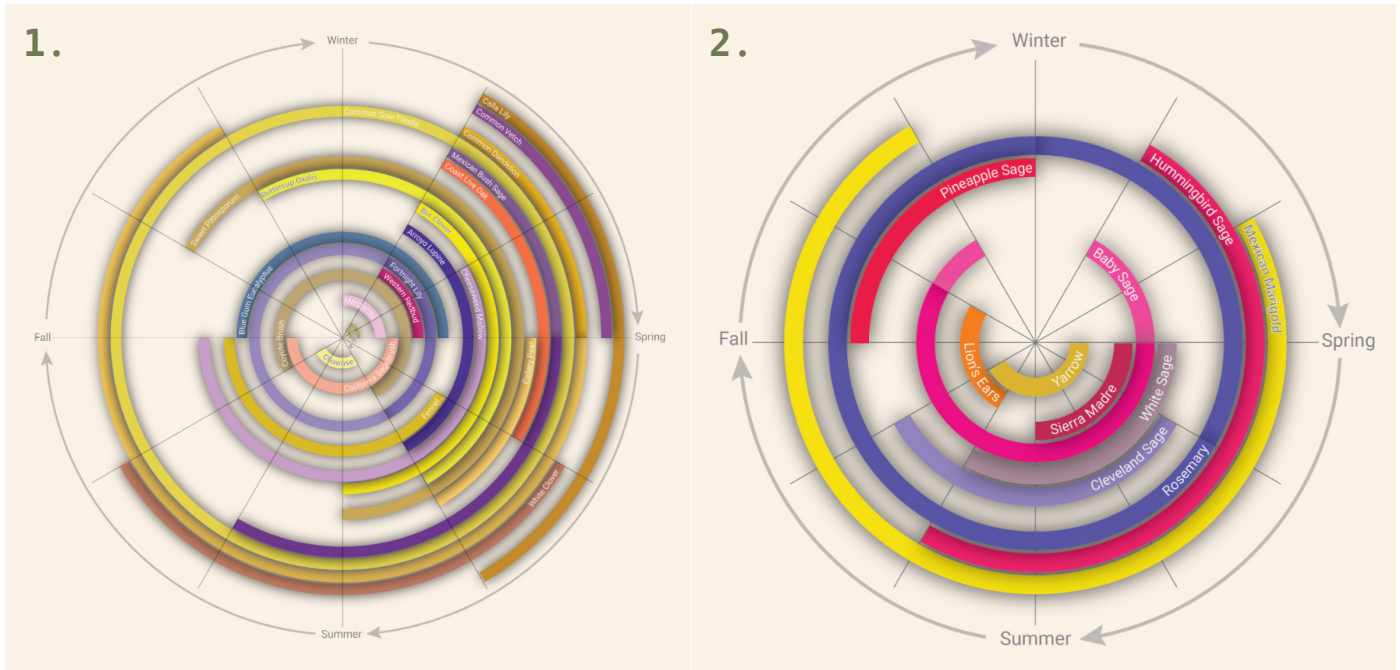
D  
Big Berry Manzanita  
*Arctostaphylos glauca*



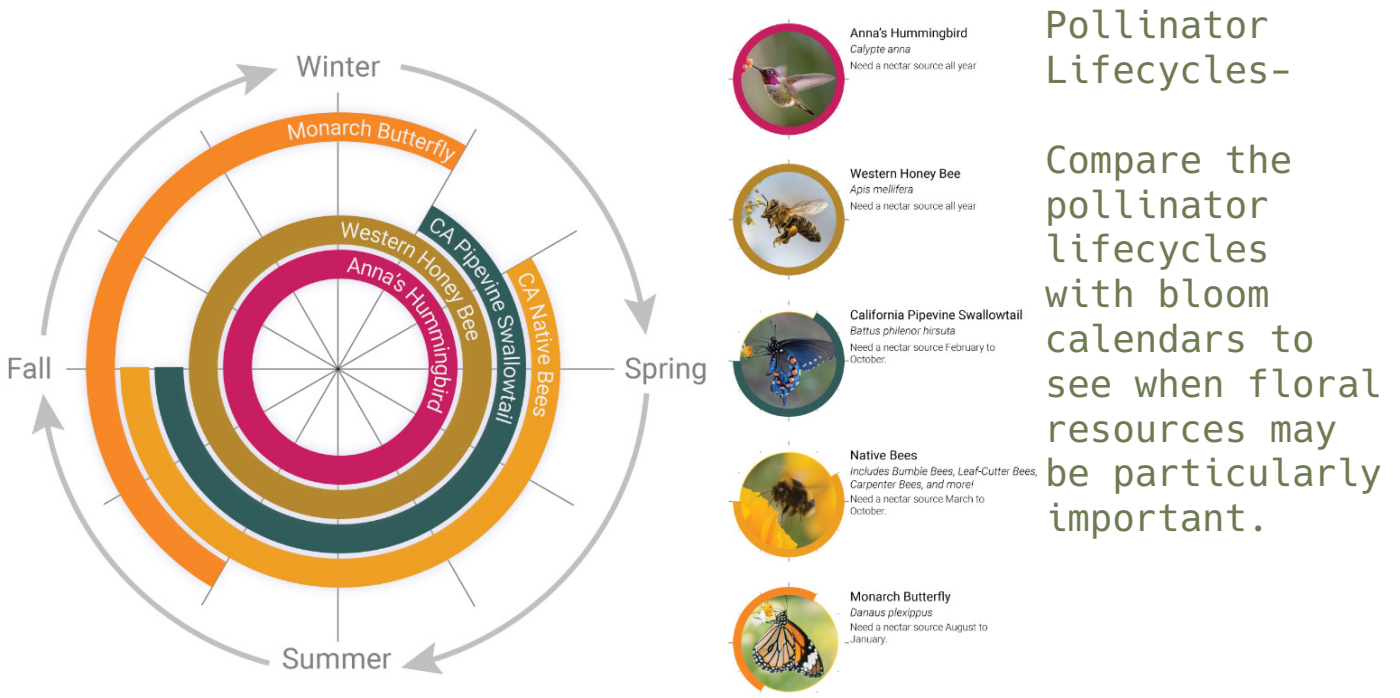
E  
Dutchman's Pipe  
*Aristolochia californica*

# Visualizing Bloom Calendars for PPHP via Storymaps

1. The bloom calendars show when we expect plant species from the park to flower. This visual is useful to identify when food sources may be lacking for pollinators.



2. The plants in this diagram grow in the cultivated garden around Peralta Hacienda Historical Park's victorian house. The patterns show that there are flowering plants year-round.




