NATURE HIKES WITH THE FRIENDS

at Huddart & Wunderlich County Parks

Docent Training Manual
Revised 2022

Online Resources Padlet:
https://padlet.com/fhwp2961/wkl8so3s0rk5

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For more resources and updates check out our online Padlet:

https://padlet.com/fhwp2961/wkl8so3s0rk5

Acknowledgements

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The Docent Handbook was created with assistance from Ann Cripps, Susan Crocker, Jennifer Gonzales, Susan Lang, Lisa Putnam, Nancy Ridgway, Laureen Sepulveda, and Kym Teppo.

1. Introduction

- Friends Mission Statement & Purpose of Nature Program
- Friends of Huddart & Wunderlich Parks History
- Huddart & Wunderlich Parks Location & Maps

Friends Mission Statement & Purpose of Nature Program

The Friends of Huddart and Wunderlich Parks are park enthusiasts and stewards who provide a wide range of programs and events in two historic redwood parks in the heart of the Bay Area. Our mission is to promote the positive health and community benefits provided by these parks and to support equitable and inclusive access for all park users. We lead hikes, provide environmental education, showcase local history, and celebrate the unique horse heritage of San Mateo County.

Friends does not and shall not discriminate on the basis of race, color, religion or creed, gender, gender expression, age, national origin or ancestry, disability, marital status, sexual orientation, or military status, in any of its activities or operations. These activities include, but are not limited to, the appointment to and termination from its Board of Directors, hiring and firing of staff or contractors, selection of volunteers, selection of vendors, and providing of services.

Thank you for volunteering to be part of the Nature Hikes with the Friends program for children. Our volunteer docents are at the heart of our organization and we appreciate your interest in sharing your love of nature with our young visitors. Each year more than 1,000 children have the opportunity to learn about nature in the midst of a majestic redwood forest. Our program is designed to teach children about the unique ecosystems in the mixed evergreen forest, grasslands, redwood forests and oak groves in Huddart Park. Docents use children's natural curiosity to help them discover Sticky Monkey flowers, giant Redwood trees, Banana Slugs, Turret Spider nests, and more. Children learn about predators and prey, birds and nesting, and the connection of Ohlone natives to the land and resources.

Our parks are unique in allowing children to compare and contrast four distinct eco-systems. Our program also blends hands-on learning with curriculum based in the Next Generation Science Standards (NGSS). Our hiking program and activity centers are designed to increase curiosity, engagement and enthusiasm for learning - setting the stage for children to become environmental stewards later in life. Since the beginning of the program more than 25 years ago, an important goal has been to bring underserved children in our community to the park. We are able to provide a low-cost field trip with highly trained volunteer docents and through our collaboration with the County of San Mateo Department of Parks.

Friends History

The Friends was created in 1995 with a grant from Robert Levenson and Susan Lang's INNW fund. The beginning of the children's hiking program started with the Water Babies program teaching preschoolers to water saplings planted by County Park Rangers. The program has evolved over the years into the Nature Hikes with the Friends field trip program with the help of countless dedicated volunteers.

The Friends became a 501(c)(3) in 2002 in order to lead the effort to save the Folger Estate Stable, a historic landmark in Wunderlich Park. Our small non-profit raised $3 million and oversaw the preservation efforts that were completed in 2010. The effort culminated in a Preservation Design Award and the Friends ensured the site's future conservation by seeking designation on the National Register of Historic Places. Currently the Friends offer a 3rd grade California history field trip in partnership with the San Mateo County Historical Association at the Folger Stable.

The Friends maintain the Carriage House Museum located at the Folger Estate site in Wunderlich Park and promote exhibits and give guided tours upon request. The museum explores the local history of Woodside and the property, life in California in the early 1900s, and the importance of the horse in Western American culture. More than 3,000 people visit the museum each year from around the world. The Folger School program, run collaboratively with the San Mateo County Historical Association, provides a history field trip for 1,400 3rd graders each year. Friends also provides a gentle introduction to horses for the youngest children in our Meet a Mini program on equestrian safety program.

Special events also help us engage the community and attract visitors to our parks. We host community days with partners such as Take a Hike, POST, Day of the Horse, and Girl Scout Leader Nature Training. The Friends also hosts community events and fundraisers such as the Folger Stable Barn Dance, Holidays with the Friends and park lemonade stands. The Folger Stable Speaker Series brings experts to speak about enriching topics. These programs are all run by a dedicated core of volunteers. Thanks for being a part of our team!

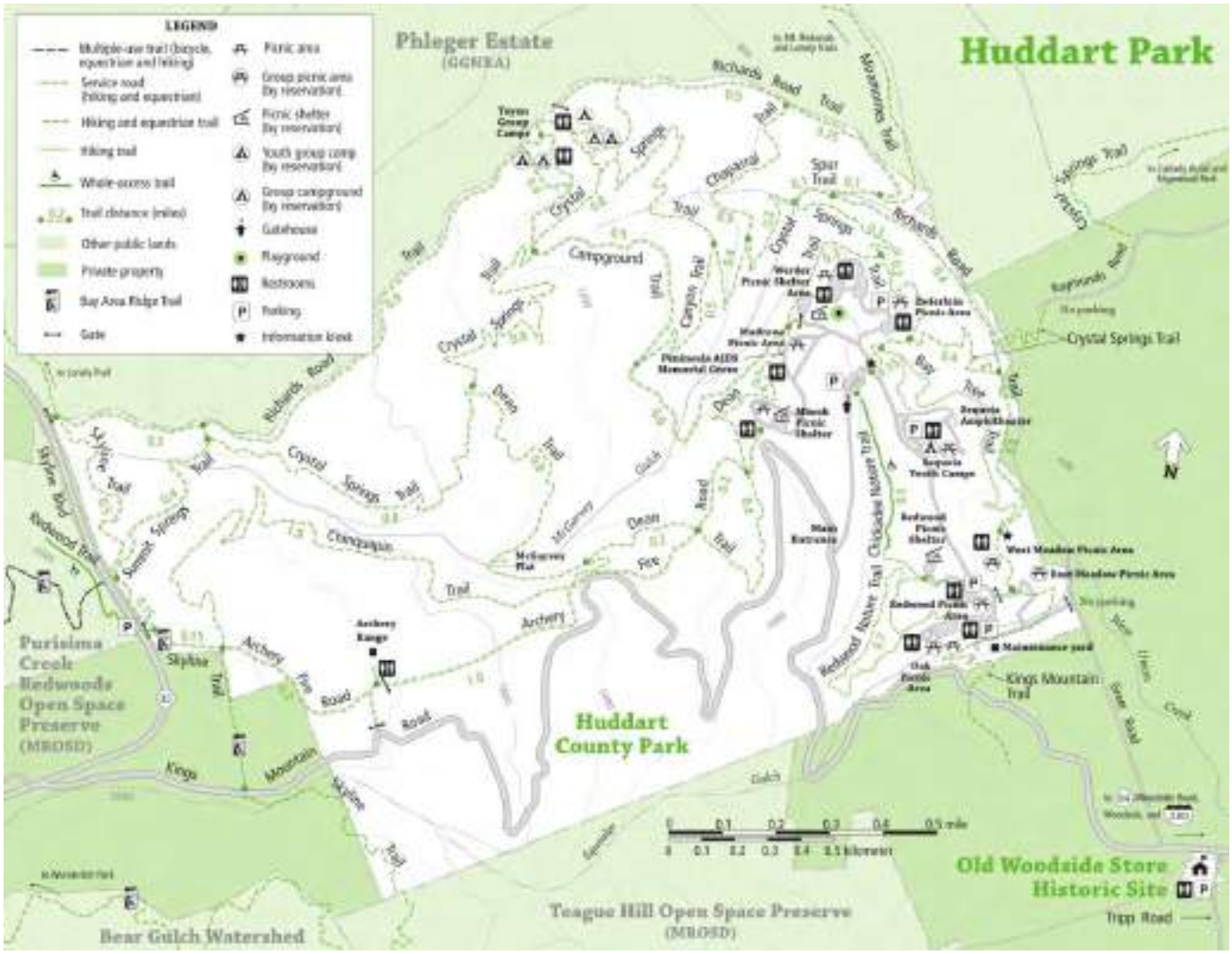
SMC Parks

County parks are open from 8:00 a.m. to dusk. No smoking, fires of any kind, or dogs (except credentialed service dogs) are permitted. For safety, docents and hiking groups must stay on the trail and use only designated trails.

To preserve the natural environment of the parks, all plants, animals and natural features stay in the park (children may not take "souvenirs"). Docents in the interpretive program may pick a leaf or two from a plant for demonstrative purposes; provided they do not pick flowers or whole plants.