# SITE ANALYSIS & DESIGN: ESTABLISHING A POLLINATOR COORIDOR

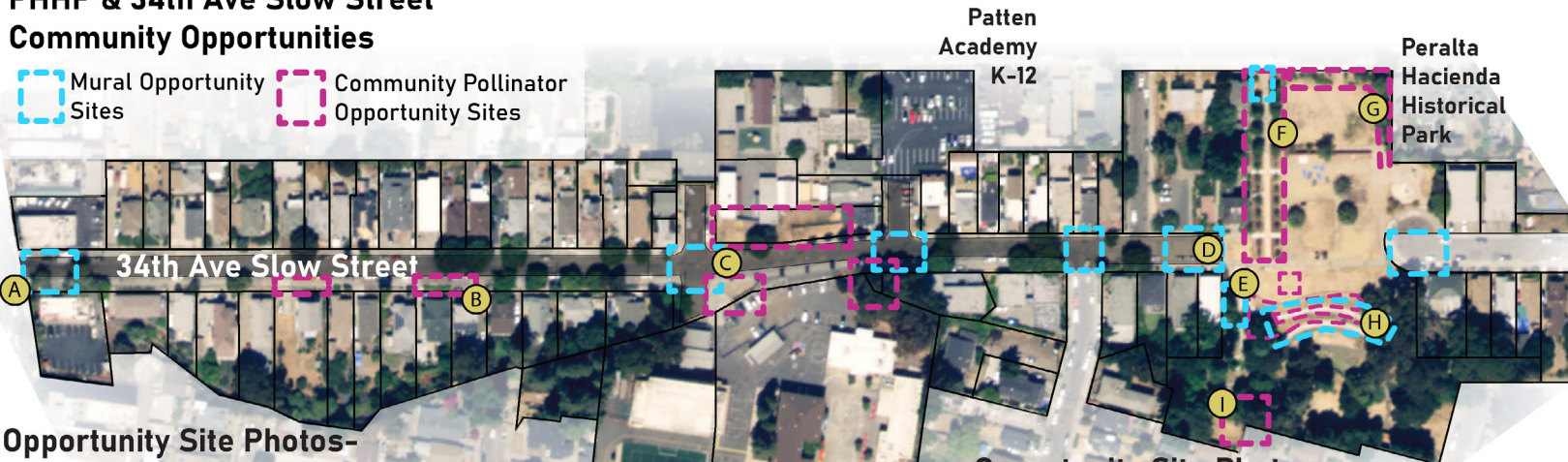
## *PART 1: SITE AND URBAN DESIGN TEAM*

Cultivating pollinator habitat can connect PHHP and neighborhood residents and schools with their surrounding ecology. Increased pollinator spaces also provide opportunities for youth engagement and education. With more plantings and programming on the street, 34th Avenue has the opportunity to become greener, more walkable, and more inviting.

Future collaboration with neighborhood residents and institutions will guide the design of future efforts to support pollinators. In this section, we identify potential opportunity sites along 34th Avenue (a low traffic street formerly designated by the City of Oakland as a 'slow street') and within Peralta Hacienda Historical Park that could create a pollinator 'corridor' within Oakland's Fruitvale District. These opportunities involve small interventions that together can enhance and expand community greenspace. Combined with educational programming, street murals, and park-based programs, these interventions can reinforce place keeping in the neighborhood and strengthen community ties.

### PHHP & 34th Ave Slow Street Community Opportunities

-  Mural Opportunity Sites
-  Community Pollinator Opportunity Sites



### Opportunity Site Photos- Existing Conditions of 34th Ave

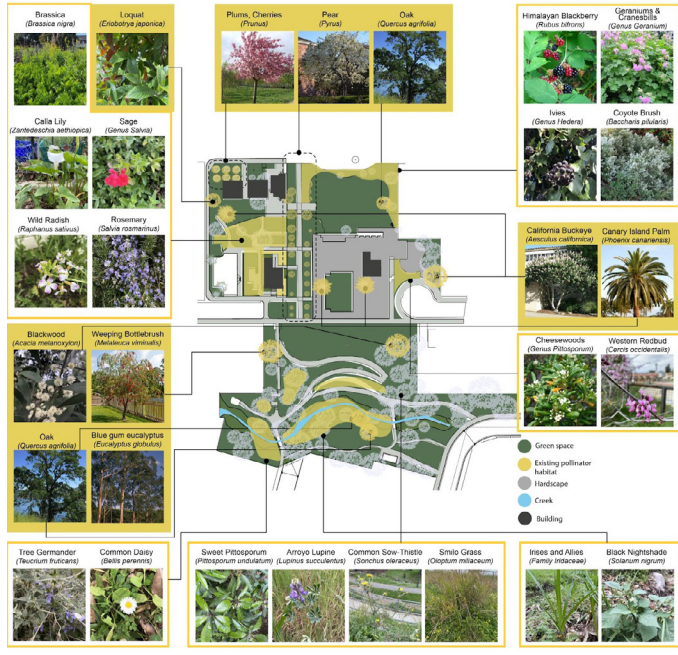


### Opportunity Site Photos- Existing Conditions of PHHP



Our aim is to identify and explore potential opportunity sites from an ecological and neighborhood perspective. Results can be communicated to park users, neighborhood residents, and nearby educational institutions, through site analysis with neighborhood maps that showcase key information.

# PHHP Site Conditions & Opportunities



## Future Opportunities for Pollinator Habitat

Our analysis suggests a “stepping stone” approach where pollinator habitat is planted in different sections of the park in sufficient proximity to promote connectivity while still considering resource constraints.

Our future pollinator planting sites were chosen to provide a trail through the park and to eventually connect to 34th Ave. The stepping stones (as seen in pink) are interventions that complement the existing landscaping.

A pollinator path running from the southeast to the northwest park entrances contributes to visitor awareness of pollinator habitat while adding to existing plantings. This pathway will enhance the existing plants at the southeast entrance and along the steps to 34th Avenue. More pollinator habitat can be added along the grassy patches under the pear trees leading from 34th Avenue to the northwest entrance.



## 34th Ave Site Conditions & Opportunities



### Existing Green Space on 34th Avenue

From 2020-2022, 34th Ave between Foothill Blvd. and PHHP was a designated City of Oakland Slow Street. While the Slow Street program itself has been transformed into the Essential Places program, 34th Ave will continue to be a low volume street - therefore only serving the residents of the street and parkgoers.

Our research and resulting schematics reveal that there is great potential for pollinator habitat in residential green spaces and schoolyard green spaces. Establishing pollinator habitats in just some of these opportunity sites can contribute to a pollinator corridor and support the local ecology.

### 34th Avenue Opportunities & Engagement

There are many ways for the schools and residents along 34th Avenue to contribute to a pollinator corridor. With school and residential interest, input, and participation, any of these opportunities could become a reality. Some examples include planting and maintaining pollinator habitat at unplanted patches of land on the schools' lots and in residential front yards. Participants could also help design and paint a street mural with a pollinator theme, to raise awareness of the importance of the neighborhood's pollinators. All of these efforts are meant to bring the Peralta Hacienda neighborhood (the park, schools, and residents) together to protect and promote pollinator abundance and diversity, while making 34th Ave greener and more walkable.

#### PHHP & 34th Ave Community Opportunities



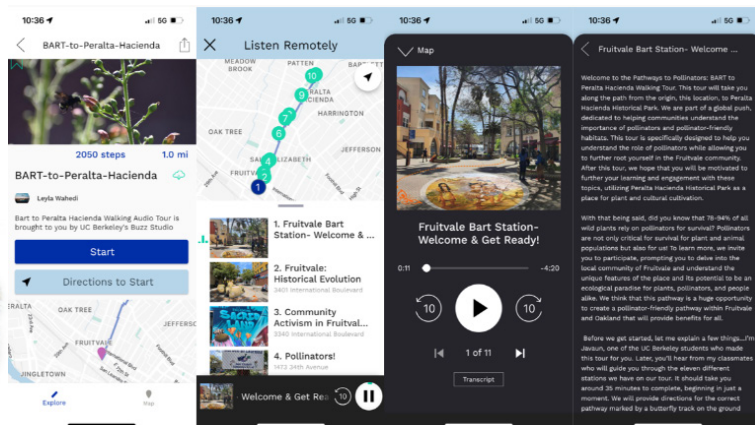
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# BART to Peralta Hacienda Historical Park AR Walking / Audio Tour

## PART 2: BART-TO-PERALTA HACIENDA WALKING TOUR TEAM

PATHWAYS TO POLLINATORS: BART to Peralta Hacienda Historical Park  
Interactive Walking Tour & Pollinator Pathway



### Existing Green Space on 34th Avenue

Our walking tour utilizes the app [Gesso](#), an audio tour platform that utilizes the geo-location of a user to direct and narrate journeys through cities. The tour can be accessed remotely on the Gesso app or on the webpage linked above where users can listen to narrated audio while walking from the Fruitvale Bart station to PHHP. The walking tour is complimented by QR codes that are will direct a user towards Linktrees- where various information, quizzes, Augmented Reality (AR) experiences, and more can be interacted with by a user. The tour can also be accessed in Spanish.