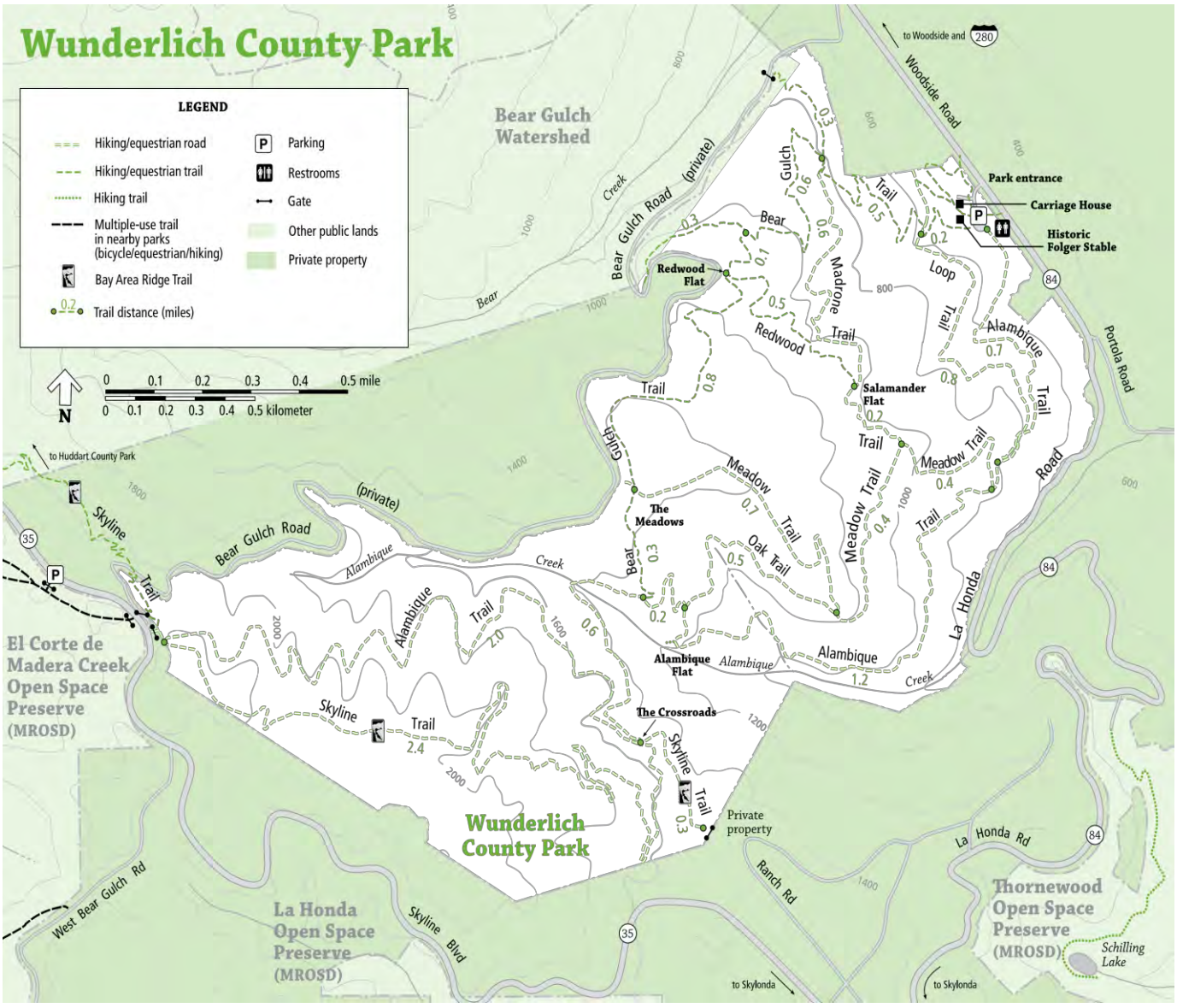
Huddart Park

Huddart Park is located at 1100 Kings Mountain Road in San Mateo County. Be cautious on the drive which is mountainous and hosts many bicyclists. K-2 programs meet at the Oak Picnic Area; 3-5th grade programs meet at the Zwierlein Picnic Area. Docents are NOT required to pay the vehicle entrance fee. A parking decal will be provided to you to show at the gatehouse and display on your windshield when in the park.



Wunderlich Park

Wunderlich Park is located at 4040 Woodside Road in San Mateo County. Friends offers some guided hikes and special programs and events at Wunderlich. There is no parking fee but the parking lot does get busy. We will sometimes request you to park in designated spots. If you are not in the regular parking lot, please display your Friends parking decal on your windshield.



2. General Policies for Docents

Thank you for volunteering to be part of the Nature Hikes with the Friends program for children!

Commitment
Docents are asked to commit to a minimum of two hikes per month. Docents schedule themselves for hikes using an online system called Sign Up Genius. If this is a hardship, please let our Executive Director know. If you are unable to lead a hike, please find your own substitute docent if at all possible. A docent contact list is provided at the end of this manual. Contact the Executive Director or lead docent ASAP if on the day of the hike you are running late or have an emergency preventing you from attending.

Background Check
Docents who work with children in our nature program undergo a routine background check required by many schools, non-profits, and agencies working directly with children. Background checks are conducted by a Live Scan fingerprinting process, which is a quick and relatively convenient process. Details are outlined in the application packet. Docents may provisionally work in our program while awaiting results.

Safety
All hiking groups require at least one chaperone or a second docent. No hiking groups may have a single adult leader. To protect the children and our docents, volunteers will avoid unsupervised and/or one-on-one interactions with minors unless there is an emergency. Volunteers will avoid taking any supervisory and/or disciplinary actions and direct chaperones to handle behavioral problems. If there are not enough chaperones or hike leaders to ensure two adults per group, combine hiking groups with another docent.

If a docent experiences an emergency, follow regular procedures for response and contact his or her emergency contact person. Each docent should carry their emergency contact card in their hiking pack. A list of emergency contacts is also stored on the lid of the walkie talkie bin. There are incident reporting forms in the bin and docents are required to report on any serious health or safety issues that happen on a hike.

Please refer to the docent manual for responses to typical hazards you may encounter.

Hiking docents recognize that there is some inherent risk in their volunteer role and are not covered for personal injury under the Friend's non-profit insurance policy. Under our non-profit liability insurance docents are not employees and are not eligible for benefits, including health insurance, worker's comp, disability, or other benefits.

Rain Policy

Our policy is that we will conduct the scheduled hikes rain or shine. If there is a light rain we will hike – please dress accordingly. Teachers are advised of this policy and will request that the children and chaperones be dressed appropriately. If there are strong winds, very heavy downpour, or lightening, the lead docent will contact the teacher and cancel the field trip by 8:00 a.m. The lead docent will contact all docents scheduled to hike if a hike is cancelled.

Parking Pass

The San Mateo County Parks Department issues all Huddart Park Nature hike docents a parking pass to be used when participating in training or guiding hikes. The parking pass must be returned when a docent leaves the program.

3. Emergency & Safety Procedures

- Important Numbers
- Medical Emergency Response
- Bee, Wasp or Hornet Bite/Swarm
- Mountain Lions
- Rattlesnake
- Poison Oak
- Ticks
- Equestrian Etiquette

Emergency & Safety Procedures

Review with your group the rules of the trail before heading out to set the stage for a safe hike (see Conducting a Successful Hike). When you arrive for a hike, the lead docent will distribute walkie-talkies. Please make sure yours is in working order before heading out. In addition, a personal cell phone may be carried to call for help. It is useful for docents enter the cell phone numbers of other docents into their phones.

The most important thing in a serious medical emergency is to maintain calm so that you can respond effectively.

Important Numbers

- Radio the lead docent in the case of a serious medical emergency. Use your discretion and call **911** if necessary. In a serious emergency the lead docent will direct another docent to notify the Director of Programs and Ranger immediately. Other docents should use the teachers and chaperones to keep children calm and in a safe location.
- For minor emergency use your radio to notify the lead docent. The lead docent will call **the Ranger Station (650-851-1210)** and **Executive Director** Kym Teppo **(650-417-5198)**.

Medical Emergency

Step 1: Assess the Situation

- Calm the person and assess problem; ask what happened.
- Note whether the person went unconscious, if there is swelling, disorientation or if the person hit his/her head.
- Be prepared to describe you location, eg, Huddart Park, and your actual location, eg, middle of Redwood Trail. New trail signs have intersection numbers – get in the habit of noticing the number as you pass.

Step 2: Response

- If it is a major medical emergency, call 911. Call the lead docent on the radio and inform other docents if necessary. The lead docent will determine what responders to call given the situation. Your focus should stay on the victim and your hiking group. Cell phones may not work in the hills.
- Stay with the person until emergency responders arrive.
- If it is absolutely necessary to leave to get help, put one adult in charge of the group.
- The lead docent will get back to the docents as soon as the responders arrive.
- Fill out an incident report form and give to the lead docent in charge.

Bee, Wasp, or Hornet Bite or Swarms

- Immediately ask the visitor if he/she is allergic to bee stings, yellow jacket stings, or other insect stings. Teachers are required by schools to carry and administer any

allergy medications. Docents are not permitted to administer medication – this is the school's responsibility.
- Move the group away from the area.
- Calm the group.
- Directly after that, call lead docent on the walkie-talkie and inform them of the incident and location. Notify other hiking docents via the walkie-talkie to ensure that other hikers avoid the area.
- If desired, apply bee sting wipe from your docent kit or the first aid kit to relieve pain and swelling.
- Alternatively, the docent can offer the bee sting application to the visitor, teacher or chaperone to administer.

Mountain Lion Sighting

- Most lions will avoid confrontation. Give them a way to escape.
- Stay calm and face the lion. Children must not move.
- Do not run.
- Appear larger by raising yours arms and opening your jacket.
- Avoid bending over or crouching.
- Pick up small children.
- If the lion approaches or acts aggressively, shout and throw whatever you can grab without turning your back or bending over.
- Fight back if attacked.

Rattlesnake Sighting

- Keep your distance.
- Allow snake to retreat.
- In highly unlikely case of a bite:
  - ✓ Calm the victim.
  - ✓ Immobilize the affected extremity.
  - ✓ Keep the bite site below the level of the heart.
  - ✓ Use walkie-talkie to contact lead docent.
- When looking under rocks, logs, etc. with children, always have everyone on one side of the object and roll it AWAY from you to provide a safe escape for hiding snakes.

Poison Oak Exposure

- While on the trail, use the poison oak soap/wipe from your docent kit or first aid to wipe any areas affected.
- When you return to the picnic area have the visitor wash thoroughly with soap and water.
- Notify the lead teacher so that the teacher can advise parents to wash all clothes and shoes.

- If properly treated within 24 hours of exposure, a visitor can dramatically reduce their chances of getting poison oak dermatitis.

Ticks

- Stay on trails. This is the best way to avoid hitchhiking ticks.
- It is good practice to casually check children for visible ticks after a hike. But you do not want to distress anyone by calling attention to it. If children are older, they can check each other for visible ticks.
- Please check yourself carefully after hiking for ticks. Follow procedures recommended by the Bay Area Lyme Foundation for preventing ticks, detecting, removing and reporting ticks in order to prevent serious illness. More information at: https://www.bayarealyme.org/lyme-disease-prevention/protect-yourself-your-family/.

Equestrian Etiquette

- Horses have the right of way on trails where they are permitted. If you see equestrians approaching your hiking group. Ask the children to stand to the side to allow the horses to pass. Remind them to use soft voices and to not touch the horses as they pass. It is a good idea to remind the group during your introduction that they may see horses on the trail and that they need to follow the protocol if encountered. This is a good opportunity to talk about prey animals and their features and instincts.

4. Use of Two Way Radios (Walkie Talkies)

RADIO INFORMATION

- "Motorola Talkabout" two-way radios (Model MH230R) are provided to be used on hikes to assist in emergencies.
- The lead docent is responsible for distributing & collecting radios.
- **The radio frequency used is Channel 20, Interference Code 80.**
- Radios are to remain ON during the entire hike.
- Radios are numbered for ID purposes and accountability.
- For those people with pacemakers, the radio must NOT be worn in the breast pocket. It can be worn using the belt clip, or on the body at least 6 inches away from the pacemaker.
- Docents need to test their Walkie-Talkies before the visitors arrive for their hikes.

RADIO PROCEDURE

- To turn the radio ON, turn the knob at the top clockwise until Channel 20 appears in the display.
- Only use in emergencies or to alert docents to important trail info. Once the radio is ON, press the button on the left labeled PTT — Press To Talk — and hold it down while speaking. Release the button when finished speaking.
- Do not speak 'over' someone else. Wait until they are finished before speaking.
- Give the person being called time to hear the request & respond.
- Identify yourself and who you are calling.
  Example...
  - "This is Radio 1, Docent Jennifer calling lead docent." If you can't remember what to say, then just say, "Help, I have an emergency, over."
  - "This is Kym, go ahead, over."
- Be prepared to identify the situation & where you are, etc.
- End each communication with the term "over" so the responding docent knows when to reply.
- If no reply, or too much static, try to contact other Docents who may be able to 'relay' the info.
- If our Walkie Talkie is malfunctioning, use your personal phone and call the lead docent.

5. Preparing for a Hike

- Checklist for a Successful Hike
- Suggested Docent Kit Content
- Trail Maps
- Lead Docent Position

Checklist for a Successful Hike

This is a checklist for docents to ensure you have everything you need for a successful hike.

☐ Day before hike:

- Review Trail Flora, Fauna, and Activity Center Descriptions
- Review **Goals of a Hike** to remind yourself of what you want to do
- Check the contents of your backpack; see attached list

☐ Day of the hike preparation

- Arrive at least 15 minutes before school arrival time
- Check in with lead docent & get your radio
- Lead docent will assign you to a group of children
- Ask what time your group is to be back from the hike
- Ensure there is at least one adult chaperone assigned to the group (combine groups if needed)

☐ Greeting your group

- Introduce yourself & share something you are looking forward to
- Ask the children what they think they will see
- Engage the group! Set the stage for fun
- Remind them they have their naturalist tools with them. What are they? (Your 5 senses!)
- Be curious! Ask questions about what you see, hear, small, or feel

☐ Review the rules before you start hiking

- Stay behind the docent, walking single file. Some docents let the children take turns being the line leader and modeling a good hike.
- Remind chaperones that you need them to model good behavior for the children. Chaperones should use phones for photos only and sparingly. One chaperone should always be the "sweep" at the end of the line. Chaperones should help children who are having trouble following the rules.
- No running
- Stay on the trail to avoid poison oak
- Only the docent may pick something – only touch items the docent tells you are ok.

☐ Concluding the hike and optional suggestions

- Special ending suggestions:
    - Give a child a special rock or nature item you are carrying & ask for him/her to say one thing they liked on the hike. Pass the rock to someone else. No repeats.

    - End of Hike Pledge: ask the children to form a circle and put one hand in the center and join you in the Pledge.
    - Gather in a circle and thank the children for being good nature detectives with you.
    - Make up your own end of hike activity!
- Locate the lead teacher. Leave the children with the teacher & chaperone at the bus or picnic tables,
- Return your walkie talkie. Notify lead docent of any issues or highlights from your hike.

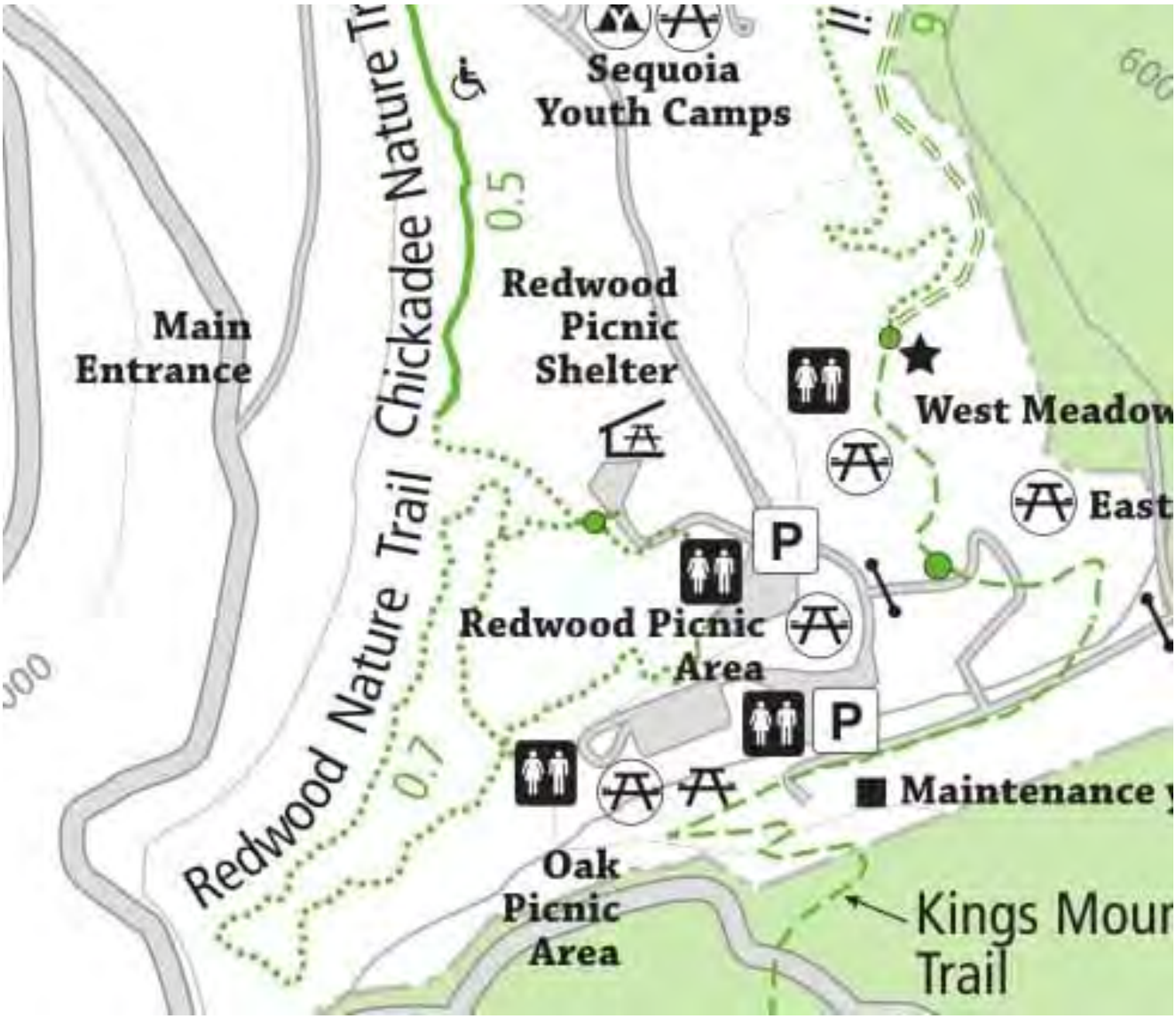
Suggested Docent Kit Contents:

- ☐ Trail Emergency Card
- ☐ Docent Nametag
- ☐ Small squirt bottle with water
- ☐ Acorns, redwood & fir cones
- ☐ Pictures of animals they may see
- ☐ Small pocket knife
- ☐ Small bug boxes
- ☐ Soap root
- ☐ Facial tissue or handkerchief
- ☐ Color samples/paint chips for color detectives
- ☐ Picture of poison oak in different phases
- ☐ Any interesting rock, bone, feather samples or other show and tell items you like to use
- ☐ Band-Aids, Poison oak soap, Sting-Ease

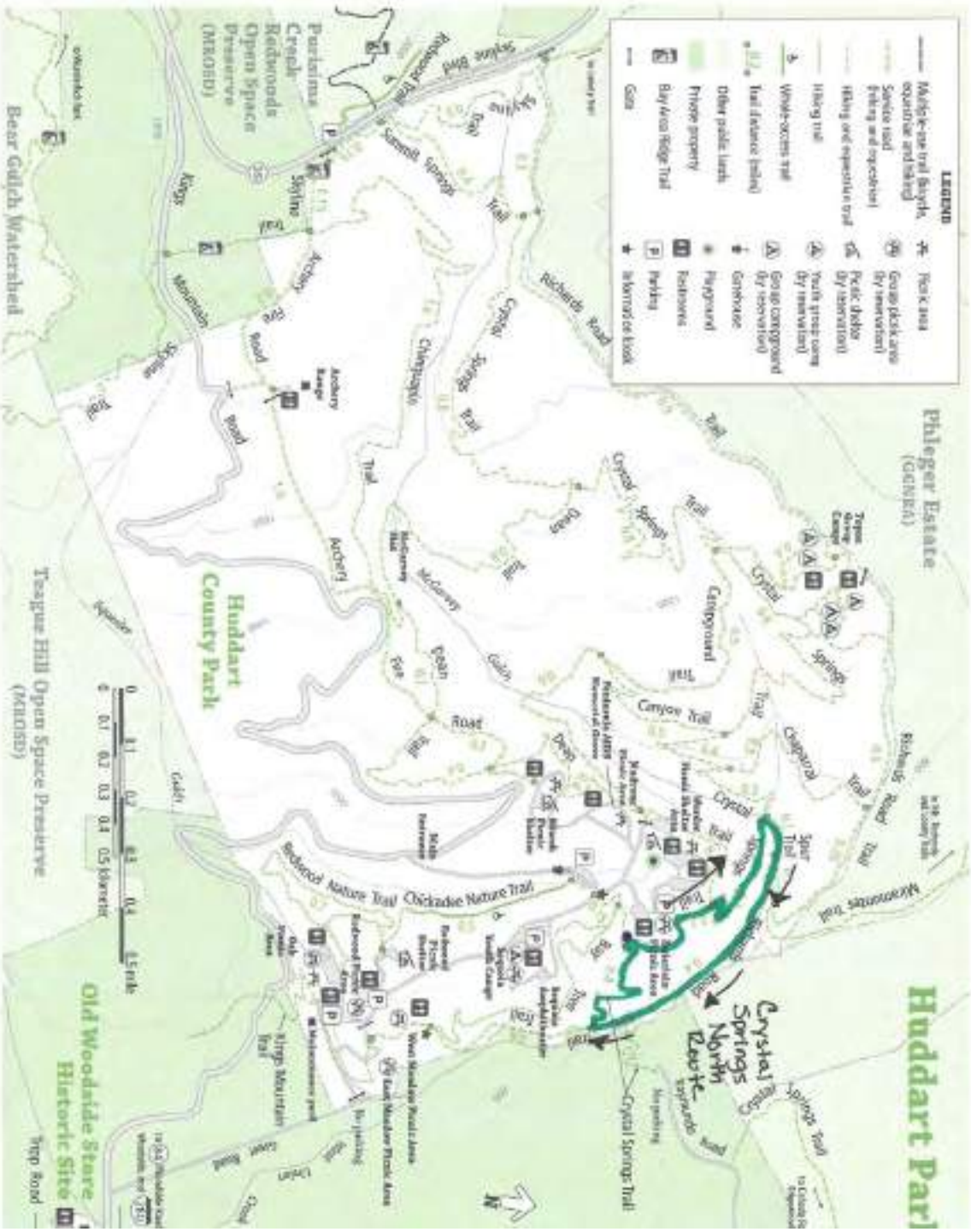
Maps

Our goal is for hike leaders to become comfortable leading a hike on any trail in Huddart and Wunderlich parks. This comes with experience and exposure. While we often mix things up with special programming, in general we hike the Redwood Trail in the Oak Area at Huddart Park for K-2nd grade programs and the Crystal Springs Trails in the Zwierlein Area for 3rd- 5th grade programs.