Along the tour we take listeners on a journey of place, acquainting them with the area around them by getting listeners in-tune with their senses and imagination and asking them to engage with how these places have changed over time and what they could look like in the future. On the following page you can see the different stops along the tour and the narration theme that each stop has. We begin with the history of the community and activism in the area, both as an introduction to Fruitvale for those who may not have been before, and because of pre-existing structures such as the Fruitvale sign in the transit village and the Ella Baker Center. From there, we teach listeners about the importance of pollinators, plants, and pollinator corridors in urban spaces. This occurs along the major stretch of 34th ave, where there is currently a lack of “green” enclaves but unlimited potential. Then, we ask people to think reflect on why these practices have disappeared, acknowledging that indigenous populations understood this importance and lived cohesively with their environment. There is an Ohlone mural along the route that was displayed on the side of a building near Foothill Blvd, alongside PHHP future plans of re-naming the park and having a monument to Ohlone people. Then, we take listeners to the information to action section, located next to schools. This educational portion links listeners to resources and educational opportunities which we thought was fitting in close proximity to educational centers. Once arriving at PHHP, users will listen to the different programming PHHP is hosting to establish pollinators in their park.



We created a few AR installations that would go along with some of the stations as well- here we animated bees and flowers to compliment the audio where listeners would learn about urban pollinator habitats.

# PATHWAYS TO POLLINATORS: BART to Peralta Hacienda Historical Park

1 WELCOME



2 HISTORY OF



FRUITVALE

3 COMMUNITY



ACTIVISM

4 POLLINATORS

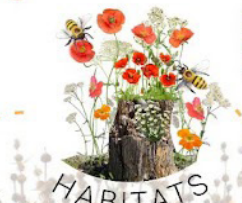


5 POLLINATORS

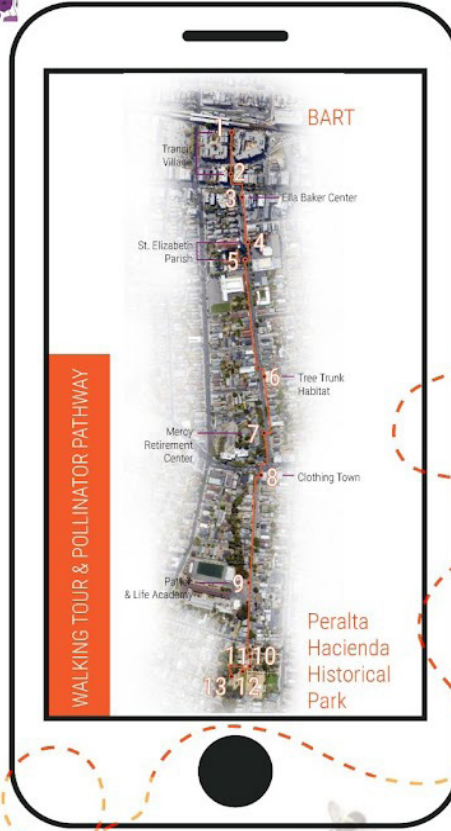


& PLANTS

6 POLLINATOR



HABITATS



7 POLLINATOR



PATHWAYS

8 OHLONE



CULTURE

9 INFORMATION



TO ACTION

PERALTA HACIENDA



11

12



13

HISTORIC ECOLOGY



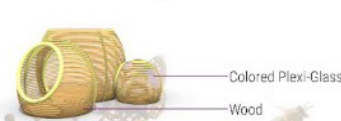
10

FLOWER



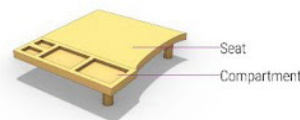
SEATING

BUMBLE BEE



PLAY POD

SCIENTIST



STATION

SEED



LIBRARY

WALL MOUNTED



QR Code



Adhesive



Planter

PLANTER

## Augmented Reality Elements

We have a collection of AR we have hosted along our tour that goes along with the narrative topic of each station. This allows users to visualize the narrative in the built environment and aid the storytelling process.

### Station 3: Fruitvale Historical Evolution



### Station 5: Pollinators & Plants



### Station 6: Pollinators Habitats

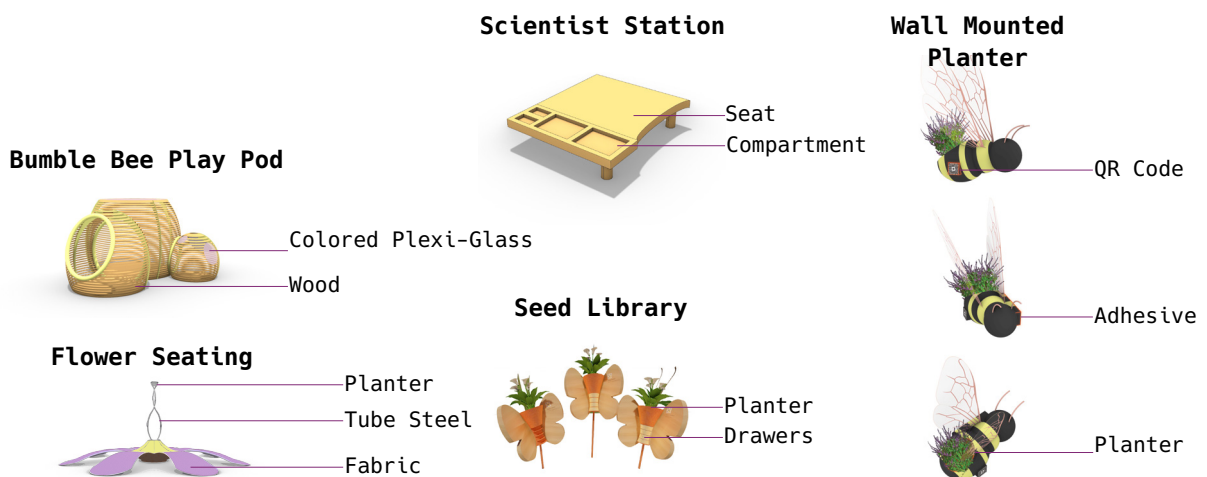


### Station 13: Historical Ecology



## Proposed Built Wayfinding Elements

We designed wayfinding elements along the tour's route that could be used by the community and users to enhance the built environment for both people and pollinators.



# PATHWAYS TO POLLINATORS

Fruitvale BART to Peralta Hacienda Historical Park

Interactive Augmented Reality Walking Tour

The BART to Peralta Hacienda Historical Park AR Walking/Audio Tour was further developed with PPHP following the completion of the Buzz Studio course, serving as an extension of the museum and the park's programming into the local community. The image above showcases the tour's webpage, which hosts information about the tour and provides instructions and audio guides.