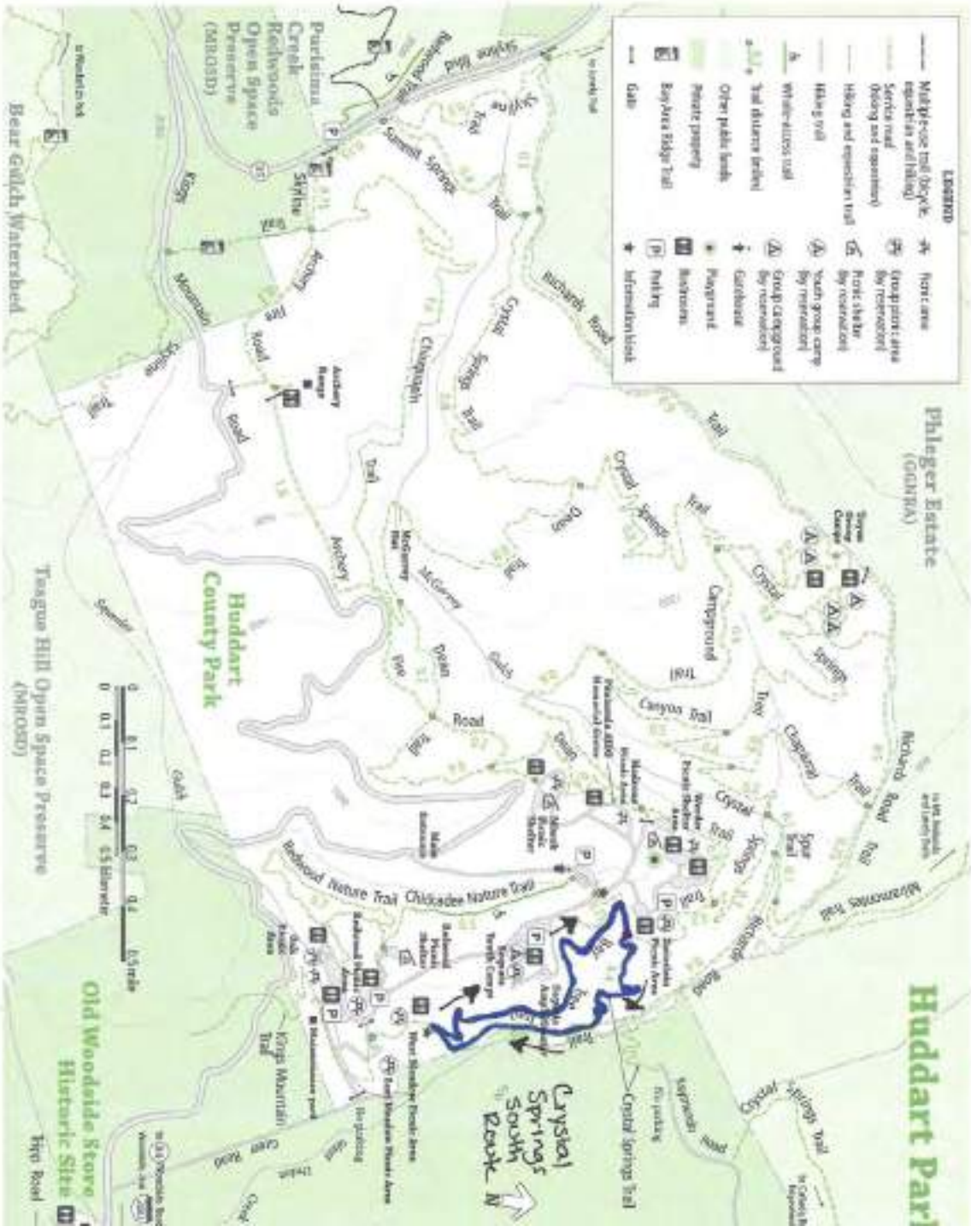
Redwood Trail: Oak Area, K-2nd



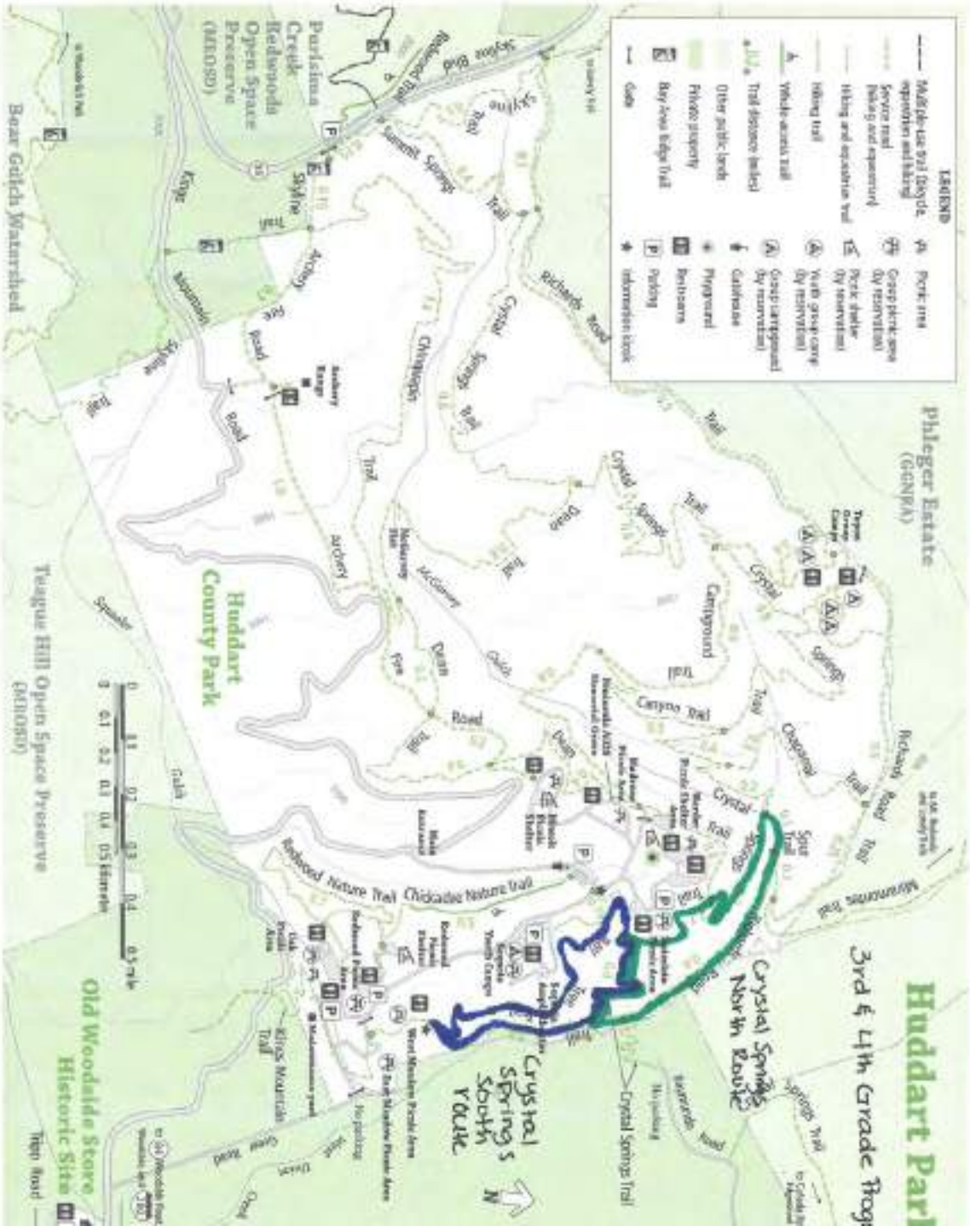
Crystal Springs North Route: Zwierlein Area 3rd-5th Grade



Crystal Springs South Route: Zwierlein Area 3rd-5th Grade

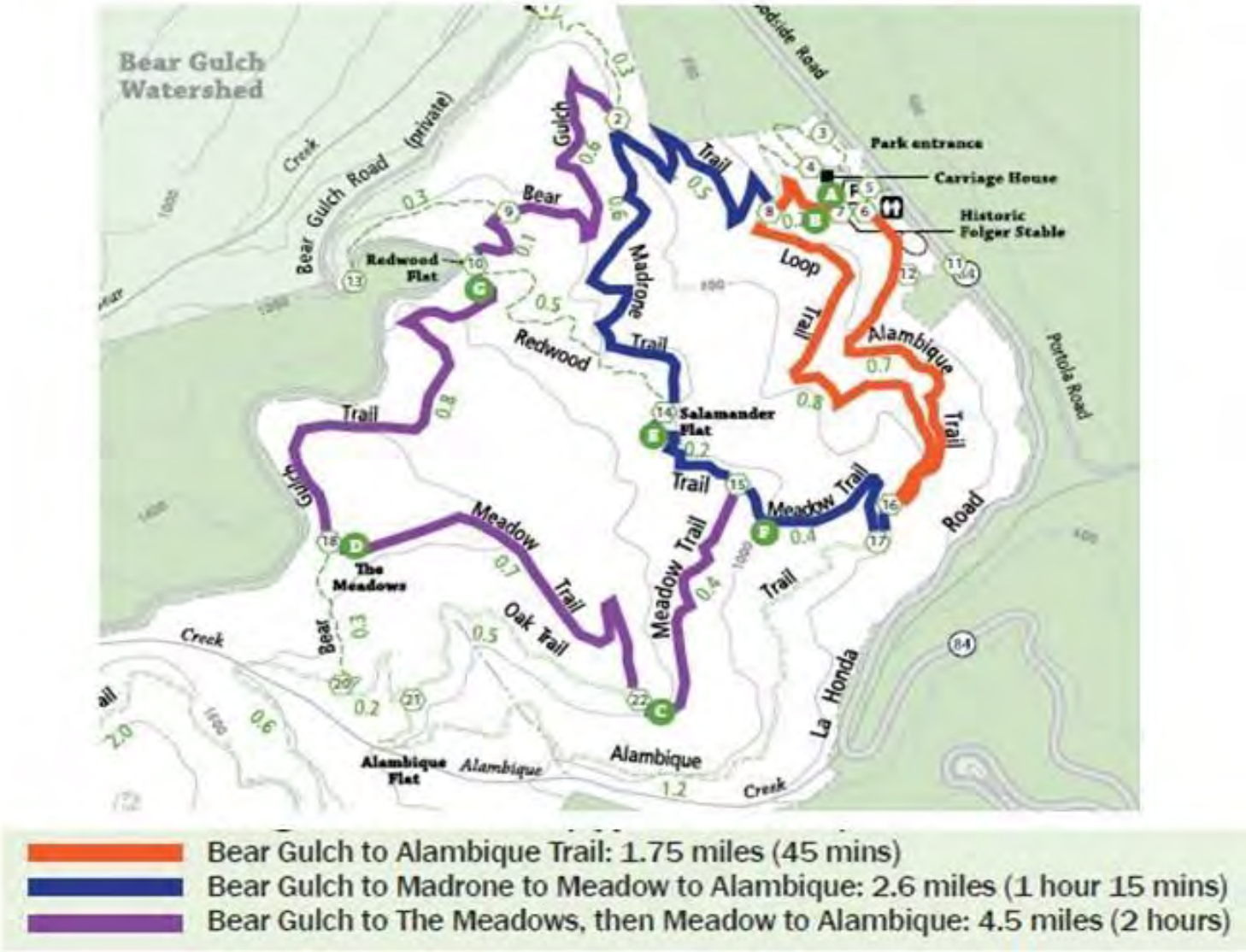


Crystal Springs Routes Combined: Zwierlein Area 3rd-5th Grade



Hiking Routes in Wunderlich

If you are leading a hike in Wunderlich, it may be an out and back route rather than a loop given time constraints. Depending on the time and abilities of the group, below are some common loop hikes. We recommend you coming up with routes and areas of the park that you enjoy working in.



Lead Docent Position

If you are interested in taking on some additional leadership, consider becoming a lead docent. The lead docent job is fairly straightforward and takes place mostly on the morning of the hike:

- Arrive 20 minutes before the bus is scheduled to arrive to greet docents and set up.
- Get supplies needed from storage shed. Set out walkie talkies and first aid supplies.
- Set up activity centers, if using. Enlist the help of other docents with set up.
- Greet the bus and head teacher. Show them the picnic tables, set a time to have docents greet the group & ensure that they have divided kids into the right number of hiking groups.
- Ensure that all docents have walkie talkies and decide who is hiking what trail route.
- Report back to the Director of Programs about the hike and any incidents or issues.

Details

When the school bus arrives, the Lead Docent greets the teachers and describes the plan for the day, and acts as "time keeper" to ensure that the students finish their snacks and that the hikes start on time. The Lead Docent encourages the teachers to get the students organized into hiking groups, if appropriate.

The Lead Docent knows the list of docents signed up for the hike. The Lead Docent helps the other docents organize themselves on the tables, and helps with deciding which direction they are hiking on the trail, if needed. If too few or more than expected docents show up, the Lead Docent can adjust the student groups, activities, or schedule to accommodate the new arrangement.

The Lead Docent has a cell phone with all docents' phone information entered, as well as the telephone numbers of the ranger and Friend's office.

If a docent-in-training comes to shadow another docent on the hike, the Lead Docent ensures that the trainee is introduced to the group, and is connected to the hiking group they will be shadowing. They answer any questions that the trainee might have.

The Lead Docent periodically reviews emergency response protocols in the training binder to effectively respond to any incidents.

The Lead Docent stays until the hikes are done, and every hiking group returns. They thank the docents and teachers, and answer questions if needed.

The Lead Docent calls or emails the Executive Director to provide a summary of the day and to report both good things and challenges that exist for the program.

Other Roles for Lead Docents:

Lead docents may be asked to meet with the Program Committee to talk about improving the program or new ideas. Lead docents may be asked to help pilot new ideas. Lead Docents may also help from time to time to train possible new docents by taking them on the trails and describing our program to them. The Lead Docent is available to answer questions (emails, phone calls, or coffee meetings) to those interested in becoming new docents.

6. Leading a Successful Hike

- Principles of Interpretation
- Techniques on the Trail
- Trail Topics
- Asking Questions
- Sharing Nature Activities with Children

Principals of Interpretation

Freeman Tilden's – Six Principals of Interpretation

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.
4. The chief aim of interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole person rather than any phase.
6. Interpretation addressed to children should not be a dilution of the presentation to adults, but should follow a fundamentally different approach.

Grant W. Sharpe's – Ten Principals of Interpretation

1. You must get and hold the attention of the visitor.
2. The experience of this communication must be rewarding to the visitor.
3. The visitor should be made to feel at ease.
4. Know with whom you are communicating.
5. The message must cater to diverse interests.
6. The message should touch people's lives.
7. The experience should be fun.
8. Do not assume that the visitor is always interested in what you have to say.
9. People in unfamiliar surroundings will tend to reject new ideas.
10. The size of the group has some effect on the learning experience.

From a National Park Service Interpretive Training

Good interpretation is like POETRY.

P – Has purpose/mission
O – Is organized
E – Is enjoyable
T – Is thematic
R – Is relevant
Y – Reflects you

Thanks to Carol Preston for compiling.

Techniques on the Trail

1. Goals
    - Engage, Explore, Explain - Stir curiosity, and have fun
    - Give meaning
    - Practice critical thinking skills, i.e., observation, ordering, relating, etc.
    - Everything has a story
2. Techniques
    - Model your enthusiasm
    - Guided Inquiry – encourage children to come to their own conclusions by asking open ended questions.
    - Ask "I wonder why….?" Wait for and respect all responses. Don't always provide answers
    - Compare and contrast
    - Engage by having them make observations using their senses, i.e., smell, see, hear, touch, taste
    - Use critical thinking skills when talking about the object, i.e., compare/contrast, ordering, observing
    - Make connections between and with things children are observing and their world
3. Themes and patterns
    - Themes make things relevant, interesting, and connect
    - Themes create a framework for how things work
    - Using the children's observations, connect the dots, and tie observations together
    - It is better to look at a few things, going into depth with them, than look/talk about a lot of things
    - Everything has a story, i.e., 5 W's
    - Everything is interconnected, there is no randomness

Thematic interpretation is not just entertaining fact-giving. It is facilitating "meaning making"! Themes can stay with us, even when we forget the facts that support them. You know that visitors are going to forget almost all of the isolated facts you tell them--even the most graphic, colorful and mind-boggling facts. But the overriding conclusions or impressions, the big picture will stick.

Thematic thinking requires you to think in terms of messages you impart to the children.

Having a theme helps YOU prepare. It makes your job much easier because with a theme you're able to see more readily what to include and not include on your hike.

All interpreters have their own personal style, and *any* style can be effective. The best style for you is your *natural* one.

Trail Topics

Looking for new topics to use on your hikes? Pick one of these or better yet create your own and have fun with it. Background information for many of these topics may be found in the respective section of Part 2 in your Docent Handbook.

1. Who pooped here?
2. Who lives here?
3. Hitch Hikers and mechanisms of seed dispersal
4. Leaf adaptations
5. Ecological importance of snags, or fallen logs
6. Animal tracks or signs
7. Looking up close at an insect (or feathers, or whatever…)
8. Functions of fungi (or lichens)
9. Decomposers
10. Producers & consumers
11. Animal homes
12. An oak is an ecosystem
13. Pollination at work
14. Symbiosis—an example of a living partnership
15. How do plants protect themselves?
16. Looking at insect galls
17. Looking at a log in cross-section
18. Form & function of flowers
19. Adaptations, or life history, of any plant or animal….

Asking Good Questions

Asking good questions helps you focus children's attention and lure them into the discovery process by engaging their imaginations. Questions can be classified according to their purpose.

Type of Question	Typical Purpose	Example
Focusing	To focus attention on something of interest	"What do you suppose this is?"
Comparison	To bring out similarities and differences between things	"How would you compare these two leaves?" "What does this smell like? Does it remind you of anything?"
Application	To get the group to see how certain information applies in different situations	"What would the Native Americans have used this for?"
Problem Solving	To get the group to think of solutions to real-world problems	"What do plants need to live here?"
Cause and effect	To get the group to think about relationships that explain the occurrence of different events and objects	"Look around-what do you think causes the tree trunks to be so narrow and tall?"

Sharing Nature Activities

For Families and Youth Groups

By Joseph Cornell and Janet Barlow

A spider web glistening in the sun, the trusting call of a chickadee, the spicy smell of a pine forest in the rain…

Many of us have treasured memories of the natural world and want to share nature's beauty with the children in our lives.

Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder, a book by Richard Louv, tells of the many challenges we face in bringing children back to nature: extended hours of "screen time," lack of physical activity, and a general alienation from nature.

For thirty years the Sharing Nature Foundation, founded by Joseph Cornell, has helped children all over the world feel close to nature. Sharing Nature uses fun and engaging activities to give children joyful and profound experiences of the natural world.

The following activities are easy to do, yet touch children deeply. Parents, community leaders, and anyone who lives, works, or volunteers with children will find that these activities can greatly enhance any outdoor adventure.

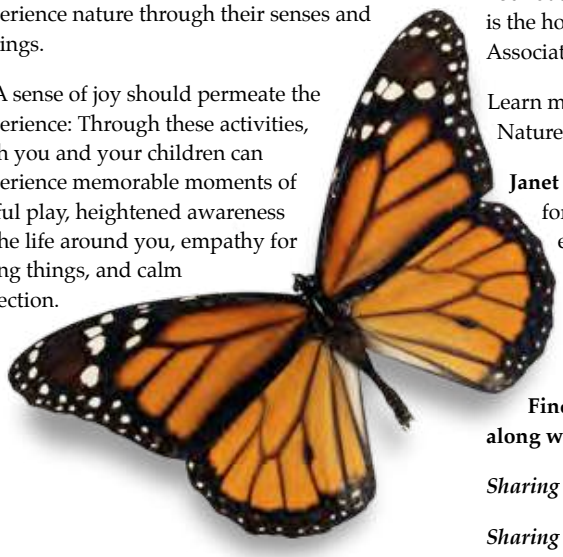
These abbreviated activity descriptions are drawn from Joseph Cornell's *Sharing Nature with Children Volumes I & II.*

Sharing These Activities:

Two important points to keep in mind as you share these activities:

1. Teach less, share and experience more: Let Nature be the teacher as much as possible. Resist the urge to spout off facts and everything you know about what you see. Focus first on helping children experience nature through their senses and feelings.

2. A sense of joy should permeate the experience: Through these activities, both you and your children can experience memorable moments of joyful play, heightened awareness of the life around you, empathy for living things, and calm reflection.



Note: Read through the activities a few times before leading them with children.

Joseph Cornell

Joseph Cornell is one of the most highly regarded nature educators in the world today. His award-winning Sharing Nature Books have been translated into twenty languages and have "sparked a world-wide revolution in nature education." In 1978 Joseph Cornell founded the Sharing Nature Foundation to spread his work around the globe. He is the honorary president of the Japan Nature Game Association, an organization of over 10,000 leaders.

Learn more about Joseph Cornell and the Sharing Nature Foundation at www.sharingnature.com.

Janet Barlow is the Sharing Nature Coordinator for Eastern Canada. An environmental educator and writer, she is also director of Sense of Wonder Environmental Education. http://www.senseofwonderee.ca

Sharing Nature Resources

Find detailed descriptions of these activities – along with many more - in the following books:

Sharing Nature with Children

Sharing Nature with Children II

Order them online at www.sharingnature.com.

Bird Calling

Bring birds to you with this simple call.

# of people: 1 or more
Ages: 4 years and up
Props: None
From: Sharing Nature with Children

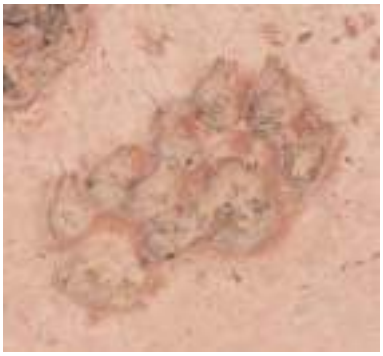
In an area where you're likely to see or hear birds, try this bird call to see how many and what types of birds you can attract. Wait quietly until you hear birds nearby. Kneel or stand without moving near some shrubs or trees. They will partially hide you and give the birds somewhere to land.