# Pollinators in the Neighborhood

## PART 2: NEIGHBORHOOD POLLINATOR SUPPORT TEAM



### Overview

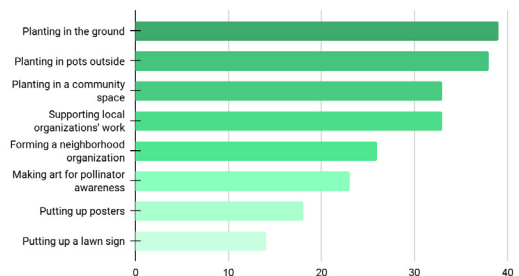
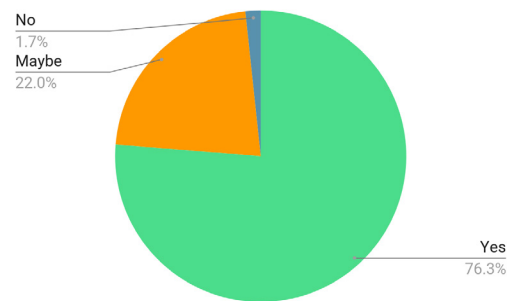
The goal of this section is to think into the future and imagine what goes into becoming a pollinator district--how can we conserve pollinators while engaging and empowering local communities? Our objective was to design a basic individual, neighborhood, and district pollinator program with help and input of PHHP community voices.

“Pollinators in the Neighborhood” consists of three components starting with Community Engagement, then planning for a Pollinator District, and finally guidelines for a Neighborhood Certification Program.

### How do Fruitvale residents envision a pollinator-friendly neighborhood?

To inform what should go into a pollinator-friendly neighborhood/district certification, we started off with gathering community feedback. Our goal was to understand residents’ opinions on pollinators and how willing or able folks would be to incorporate pollinator-friendly plants into their yard space. To do this, we created a survey aimed for Fruitvale residents, and distributed it at in-person events at the park and through email distribution lists. We facilitated a few focus group discussions to gather more in-depth thoughts.

Of 60 survey respondents, 76% shared they were interested in supporting pollinators in some way in their neighborhood. Many believed that pollinators are ecologically important animals and we should support their conservation, and that pollinators should be treated with kindness and respect.



# POLLINATOR DISTRICT- How to make your neighborhood a pollinator paradise in 5 steps:

These are useful tips to get you started on organizing your own pollinator district. Methods include a step-by-step approach, with prompts for community members to work through to establish a pollinator neighborhood.

## STEP ONE:

Reach out to your community



## STEP TWO:

Assess your resources



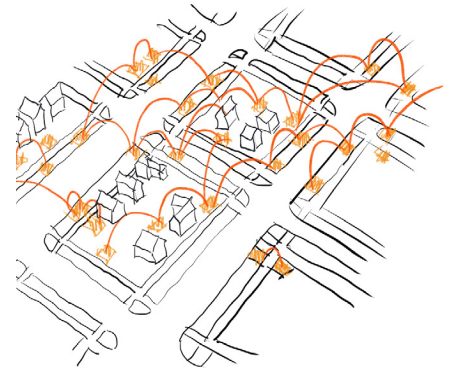
## STEP THREE:

Create a leadership committee



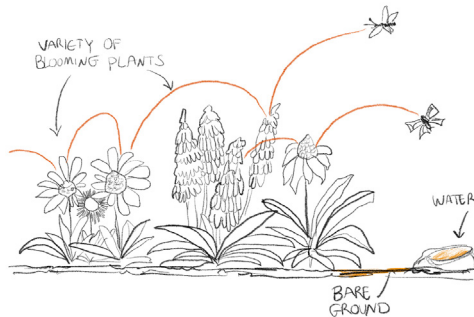
## STEP FOUR:

Map existing and potential pollinator habitats



## STEP FIVE:

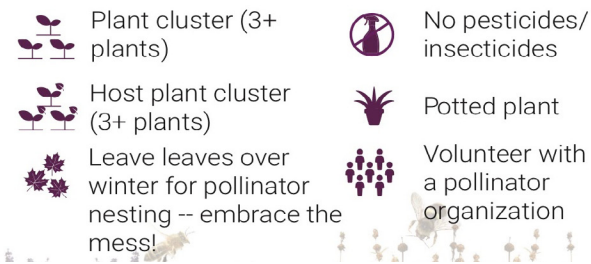
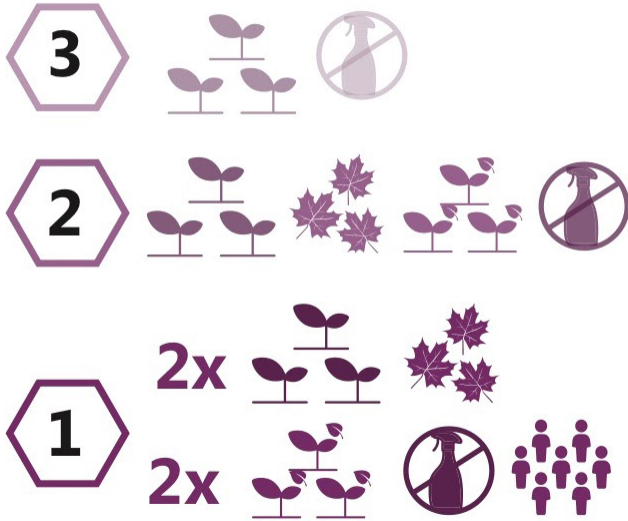
Establish your pollinator paradise!



# CERTIFICATION PROGRAM- Creating Pollinator-Friendly Spaces

Pollinators need plants to thrive! One way you can help them is by planting pollinator plants and following pollinator gardening guidelines. The tiered guides below can be transformed into a certification system which recognizes and awards pollinator-friendly spaces with signage.

## Tiers for Gardens



## If you have outdoor garden space:

### Tier 3 (Easiest)

- Plant one plant cluster (3+ plants)
- Do not use any pesticides on your plants and make sure they came from a nursery that does not use neonicotinoids or other insecticides

### Tier 2

- Plant one plant cluster
- Plant one host plant cluster
- Do not use any pesticides on your plants and make sure they came from a nursery that does not use neonicotinoids or other insecticides

### Tier 1 (Best)

- Plant two plant clusters
- Do not use any pesticides on your plants and make sure they came from a nursery that does not use neonicotinoids or other insecticides
- Leave leaves and perennials until spring to allow pollinators to nest over winter – embrace the mess!
- Plant two clusters (3+ plants each) of host plants
- Get involved with a local pollinator group by volunteering, signing up for emails and events, or hosting demonstrations in your garden (please see the organization list)

# Pollinators at School

## PART 2: SCHOOL-BASED POLLINATOR EDUCATION TEAM






**A Opportunity Site Photos-Existing Conditions**



Fenced in grassy hillside along 34th Avenue on Patten Academy property.



Grassy hillside stretches from Patten Academy property to private residential property.

- |   |  |  |
|---|--|--|
|  <b>Opportunity greenspace along 34th Ave:</b><br>~6,400 sq ft |  <b>Existing Educational Garden Space within Site:</b><br>75' x 25' |  <b>Total greenspace within Site:</b><br>~10,407<br>18% of site is greenspace |
|---|--|--|

### ***Why are Schools Important to Creating Pollinator-Friendly Cities?***

Schools offer a remarkable opportunity to do just that. Schoolyard fences offer space for vertical gardens, and garden beds can become “living laboratories” to incorporate hands-on learning into environmental science curriculum. It’s a win-win-win for the students, teachers, and friendly local microfauna.

As the Patten Academy site map above demonstrates, opportunities to boost pollinator habitat abound on many urban school grounds. Pre-existing educational garden space can be expanded upon and even parking lot medians can flourish with flowers — beautifying the campus, adding much-needed green cover to the community, and offering nectar and nesting places for the pollinators.

### ***Why Should Schools Focus on Pollinators?***

The future of pollinators depends on the next generation of gardeners, climate activists, and stewards of the earth. Fortunately, there is unprecedented support for bringing students and teaching staff out of the classroom and into the outdoors as a means of protecting their health, safety, and wellness. Oakland schools can use this opportunity to help students develop a first-hand understanding of the ecosystems around them. The content below outlines step-by-step strategies for schools to create formal gardens and/or to add pollinator-friendly components to the school landscape. Subsequent sections of this page will provide more information about how teachers can integrate pollinator education into existing class curricula.

As a result of the efforts outlined here, students can engage directly with plants and pollinators, learn about seasonal blooming and supplies of nectar, and observe the steps required to grow and maintain a native yet biodiverse landscape. Knowledge of how to protect pollinators can then be applied inside and outside of the classroom – at school, at home, and in the community.





## ***What Steps Can Schools Take to Welcome Pollinators?***

Given the central role schools play in meeting neighborhood needs and contributing to social life, successful pollinator programs for schools will build off the strengths schools already possess. School administrators, faculty and staff are busy and have limited financial resources to devote to a school garden. With this in mind, it makes sense to make the development of pollinator-friendly school grounds as simple as possible. This section provides actionable yet straightforward steps towards fostering a pollinator-friendly school ground. It includes most notably a Pollinator-Friendly School Certification program, which offers goal-setting guidance for schools that seek to be certified by PPHP for promoting the pollinator habitat corridor being established through Fruitvale. While a large garden may require a paid garden coordinator, small steps can be made by teachers and students interested in gardening.

### ***Step One: Pollinator-Friendly School Certification***

Setting clear, actionable goals that are adaptable and scalable is a vital component of a successful pollinator habitat project. The Pollinator-Friendly School Certification outlined below can help schools with varying resources and levels of engagement make valuable steps towards supporting pollinators on campus. Since starting projects is almost always easier than maintaining them, this program prioritizes steady, achievable growth over rapid expansion. Such a program may also be used to reward teachers for what they are already doing and provide simple strategies to bolster their current curriculum.

***Bronze: Native Garden  
Plot, Least Commitment***

***Silver: Pollinator-friendly  
School Ground and  
Curriculum***

***Gold: Pollinator and  
Human Symbiosis***

### ***Step Two: Pollinator-Friendly Planning (What is your process?)***

Occasionally schools are re-landscaped. This re-landscaping may be an opportunity for a school to create larger-scale pollinator habitats and have positive impacts on pollinator populations, at little extra cost by considering what plants are included in the landscape plan. Whether your school is pursuing a re-landscaping project at this time or simply wants to add a simple pollinator-friendly garden plot, there are many resources available to help schools maximize their return. The U.S Fish & Wildlife Service has created a wonderfully well-researched [Schoolyard Habitat Project Guide](#) that walks schools through planning a thriving schoolyard habitat or outdoor classroom project. In addition to recommending their guide, below we provide an adapted version of their step-by-step process specifically designed for pollinator gardens, as well as an infographic outlining how to create and sustain momentum for such a project.

## Developing a School Pollinator Garden

Step 1: Form a Team

Step 2: Develop a Master Plan

Step 3: Assess Project Site

Step 4: Design Project

Step 5: Decide Money Matters

Step 6: Install Project

Step 7: Create a Maintenance Plan

Step 8: Use the Project

Step 9: Share Your Story



### ***Step Three: Pollinator Best Practices (How are you assessing and designing your site?)***

#### *Pollinators Like*

- **Diversity** of plant species
- **Colorful flowering species** that provide nectar and pollen throughout the year and attract a range of pollinators (e.g. butterflies, bees, birds and moths).
- **Woody vegetation** (trees and shrubs) for nectar, pollen, shelter, and shade.
  - Tip: Leave brush piles and stumps for cavity-nesting pollinators, overwintering, shelter from harsh weather.
- **Sun** exposure
- **Structural elements** such as small artificial nest boxes for cavity-nesting bees and wasps.
- **Close proximity** to other pollinator habitats
  - Tip: Think about creating connected paths. How far is the nearest pollinator patch? Is there a creek or other pollinator corridor nearby? Smaller and more frequent patches are preferable to one large patch. A small area of pollinator-friendly habitat can go a long way for these creatures.

#### *Pollinators Dislike*

- **Weeding** due to reduced habitat utility
  - Fun fact: dandelions are foraging resources and host plants!
- **Mulching** may retain soil moisture, but too much mulch blocks ground-nesting species (such as bees who excavate and build ground nests), and create pollen and nectar 'deserts'.
- **Aggressive pruning / removal of dead vegetation** makes certain life stages for pollinators more challenging (think: eggs, pupae, adult wintering). This practice also exposes pollinators to greater predation risk.
  - Tip: prune later in the season, after cavity-nesting pollinators and overwintering butterflies emerge.
- **Insecticides** are commonly applied by gardeners or by garden centers on ornamental plants and can be harmful to pollinators for years after their application. Be especially sure to avoid neonicotinoids).
- **Diesel Fuel.** Avoid planting too close to busy roadways if possible!
- **Extreme temperatures** if planting on or near hot surface areas (such as asphalt playgrounds), consider only plants that prefer heat as well as shade and refuge for people and pollinators.

## Step Four: Let's Get Started! (What, when, & how to plant?)

Before diving in, please start your native school garden with any native plants you may already have! You may be surprised by what you find on your school grounds. Moreover, a good idea is to consult with a landscaping expert such as a [UC Master Gardener](#), or at the very least, conduct your own research on site conditions and compatible plants prior to planting. The slope of the land, the temperature, and availability of sunlight and water will determine what plants are best suited for your site. With that stated, here is a list of favorite pollinator-friendly plants to help you get started with your research and planting design. Each plant has a link to its corresponding page on [Calscape](#), a California native landscape gardening resource that hosts a wealth of plant-specific information for gardeners.

### Easy Starters



Photo: Common Yarrow

#### [California Poppies](#)

- Bloom Times: All Seasons
- Planting Times: Spring (ideally)
- Type: Annual Herb
- Wildlife Supported: Birds, small herbivores, butterflies, bees, other pollinators.

#### [Common Yarrow](#)

- Bloom Times: Spring, Summer
- Planting Times: Spring or Early Summer
- Type: Perennial Herb
- Wildlife Supported: Carnivorous insects; butterflies; bees

Tip: Check out [Calscape's Garden Planner](#) tool for more native plant suggestions suitable for your school grounds. Remember: right place, right time, right plant!

### Other Options



Photo: Monkey Flowers

#### [Hummingbird Sage](#)

- Bloom Times: Winter, Spring, Summer
- Planting Times: Early Fall
- Type: Perennial Herb
- Wildlife Supported: Hummingbirds, bees and butterflies

#### [Monkey Flowers](#)

- Bloom Times: Winter, Spring, Summer
- Planting Times: Late Winter
- Type: Shrub
- Wildlife Supported: Hummingbirds, insects, bees, caterpillars

#### [Sticky Cinquefoil](#)

- Bloom Times: Spring, Fall
- Planting Times: Spring (ideally)
- Type: Perennial Herb
- Wildlife Supported: Various small insects are attracted to the flowers

#### [Manzanita](#)

- Bloom Times: Winter, Spring
- Planting Times: Fall, Early Winter (ideally)
- Type: Shrub
- Wildlife Supported: Insects and hummingbirds are attracted to the flowers. Other birds are attracted to the fruits.

## ***What Can Teachers Do to Help Bring Pollinator Education to the Classroom?***

Teachers should be recognized by their schools for their hard work to help their campuses become pollinator-friendly. While there are official pollinator steward certification programs, such as Pollinator Partnership's, the knowledge and expertise of [Oakland's Pollinator Posse](#) can be utilized to create a local public school teacher Pollinator Ambassador Certification. Components of a pollinator ambassador certification program include:

### *Educational Components*



#### Pollinator Basics

- Pollinator ecology
- Habitat needs
- Nesting Needs
- How people (teachers specifically) can help
- Bee anatomy

#### Plants that support pollinators

- Best plants for pollinators in the Bay Area
- Importance of connected greenways
- A little greenery and flowers go a long way to supporting pollinators

#### Monitoring

- Ways that teachers and students can identify and monitor pollinators on campus

### *Integrating Pollinator Education into Existing Curricula*



(Education Curriculums Sourced from [Next Generation Science Standards](#))

Teachers can support pollinator education by discussing the importance and role of pollinators with their students. Additionally, working with the school's Garden Coordinator to develop outdoor learning activities can be a powerful aid in teaching students about their pollinator ecology. Using the Next Generation Science Standards curriculum search tool, teachers can discover how education about pollinators and native plants can be integrated into existing curricula for students of different ages. Pollinator education can help students at different grade levels demonstrate understanding of diverse topics.