The call is a series of repeated "psssh" sounds. Try different rhythms to see what works with different birds. Here are a few to start:

pssh…… pssh…… pssh

pssh…… pssh…… pssh-pssh…… pssh…… pssh

Each series should be about three seconds. Pause after three or four rounds to listen for incoming birds. Small birds will respond right away or not at all.



Camera Game

Children remember their "pictures" for years.

# of people: 2 or more
Ages: 3 years and up
Props: Index cards & pencils for each person
From: Sharing Nature with Children II

Have the children pair off. One player is the photographer and the other is the camera. The photographer guides the camera, who keeps his eyes closed. The photographer searches for beautiful and interesting photos.

The photographer points the camera's shutters (eyes) at the object or scene he wants to "shoot" and then presses the shutter button to take the photo. You "press the shutter button" by tapping the camera's shoulder once to open the camera's shutters. Two taps tells the camera to close his shutters. The photographer should close the shutters after 3 to 5 seconds. Try creative shots: different angles, close ups, panorama shots, etc. While taking photos, it's best to talk as little as possible.

Give photographers about 10 minutes to take at least three photos. Then the pairs switch places. When everyone is finished, have each child use an index card and pencil to draw a favorite photo they took as the camera. Share the photos in a group.

Have younger children be partnered with an adult or older child.

Meet a Tree

See if you can find your tree again.

# of people: 2 or more
Ages: 4 years and up
Props: Blindfolds for each pair
From: Sharing Nature with Children

Have the children pair off. One partner is blindfolded and the other leads him through the forest to a nearby tree.

The "blind" partner then explores his tree to feel its uniqueness. Tell children to, "Rub your cheek on the bark... Is this tree alive?... Can you put your arms around it?... Can you feel roots and branches?... Is the tree older than you are?... Can you find plants growing on it?... Animal signs?... Lichens?"

When the "blind" partner is finished exploring, the other partner leads him back to where they began by an indirect route. The "blind" partner removes the blindfold and tries to find the tree with his eyes open. Suddenly, what was once a forest becomes a collection of very individual trees. Partners change places so that both have a chance to meet a tree.

Unnature Trail

This game challenges children to look closely.

# of people: 1 to 30
Ages: 5 to 13 years
Props: Man-made objects
From: Sharing Nature with Children

Look for a trail going through an area with small and large trees, leaf litter, rotting logs and some other plants. Mark the beginning and end of a 65 to 100-foot section of the trail (make sure it's wide enough for two people to pass). Secretly hide 16 to 20 man-made objects along one side of the trail beforehand. Some should stand out (brightly colored balloons or fluorescent pink cockroaches). Others should blend with surroundings (a nail, rubber band, clothes pin). Keep the number of objects you've planted a secret.

Have the children walk over the section of trail one at a time, trying to spot as many objects as they can. They remain quiet and do not pick up the objects or point them out to others. Have them whisper in your ear how many objects they saw. Tell each child the total number of objects, and have them walk the trail again, trying to find more.

After two rounds, go to one end of the trail and have them tell you where the objects are, picking them all up as you go. Discuss how camouflage and coloration helps animals hide in the woods. Then go on a search for small camouflaged animals (insects, spiders, etc.).

Interview with Nature

See life from another perspective.

# of people: 1 or more
Ages: 5 years and up
Props: Index card & pencil for each person
From: Journey to the Heart of Nature

Have each child choose a nearby plant, rock, or animal that he feels has an interesting story to tell. It should be within 20 or 30 yards from your central gathering place. Each child spends 10 minutes on his interview.

The child asks it questions as if he were interviewing a person. Ask things like, "How old are you?... What events have you seen in your life?... What is it like living here?...Is there something special you would like to tell me." The children write or draw (depending on their ages) the answers to the questions they ask on the index card.

Gather the children back together again and have them share their "interviews" in small groups.

Sound Map

Listen to and record the sounds of nature around you.

# of people: 1 or more
Ages: 5 years and up
Props: Index card & pencil for each person
From: Sharing Nature with Children II

Select a site where your group is likely to hear a variety of nature sounds, such as a meadow, forest or marsh. Each child finds a special listening spot nearby and settles down with their pencils and index cards.

Have the children mark an X in the center of the card. This marks where they're sitting on the sound map. When they hear a sound they should make a mark on the card to symbolize the sound (for example: wavy lines for wind, musical note for a bird, etc.). The mark's location on the map should indicate roughly the direction and distance of the sound.

After explaining the sound map activity, have everyone listen for five to 10 minutes. After the time is over, have everyone gather together and share their sound maps.

Silent Sharing Walk

Commune with nature and each other.

# of people: 1 or more
Ages: 5 years and up
Props: None
From: Sharing Nature with Children

This activity involves walking quietly together down a trail. The silence and harmony of this activity, especially at dawn or dusk, creates an awareness that we share the world with all living things.

Explain to the children that they should follow you quietly down the trail without talking. The idea is to blend into the forest so that animals will not run away from you, but stop to look at you instead. You are entering their world as co-members, rather than as outsiders, and nature will accept you as part of itself.

Begin by sitting down in silence for a few minutes to calm and quiet yourselves. Then lead the children down the trail. When someone sees or hears something he'd like to share, he signals the others with a gentle tap and points to what caught his attention. Walk for however long the group is able to stay quiet. Try for at least 10 minutes.

Safety Tips

Be mindful of safety when in the woods, at the stream/lake side, or near the ocean. Bring along water, snacks, and a small first aid kit (and know how to use it). Tell someone else where you are going and when you plan to return. Be mindful of those with allergies, limited mobility, or medical conditions. Be aware also of poisonous plants and harmful animals.

Instruct children to be very careful when leading partners who are blindfolded or have their eyes closed. The sighted leader should take his partner's hand and gently pull an arm in the direction he wants to go. He should walk slowly as he lead his partner around, telling his partner when to duck under a branch and when to lift his steps over a log or root. Before playing the Meet a Tree or Camera Game, make sure the children are mature and calm enough to lead each other responsibly.

Hand out props after you've explained the main points of each activity. This will ensure that the props won't distract the children from hearing your instructions. Have the props ready at hand and give them out quickly so the activity flows well.

Sharing Nature Foundation
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Credits:
Content by Joseph Cornell
Layout by Amy Ford
Photography by Duane Ford

7. Ecology & Habitat: Basic Concepts

- Seven Basic Concepts of Ecology
- Exploring Habitats on the Trail
- Redwood Post Sign Trail Guide

SEVEN BASIC CONCEPTS IN ECOLOGY

1. **All living things depend (directly or indirectly) on earth, air, sun and water for survival**
   - Earth: soil type, topography, degree of slope, pH, exposure, and nutrients
   - Air: oxygen, other gases, wind, and wind-borne particles
   - Sun: degree of heat, light, and energy
   - Water: contained within earth and air, as interacting with heat and light, as a solvent for nutrients and gases, as a medium for life forms, as a chemical to maintain internal physiological functions.
2. **Living things are adapted to their environment; they can change and make change (change occurs over time.)**
   - Living organisms adapt, are modified by, and interact with their physical environment.
   - Living organisms modify their physical surroundings through their various interactions.
3. **Living things depend (directly or indirectly) on other living things for survival**
   - Organisms interact with other organisms in order to survive.
   - Organisms are interdependent.
4. **A living things have a niche within an ecosystem**
   - Organisms have specific roles within an ecosystem, this creates a niche (special role and space) within their habitat. The variety of organisms in their niches and habitats within an ecosystem comprise a community.
5. **Living things are producers or consumers**
   - Producers provide the basic energy within a food web. These are usually plants and are eaten by first order consumers.
   - Consumers may eat live producers, other live consumers, or dead or decayed organic matter. The highest order consumers are predators and not usually prey; in a food pyramid they are at the top.
6. **Materials are recycled, and energy is transferred in different forms**
   - Organic & inorganic matter is transferred through a variety of methods & forms.
   - Original energy from the sun is transferred by plants through photosynthesis to first order consumers. Dead matter is broken down into simpler material by decomposers. Energy not utilized by various forms such as invertebrates, fungi, and bacteria is released as heat.
7. **Humans are directly responsible for the health of the planet**
   - Humans serve a role within each individual's community and therefore affect global environments. Since humans are capable of manipulating the environment, we can become aware of our impact on the community. Each one of us, to the best of our ability, must make our impact positive by minimizing or eliminating environmental degradation.

Source: Dr. Diane Conradson

Exploring Habitat on the Trail

This is an outline of the various habitats you will find, species that live here and questions to consider. For more in-depth materials, consult the supplemental section.

Chaparral (see supplemental article)

- **How do plants survive during the drought or in the summer when it is so hot?**
    - Leaves adapted to withstand heat; e.g., hairy, shiny or light colored to reflect the sun, waxy or resinous coating on leaves
    - Have deep roots to tap ground water or spreading & shallow to catch surface water
    - Some secrete toxic compounds that inhibit other plants from growing or sticky compounds that prevent insects from eating them

Riparian

- **Why do some trees lose their leaves in the Fall?** (see supplemental article)
    - Big leaf Maple
    - Blue Elderberry
    - Poison Oak
    - Thimbleberry
- **Who lives here?**
    - Woodrat
    - Turret spider
    - Squirrels
    - Deer
    - Birds
    - Newts
    - Banana Slugs

Broadleaf (oak, bay, toyon)

- Who lives under this log? (turn over a log & see who is eating/recycling the log), role of decomposers
- Who would eat these berries? Are there any signs of them?
- Role of lichen and fungus in the ecosystem

Evergreen (redwood)

- What's the tallest known tree (350+ feet)?
- Where do they get their water (40% from fog)?
- Why isn't anything growing under the redwoods (tannins)?
- Would any of these plants or trees survive in the Chaparral?

Sign Post Guide to the Redwood Trail

You May Encounter Along the Trail

Woodrat Nest: Dusky-footed Woodrats are nocturnal and a protected species that is disappearing. Woodrats are also known as pack rats because of their penchant for collecting all kinds of things. They eat many of the leaves, nuts and berries from plants at the park such as Coffeeberry, Coast Live Oak, Poison Oak, Toyon and Bay Laurel. They put laurel leaves in their nests to repel bugs. Their homes are built like ours with many rooms for designated purposes.

Turret Spider Nest: All spiders catch food by building traps. The turret spider builds a nest out of soil, vegetation and silk with a trap door to lure bugs in. At night the turret spider feels the vibrations of insects walking by its nest and lures them in.

Banana Slugs: Banana slugs like to live near Redwood trees-they clean the forest floor and make compost so that Redwood seedlings can grow. They are coated in thick slime to help them move and protect themselves. Their top tentacles sense light, the bottom tentacles taste and smell. Banana slugs have up to 27,000 “teeth” (radula) to help decompose forest vegetation. Other fun facts-they are the biggest slugs in the U.S. and they love to eat mushrooms.