## Precedents

- The [Butterfly Garden](#) at Columbiana High School in Columbiana, Ohio: Partnership between a school and non-profit organization that used [Project Learning Tree's](#) guide to start their research, planning, gardening, and botany workshops for students.



Photo Source: Project Learning Tree. Students from Columbiana High school took part in many aspects of creating the pollinator garden including removing the sod and sowing seeds according to their garden designs.

- Herbert Akins Elementary School in Fuquay-Varina, North Carolina: Collaboration between a local gardening club, a school garden club coordinator, and a special education teacher to create a rain and pollinator garden, documented in blog posts [here](#).



Photo Source: Soil3 Blog. The Fuquay Garden Club at Herbet Atkins Elementary School were so surprised by how fast and easy the seeding process was as well as the planting installations. To their surprise, the entire garden was planted, fertilized, and watered in under an hour

- Oakland, California's Bishop O'Dowd High School's [Living Lab](#): A four acre certified wildlife habitat that serves as an outdoor classroom for students to learn more about the natural world, including pollinators.



# Pollinators Education in the Park

## PART 2: YOUTH EDUCATION TEAM

### Overview

Over 85% of flowering plants rely on pollinators such as bees, butterflies, bats, flies, hummingbirds and a range of other animal to reproduce. Unfortunately, many pollinator populations, particularly bees, butterflies, and bats, are in decline due to habitat loss, diminished food resources, pesticides, and parasites. Studies show that pollinator education decreases fear and increases interest and increases willingness to protect these critters.

Peralta Hacienda Historical Park offers semester-based education programs and week-long summer programs for a variety of age ranges. In collaboration with the educators at the park, we created four 45-minute lesson plans tailored to the 6th grade participants as well as a 45 minute lesson plan and accompanying pollinator census data collection tool for the Park's high school student interns.

Below you can find links to the Pollinator Lesson Plans and the Pollinator Census. All plans can be adapted to different age groups and settings.

**Grade: Sixth Grade**      **Time: 45 Minutes**      **Topic: Pollinator Education**

## (1) Intro to Flowers and Pollination

**GUIDING QUESTIONS:**

1. How does pollination work and how do bees and plants work together to build healthy ecosystems?

**MATERIALS NEEDED**

1. Pollination Diagram
2. Blank Paper and Colored Pencils/Markers for kids to draw their own diagram

**INVITATION**

**Overview of Pollination**

- Over 90% of flowering plants rely on pollinators to reproduce
- Pass around pollination diagram and have the students draw out their own diagram as you explain pollination (they can get creative with what pollinators and flowers they want to draw)
  - What is pollination? (See Figure 1)
  - Ask the students why they think plants have flowers?
  - Flowers help a plant create a seed for reproduction
    - 1) Flowers attract pollinators with their bright colors, aromas, and supply of nectar. Have students draw flowers they think would attract pollinators in their own diagrams
    - 2) When pollinators come to take the nectar from the inside of the flower, the flower's pollen (which holds some of the plant's genetic material) rubs off from the anther onto the pollinator's body. The pollinator then transfers that pollen to the stigma of another flower when they dive for more nectar.
    - 3) The sperm cells from the pollen reach and fertilize the ovary, The petals then fall away and the ovary grows into a fruit - which contains seeds for a new plant!
- Bees are incredibly efficient pollinators, but not the only pollinators in the environment.
  - Ask students for examples of different pollinators.
  - All types of Bees, Bats, Hummingbirds, Butterflies, Moths, Flies, Beetles, Wasps
  - Ask the students when they notice flowers blooming?

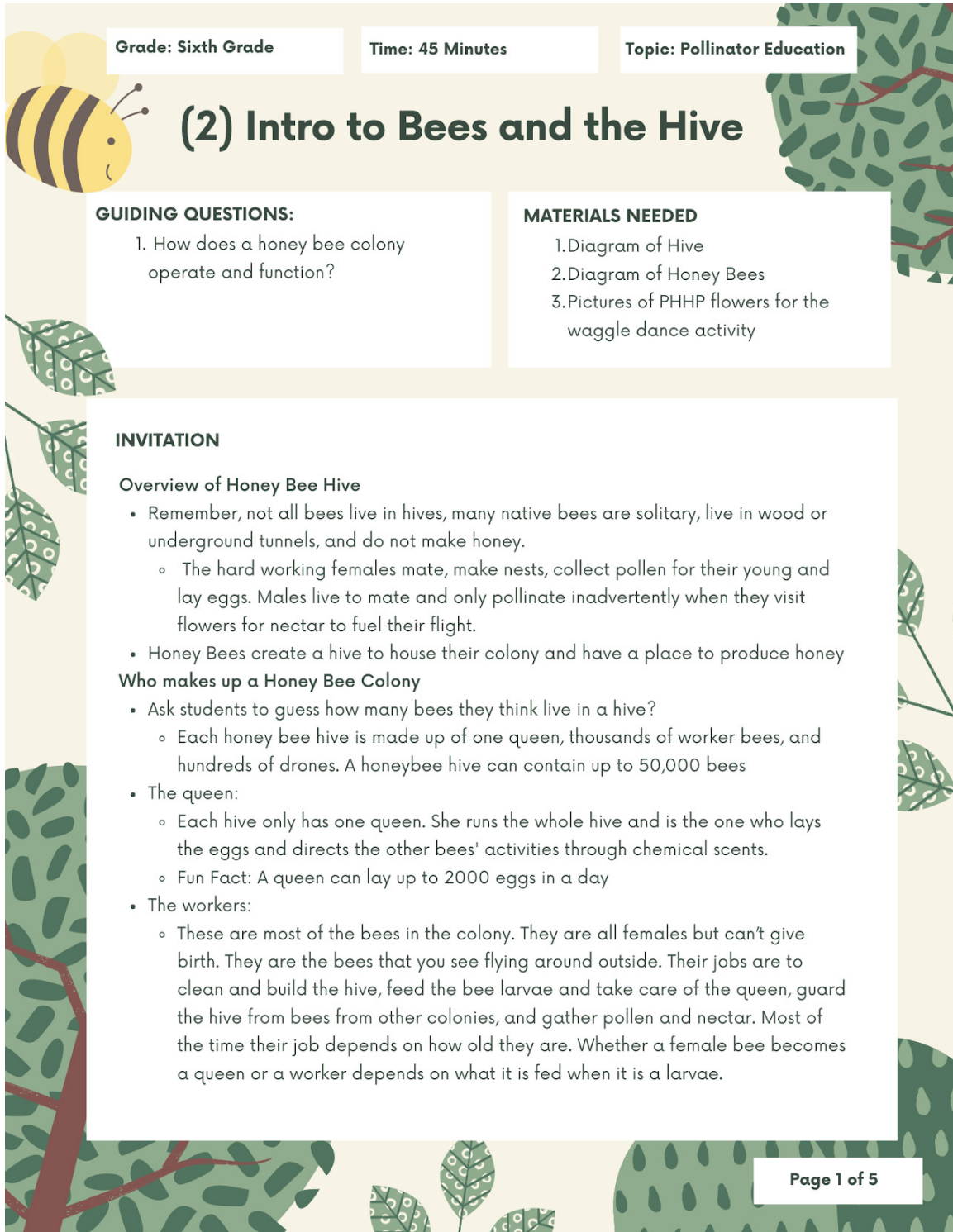
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## Lesson 1: Flowers & Pollination

This lesson introduces the concepts of flower anatomy and pollination for sixth graders. The curriculum underscores how pollinators and plants can work together to build healthy ecosystems. The lesson includes an activity for students to run around the park and search for different examples of pollinator food sources and habitat.