Moss & Lichen: Mosses are simple plants while lichens are a joining of algae and fungus. Lichens can be found in even the coldest of Arctic climates, and are used as dye and antibiotics. Lichen is an indicator of good air quality or lack of pollution.

Fungi: mushrooms and other fungi don’t have chlorophyll and cannot make their own food. Mushrooms release enzymes through strands that allow them to “eat” live plants and decompose dead plant material. This creates rich nutrients for the soil.

Redwood Trail Signpost Guide: These are the signposts and other stopping points that you will note along the trail. This guide starts at trailhead by Redwood Shelter.

Signpost: Coast Live Oak
This tree is adapted to dry areas with its small tough leaves that prevent evaporation of water. Native Americans from this area ate the acorns as the most important plant food in their diet. Ask the children to stay on the trail and look for any acorns or touch the prickly leaves of the oak tree. (Follow trail to the right and uphill).

Coast Redwood Area Note the circle of Redwood trees surrounding a stump. This is a "fairy circle" growing around the mother stump–these are clones. Redwoods often grow off the roots of dead trees.

Spray the leaves of a redwood tree like the fog that comes into the area. Redwoods "drink" fog. The leaves absorb the water and it drips to the ground where their shallow roots are. Ask children if they would like to pretend to be redwoods in the fog and lightly spray them.

Other facts about Redwoods you can talk about while walking the trail:

- Redwood trees are the tallest trees in the world (up to 300 feet) and usually live about 500 years. Oldest was 2,200 years old.
- The only place in the world that Redwood trees grow is the California and a small part of the Oregon coast.
- 95% of all Redwoods were cut down in the past 150 years to build houses.
- Redwoods absorb more CO2 into oxygen than any other tree in the world.
- Up to 40% of the water in a redwood forest comes from fog drip.

Signpost: Poison Oak

"Leaves of three, let it be." Many people are allergic to the oil in the plant. Deer and woodrats love poison oak and are not allergic to it like most people. Many Native Americans in the area were usually not allergic to it and used poison oak sap to make tattoos. Poison oak and wild blackberry can be confused because they both grow in leaves of three. Poison oak does not have serrated leaves or thorns and the leaf is smooth.

Signpost: Big Leaf Maple
Show the children the five fingered leaf shape. This is a good time to compare the water-conserving live oak leaves with the broad shade dwelling maple leaves.

Signpost: Toyon
Is also called Christmas Berry or California Holly because its berries are used for holiday decor. Bees and hummingbirds love it. Natives would roast the berries to remove bitterness and eat as a treat.

Signpost: Madrone
The Madrone Tree is also called the Refrigerator Tree. Why is that? Have the children touch a spot where the bark has peeled away. The outer bark insulates the inner part of the tree. The Madrone also draws cold water from deep in the ground, unlike the redwood, which has roots very close to the surface.

Signpost: Coyote Brush
The leaves are coated with a sticky substance that repel fire and the plant grows back quickly after a burn. Rub the leaves; your fingers will smell lemony.

Signpost: Coffee Berry

Animals love the coffee berries. The berries do not make good coffee though!

Signpost: California Bay Laurel
Have children smell the leaves, this tree is also called the “pizza tree”- because the leaves are used to season sauces. Dried leaves from this tree were used by Native Americans in bedding and as a way to repel insects. Woodrats repel bugs from their nests with laurel leaves. Some people make tea with the leaves. You can also make ice cream with the fruit of the tree.

Signpost: Black Oak
The acorns from the black oak tree feed many animals including deer, mountain quail, woodpeckers and the CA grey squirrel. Black oak leaves are unlike any other California oak – they are deep green and bristle tipped.

Signpost: Sword Fern
Sword fern has long narrow fronds and looks like a sword. If you look at the underside, you might see orangish-brown dots. These are packets of spores that will burst open and be blown by the wind to make new ferns. Wood Fern leaves are notched and larger. Compare both species growing here. Goldback ferns have a bright, gold, waxy surface on the underside. Ferns are plants from the times of the dinosaurs over 200 million years ago.

Signpost: Tanoak

Native Americans particularly liked the acorns from this bush. Many were cut when the redwoods were first harvested. The bark is an important source of tannin. The Spanish used the tannin to soften the cow hides. This species is very suseptible to Sudden Oak Death.

Signpost: Redwood Grove

You can talk about the material from the Coast Redwood section above if you prefer.

Signpost: Douglas Fir

This is the tallest tree in the park. The Ohlone had a fable that during a forest fire the fir offered to hide mice in its cones to keep them safe because the fir has good fire resistance. That is why the cones have "mice tails" today. Have the children look for mice tails in the cones.

Signpost: California Hazelnut

This tree is also known as the "toilet paper tree." Have children feel the leaves of the tree. The Ohlone Indians loved the nuts as do squirrels. The root of the Hazelnut makes a blue dye that was prized by the Ohlone because it is a color hard to find in nature.

On the Bridge:

As you leave the Redwood forest and enter the Oak forest, ask the children to describe the differences between the two ecosystems. The Redwood forest is shady and cool because of the high canopy created by the trees. The Oak forest is warmer, with sun dappling the forest floor.

Sticky Monkey Flower is also found in this area (orange tubular flowers). Have the children feel a leaf and ask why it feels sticky. Could it be a defense mechanism to keep away things that want to eat it or sun protection?

8. Ohlone Resources

- Respectful Interpretation: Teaching Respect for Native Peoples
- Trail Topics
- Ohlone Use of Native Plants
- What the Tule House Can Teach Us
- The Ohlone People of Central California: An Educator's Guide

Teaching Respect for Native Peoples

The following are teaching guidelines from Oyate, a Native organization whose goal is to insure that native peoples' histories are portrayed honestly and accurately.

- Do present Native peoples as appropriate role models with whom a Native child can identify. Don't single out Native children, ask them to describe their families' traditions, or their people's cultures. Don't assume that you have no Native children in your class. Don't do or say anything that would embarrass a Native child.

- Do look for books and materials written and illustrated by Native people. Don't use ABC books that have "I is for Indian"' or "E is for Eskimo." Don't use counting books that count "Indians." Don't use story books that show non-Native children "playing Indian." Don't use picture books by non-Native authors that show animals dressed as "Indians." Don't use story books with characters like "Indian Two Feet" or "Little Chief."

- Do avoid arts and crafts and activities that trivialize Native dress, dance, or ceremony. Don't use books that show Native people as savages, primitive craftspeople, or simple tribal people, now extinct.

- Don't have children dress up as "Indians," with paper bag "costumes" or paper-feather "headdresses." Don't sing "Ten Little Indians." Don't let children do "war whoops." Don't let children play with artifacts borrowed from a library or museum. Don't have them make "Indian crafts" unless you know authentic methods and have authentic materials.

- Do make sure you know the history of Native peoples, past and present, before you attempt to teach it. Do present Native peoples as separate from each other, with unique cultures, languages, spiritual beliefs, and dress. Don't teach "Indians" only at Thanksgiving. Do teach Native history as a regular part of American history.

- Do use materials which put history in perspective. Don't use materials which manipulate words like "victory," "conquest," or "massacre" to distort history. Don't use materials which present as heroes only those Native people who aided Europeans. Do use materials which present Native heroes who fought to defend their own people.

- Do discuss the relationship between Native peoples and the colonists and what went wrong with it. Don't speak as though "the Indians" were here only for the benefit of the colonists. Don't make charts about "gifts the Indians gave us."

- Don't use materials that stress the superiority of European ways, and the inevitability of European conquest. Do use materials which show respect for, and understanding of, the sophistication and complexities of Native societies.

- Do use materials which show the continuity of Native societies, with traditional values and spiritual beliefs connected to the present. Don't refer to Native spirituality as "superstition." Don't make up Indian "legends" or "ceremonies." Don't encourage children to do "Indian" dances.

- Do use respectful language in teaching about Native peoples. Don't use insulting terms such as "brave," "squaw," "papoose," "Indian givers," "wild Indians," "blanket Indians," or "wagon burners."

- Do portray Native societies as coexisting with nature in a delicate balance. Don't portray Native peoples as "the first ecologists."

- Do use primary source material — speeches, songs, poems, writing — that show the linguistic skill of peoples who come from an oral tradition. Don't use books in which "Indian" characters speak in either "early jawbreaker" or in the oratorical style of the "noble savage."

- Do use materials which show Native women, Elders, and children as integral and important to Native societies. Don't use books which portray Native women and Elders as subservient to warriors.

- Do talk about lives of Native peoples in the present. Do read and discuss good poetry, suitable for young people, by contemporary Native writers. Do invite Native community members to the classroom. Do offer them an honorarium. Treat them as teachers, not as entertainers. Don't assume that every Native person knows everything there is to know about every Native Nation.

Trail Topics: Ohlone

- If you lived here 500 yrs ago, what would you eat, use for toys, get diapers, make tools, soap, get medicine?
- Where would you live, what would your house be made of?
- How would your life be different? How would it be the same? What would boys be doing this time of the year (describe learning to hunt)?
- What would girls be doing this time of the year (describe what they would gather)?
- Investigate native plants as you find them on the trail and talk about Ohlone uses of local plants (see attached article)

Ohlone Use of Native Plants

TREES

California Bay Laurel (Umbellularia californica)

Decoction of leaves used for poison oak rash, raw or boiled fruits and roasted kernels eaten, leaves burned as flea repellent and aid in hunting ground squirrels.

California Buckeye (Aesculus californica)

Leaves and seeds contain toxins that effect red blood cells and the central nervous system. Widely used to stun or kill fish in dammed streams or small pools. Nuts are nutritious, but need careful and prolonged leaching to remove poisons. Nuts eaten after leaching; also used as a fish poison; tea from bark used to treat toothache and loose teeth.

Madrone (Arbutus menziesii)

Small quantities of fruits eaten

Big-Leaf Maple (acer macrophyllum)

Seeds eaten occasionally

Arroyo Willow (Salix lasiolepis)

Straight, supple withes from previously burned or coppiced willow trees were an important basket material for many California tribes. Willow bark contains salicylic acid, the active ingredient in aspirin, but some tribes also used leaves and flowers for medicine. Shoots used for baskets, tea from bark or young leaves used as cold remedy, young saplings used as a frame for tule houses.

Oaks

Acorns were a staple of the native diet in many, but not all, parts of California. They were gathered, dried and stored in baskets or granaries. Cracked nuts were cleaned, pounded in stone mortars and sifted until a fine flour was produced. This was leached with hot or cold water to remove the bitter tannic acid then made into mush, bread, etc. Acorns vary in taste and nutrition so tribal preferences for certain species were common.