## Lesson 2: Honeybees & the Hive

This lesson introduces sixth graders to the western honey bee colony. Students learn how a bee hive operates and go on a scavenger hunt to find flowering plants using the worker bee waggle dance.



**Grade: Sixth Grade**      **Time: 45 Minutes**      **Topic: Pollinator Education**

### (2) Intro to Bees and the Hive

**GUIDING QUESTIONS:**

1. How does a honey bee colony operate and function?

**MATERIALS NEEDED**

1. Diagram of Hive
2. Diagram of Honey Bees
3. Pictures of PHHP flowers for the waggle dance activity

**INVITATION**

**Overview of Honey Bee Hive**

- Remember, not all bees live in hives, many native bees are solitary, live in wood or underground tunnels, and do not make honey.
  - The hard working females mate, make nests, collect pollen for their young and lay eggs. Males live to mate and only pollinate inadvertently when they visit flowers for nectar to fuel their flight.
- Honey Bees create a hive to house their colony and have a place to produce honey

**Who makes up a Honey Bee Colony**

- Ask students to guess how many bees they think live in a hive?
  - Each honey bee hive is made up of one queen, thousands of worker bees, and hundreds of drones. A honeybee hive can contain up to 50,000 bees
- The queen:
  - Each hive only has one queen. She runs the whole hive and is the one who lays the eggs and directs the other bees' activities through chemical scents.
  - Fun Fact: A queen can lay up to 2000 eggs in a day
- The workers:
  - These are most of the bees in the colony. They are all females but can't give birth. They are the bees that you see flying around outside. Their jobs are to clean and build the hive, feed the bee larvae and take care of the queen, guard the hive from bees from other colonies, and gather pollen and nectar. Most of the time their job depends on how old they are. Whether a female bee becomes a queen or a worker depends on what it is fed when it is a larvae.

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## Lesson 3: Bees & Food System

This lesson introduces sixth graders to the role of pollination and bees in our food system, and conveys how bees contribute to the foods we enjoy every day. The lesson includes an activity to mimic the journey bees make to pollinate plants and helps students understand the types of edible plants that require pollination.



**Grade: Sixth Grade**      **Time: 45 Minutes**      **Topic: Pollinator Education**

# (3) Bees and Food

**GUIDING QUESTIONS:**

1. What is pollination? Recap from Lesson #1
2. What role do bees play in our food system?
3. How do bees contribute to the food we eat every day?
4. What kinds of food require help from bees to grow?

**MATERIALS NEEDED**

1. Old magazines (food/ home/ nature magazines if possible)
2. Gluesticks
3. Scissors
4. Paper plates (2x the number of students)
5. Pens/ markers
6. Two containers
7. Foods from food pantry (optional)

**INVITATION**

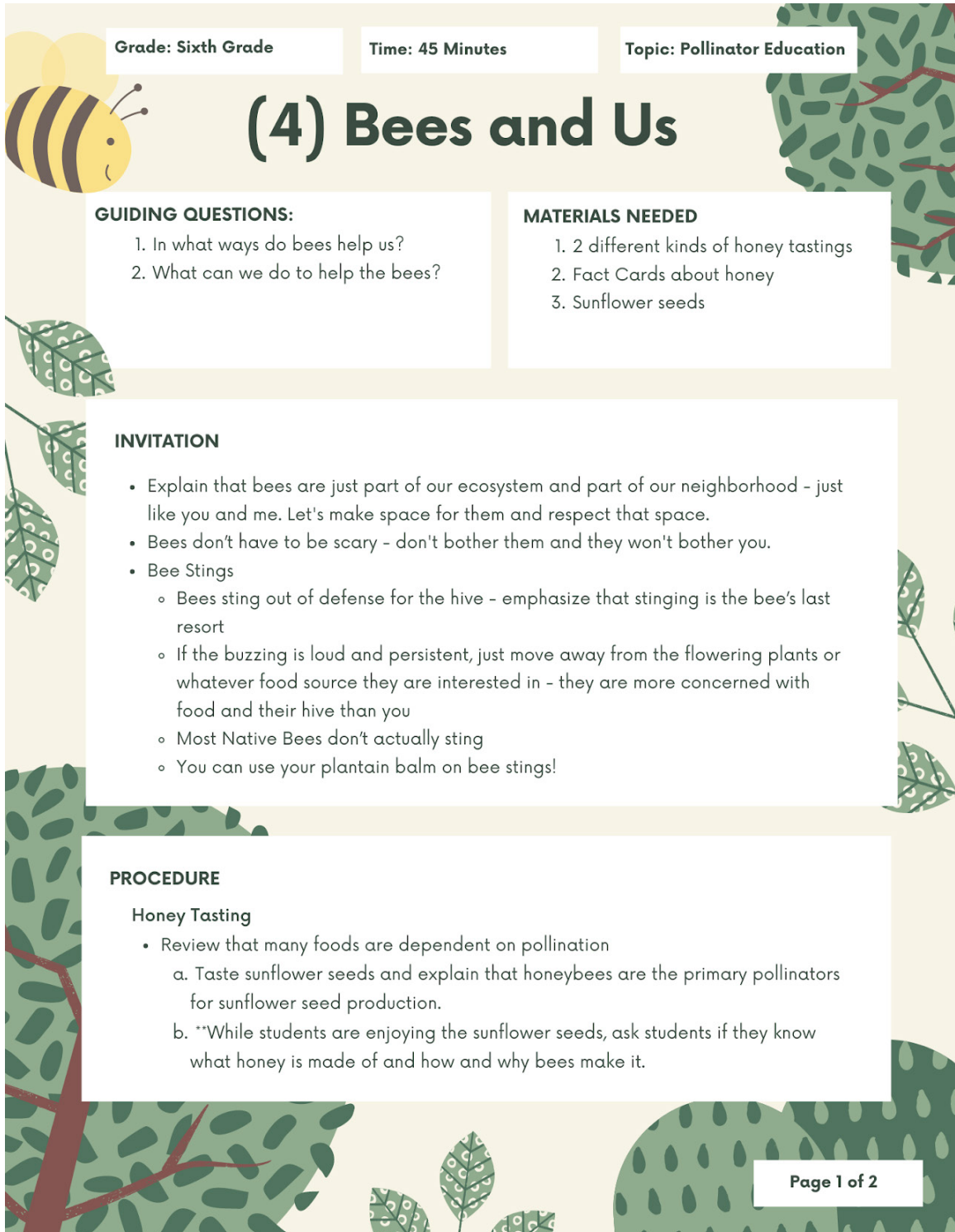
- Begin the lesson by providing a brief recap of what pollination is (See Figure).
- Ask students to guess how much food is dependent on bees for pollination.
- Bees pollinate approximately 75 percent of the fruits, nuts, and vegetables grown in the US.
- Ask students what their favorite food is to eat and engage students in a conversation to identify foods that bees help pollinate (See Food Reference List).
- Show foods from the food pantry as examples (optional).
- Explain to the students that we will next do an activity to mimic “pollinating” food and create a plate of food.

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## Lesson 4: Bees & Us!

This lesson focuses on the relationship between bees and humans (us!). The purpose of the lesson is to show sixth graders that bees are not harmful if left unbothered and that humans and bees have enjoyed a symbiotic relationship. The students have a chance to experience a benefit of bees by participating in a honey tasting.



**Grade: Sixth Grade**      **Time: 45 Minutes**      **Topic: Pollinator Education**

# (4) Bees and Us

**GUIDING QUESTIONS:**

1. In what ways do bees help us?
2. What can we do to help the bees?

**MATERIALS NEEDED**

1. 2 different kinds of honey tastings
2. Fact Cards about honey
3. Sunflower seeds

**INVITATION**

- Explain that bees are just part of our ecosystem and part of our neighborhood - just like you and me. Let's make space for them and respect that space.
- Bees don't have to be scary - don't bother them and they won't bother you.
- Bee Stings
  - Bees sting out of defense for the hive - emphasize that stinging is the bee's last resort
  - If the buzzing is loud and persistent, just move away from the flowering plants or whatever food source they are interested in - they are more concerned with food and their hive than you
  - Most Native Bees don't actually sting
  - You can use your plantain balm on bee stings!

**PROCEDURE**

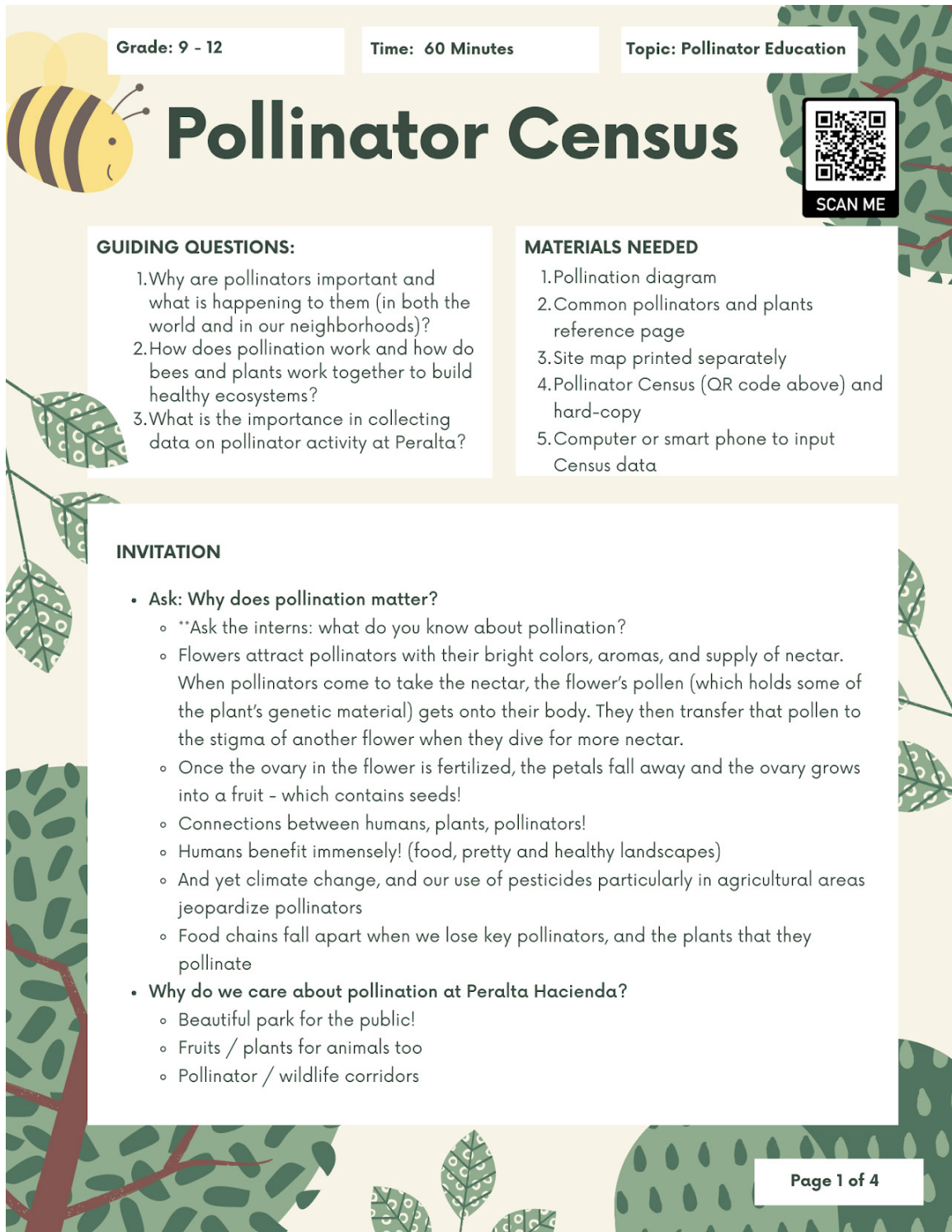
**Honey Tasting**

- Review that many foods are dependent on pollination
  - a. Taste sunflower seeds and explain that honeybees are the primary pollinators for sunflower seed production.
  - b. \*\*While students are enjoying the sunflower seeds, ask students if they know what honey is made of and how and why bees make it.

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# Tracking Pollinators through the Pollinator Census!


The final lesson is the Pollinator Census created for high school students. While the lesson itself was designed with high school students in mind, the Pollinator Census is open to everyone! We encourage all Park visitors to try out the Pollinator Census.



The image shows a worksheet titled "Pollinator Census" with a bee illustration on the left. At the top, it specifies "Grade: 9 - 12", "Time: 60 Minutes", and "Topic: Pollinator Education". A QR code is labeled "SCAN ME". The worksheet is divided into sections: "GUIDING QUESTIONS" with three numbered questions about pollinator importance, pollination mechanics, and data collection; "MATERIALS NEEDED" with five items including a pollination diagram, reference page, site map, the census form, and a device for data entry; and "INVITATION" with two main bullet points: "Ask: Why does pollination matter?" and "Why do we care about pollination at Peralta Hacienda?". The "Ask" section includes sub-points about asking interns, the process of pollination, fertilization, and the impact of climate change and pesticides. The "Why do we care" section lists reasons like public enjoyment, wildlife support, and wildlife corridors. The page is decorated with green leaf patterns and a tree branch.

**Grade: 9 - 12**      **Time: 60 Minutes**      **Topic: Pollinator Education**

## Pollinator Census



SCAN ME

**GUIDING QUESTIONS:**

1. Why are pollinators important and what is happening to them (in both the world and in our neighborhoods)?
2. How does pollination work and how do bees and plants work together to build healthy ecosystems?
3. What is the importance in collecting data on pollinator activity at Peralta?

**MATERIALS NEEDED**

1. Pollination diagram
2. Common pollinators and plants reference page
3. Site map printed separately
4. Pollinator Census (QR code above) and hard-copy
5. Computer or smart phone to input Census data

**INVITATION**

- **Ask: Why does pollination matter?**
  - \*\*Ask the interns: what do you know about pollination?
  - Flowers attract pollinators with their bright colors, aromas, and supply of nectar. When pollinators come to take the nectar, the flower's pollen (which holds some of the plant's genetic material) gets onto their body. They then transfer that pollen to the stigma of another flower when they dive for more nectar.
  - Once the ovary in the flower is fertilized, the petals fall away and the ovary grows into a fruit - which contains seeds!
  - Connections between humans, plants, pollinators!
  - Humans benefit immensely! (food, pretty and healthy landscapes)
  - And yet climate change, and our use of pesticides particularly in agricultural areas jeopardize pollinators
  - Food chains fall apart when we lose key pollinators, and the plants that they pollinate
- **Why do we care about pollination at Peralta Hacienda?**
  - Beautiful park for the public!
  - Fruits / plants for animals too
  - Pollinator / wildlife corridors

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