Tanoak (Notholithocarpus deniflorus)

Bark used to make a dye and a wash for sores and acorns eaten

Valley Oak Quercus lobata)

Decoction of oak galls used for toothache and loose teeth

SHRUBS AND VINES

California Blackberry (Rubus ursinus)

Fruits eaten as a favorite food, root decoction very effective remedy for dysentery

Ceanothus (Cenothus spp., Ceanothus thyrsiflorus)

Detergent decocted from plant used for acne remedy and for the hair

California Buckthorn/Coffeeberry (Frangula californica)

Inner bark dried, ground and used as a laxative. Decoction of leaves used to treat poison oak rash and berries eaten fresh

California Hazelnut (Corylus conuta var. californica

Branches used for basket rims and arrow shafts. Nuts eaten late in season

Manzanita (Arctostaphylos spp., A. tomentosa, A. regismontana, A. nummularia)

Raw fruits eaten, soaked in water to make unfermented cider or dried for Winter use

Sticky Monkey Flower (Diplacus aurantiacus)

Decoction of plant used for kidney and bladder problems

Poison Oak (Toxicodendron diversilobum)

Shoots used in basketry, leaves used to wrap bread while cooking

Wild Rose (Rosa californica)

Rose hips decocted and used externally as a wash for scabs and sores. Internally used for sore throat, colds, fever and rheumatism

Snowberry (Symphoricarpos albus)

Brooms made from brushy stems

Toyon (Heteromeles arbutifolia)

Berries eaten dried or toasted

Yerba Santa (Eriodictyon californicum)

Tea from leaves used to treat asthma, rheumatism and colds. Leaves woven into skirts. Poultice of leaves used for headaches.

HERBS, BULBS, FLOWERS & FERNS

Miner's Lettuce (Claytonia perfoliata)

Foliage gathered in early Spring and eaten raw. Foliage boiled or steamed later in season.

Soap Plant (Chlorogalum pomeridianum)

Many tribal groups tied the coarse brown fibers surrounding the bulb into brushes for household and personal use. Plant high in saponins. The crushed bulbs produce a very efficient detergent used for soap, shampoo and a fish poison. The young leaves are eaten and detergent foam is used for dandruff shampoo and to stun fish.

Yerba Buena (Clinopodium douglasii)

Strong solution held in the mouth for toothache

Western Bracken Fern Pteridium aquilinum)

Root paste used to promote hair growth, fiber from rhizomes used in basketry, young fronds eaten, large fronds used as umbrellas and for roofing.

Giant Horsetail (Equisetum telmateia ssp. Braunii)

Rhizomes of Equisetum arvense and E. hymale were used to make black designs in baskets. The silica-rich stems of E. laevigatum were used as a hair rinse.

Compiled by D Young 2015

What the Tule House Has to Teach Us

MALCOLM MARGOLIN

One of the biggest challenges in teaching youngsters about California Indian life is to get them beyond the facts and fantasies, beyond the rote responses. It is easy enough, for example, to tell them that the Indians of the San Francisco Bay area lived in dome-shaped houses made of tule (bulrush); getting them to imagine what life would have been like in a tule house is somewhat more difficult.

As a special favor to old friend, I found myself in front of a group of fourth-graders one day describing a traditional tule house. I explained how the framework of willows was erected and how the tule was cut, aged, bundled, and tied onto the framework to form a watertight covering. I tried to evoke the texture of the tule and its distinctive smell—earthy and musty, a bit like Lipton tea. I asked them to envision what it would be like to crawl through the doorway into the cool, dark interior of the dwelling, to touch the earthen floor packed hard, almost to a polish, and strewn with sleeping mats and rabbit-skin blankets. I tried to get them to picture what it would be like to sleep in one of these houses shoulder-to-shoulder with brothers and sisters, uncles and aunts, parents and grandparents; what it would be like to wake up on a cold winter morning to hear the elders, who would have stayed awake all night to keep the fire lit, talking softly among themselves; or to look through the entrance on a bright spring morning to see the welcome sunshine.

"Now what do *you* think it would be like to live in a tule house?" I asked in my most ingratiating manner. A dozen hands shot up. I pointed to a little girl with dreamy eyes and a charming smile.

"Mucky!" she said, with unexpected clarity and force. "Why?" I asked, shocked and completely taken aback.

"I *like* having my own room. I *like* how big my house is. I don't *want* to live on a dirt floor with tule walls and sleep with my whole family."

I was amazed and in truth delighted with the response—I realized that she had indeed been picturing life in a tule house. Her real, deeply felt answer, free of piety or politically correct platitudes, was a wonderful beginning for a discussion about tule houses. So without trying to "convert" her, I led the discussion along a different track.

Here are some of the topics we considered:

What would it mean if all the materials for building a house were free and readily available to everyone? It costs tens of thousands of dollars to buy the an lumber, plumbing, wiring, tiles, and fixtures needed for a modern house.

A Porno tule house at Clear Lake. Photo courtesy of the Bancroft Library, University of California.

What if all the material you needed was growing all around you, free to anyone who wanted to gather it? The first thing that dawned on everyone was that under these conditions there would be no homelessness. (I was surprised at how deeply concerned these youngsters were with the problem of homelessness.) We also discussed how when you are an adult, you end up spending a quarter to a third of your waking hours earning enough for housing, not to mention the huge amount of time spent dusting, mopping, sweeping, painting, mowing the lawn, and fixing up. Living in tule houses might have its inconveniences, but it would free up a lot of time. "What would your parents do with the time?" we wondered. Would they, like native people in traditional cultures, put more time into the arts, religion, ceremony, socializing, or even play?

We also touched upon the self-sufficiency of a society that has no need for the far-flung political and economic ties and massive transportation networks that ensure our access to housing materials, no need for our lumber and mining industries; tule and willow grow locally and in such abundance that they can be harvested without damaging the environment. Under such conditions, we would have a peculiar freedom—the freedom to develop our own languages, customs, set of beliefs and ways of doing things.

What would it be like if all the houses in your village were made of the same material and were more or less the same size? This question was loaded and we edged gingerly around it, because what it kept leading to was a discussion of class of how our culture creates distinctions between people based on wealth, and it makes a difference whether you live in a mansion in the hills, a rented apartment, or in a trailer park. We discussed, at least circumspectly, the implications of living in a society where the differences between being poor and being wealthy are not so dramatic as in our own.

What would it be like to live in a society where houses were not a major form of wealth? Owning a house in this culture gives people a huge piece of wealth, a way of providing for their old age, something to pass along to their children. What if you lived in a society where houses were not a form of wealth? How would your parents store wealth? In regalia? In baskets? Or would people redefine "wealth" more in terms of their relationships and connections to others?

Is privacy a good thing? Most of the youngsters either had their own room or shared one with only one sibling, and they liked it that way. In traditional times, it is true, there wasn't much privacy. Tule houses were used primarily for storing things and for sleeping. The rest of life—cooking, washing, entertainment, etc.—was carried on outdoors and in a more or less communal atmosphere. We considered the possibility that the privacy modern life affords us is a mixed blessing—does it bring an element of isolation, selfishness, and mistrust with it?

We discussed many other things as well, and in the end I asked the question again: "How many of you would like to give up your houses and live in an old-time tule house?" Still no takers. But we had accomplished something that afternoon—a recognition of the social and moral expenses of our way of life, and a recognition of the value of other peoples' choices. While no one in the class wanted to take up residence in a tine house, it was clear that at least some aspect of what it means to live in a tule house had taken up residence in us.

Malcolm Margolin is publisher of News from Native California.

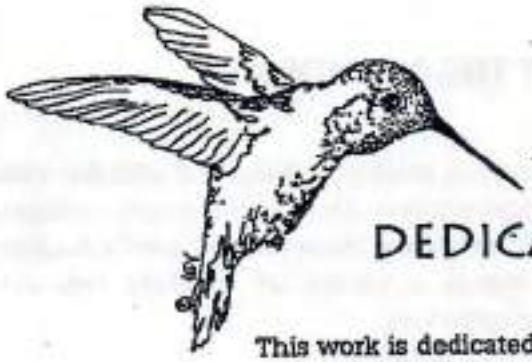
THE OHLONE PEOPLE OF CENTRAL CALIFORNIA

AN EDUCATOR'S GUIDE

PREPARED BY

DOUGLAS PETERSEN & LINDA YAMANE

FOR
SANTA CLARA COUNTY PARKS & RECREATION



DEDICATION

**This work is dedicated to the Ohlone people,
who lived here for thousands of years
in balance with the land,**

**and to their descendants,
many of whom continue the traditions
of their ancestors.**

SOME PAGES OMITTED

TO THE EDUCATOR

The material within these pages is provided to help you teach about Ohlone people, both past and present, and reflects the most accurate information available at the time of this writing. Early contact with the Spanish missions dramatically changed the Ohlone way of life and many of the old ways were lost, however knowledge of the ways of the past continues to be recovered, and we trust that some of what we have written will need to be revised in the future.

There remain brief accounts of the Ohlone from the writings of the Spanish missionaries as well as the journals and diaries of other early visitors to the area. Much information has also been preserved in Catholic church records. While valuable, these sources often reflect the cultural biases of the writers, which clouds the credibility of the information. Later, the ethnographic studies of anthropologists like Alfred Kroeber, C. Hart Merriam, and John P. Harrington, who worked in the early 1900s, recorded the knowledge of several Ohlone elders who shared what they knew of life before, during and after the missions. Archaeological evidence has also contributed clues to the distant past. Together, these bits and pieces combine to form an ever-expanding, though still incomplete, picture of the Ohlone world.

The early Ohlone were a unique people, different from the hundreds of other tribal groups in North America. Their culture was shaped by their environment and so was perfectly adapted to the world in which they lived.

When you teach your students about the Ohlone, please do so with the care, honesty and respect due a people who have lived here successfully for thousands of years, and whose cultural heritage is an important part of California's history.

ABOUT THE AUTHORS

DOUGLAS PETERSEN is an anthropologist who has studied and worked with the material culture of Native California for over 25 years. He is a regular guest speaker at schools, colleges, museums, and parks throughout the Bay Area, and works with many museum and park education programs training their staff and docents. He also makes a variety of carefully researched artifact reproductions for museums, schools and private collectors.

LINDA YAMANE, Ohlone basketweaver, singer and storyteller, traces her ancestry to the Rumsien Ohlone, the native people of the Monterey area. She has been active in researching and retrieving Rumsien language, song, folklore and basketry—traditions that were once thought lost. Linda works as a freelance writer, illustrator and graphic designer. She is the newsletter editor for the California Indian Basketweavers Association and a contributing editor to *News From Native California* magazine. Her thirty years of experience in enrichment education has included workshops for teachers and docents, outdoor and classroom programs, and school assemblies throughout the San Francisco and Monterey Bay areas.

ORIGINS IN NORTH AMERICA

Contrary to what many books imply, California's history did not begin when Father Serra and Portola arrived in 1769 and established the first mission in San Diego. The history of people in California reaches back at least 10,000 years, to a time when the last of the mammoths and mastodons still walked the earth and saber-toothed cats stalked the forests.

MIGRATION THEORY

Between about 40,000 and 10,000 years ago, the earth was undergoing an ice age. Snow and ice covered most of Canada and some of the northern United States, in places up to a mile thick. With that much of the earth's water trapped on land in the form of ice, sea level was lower, at times between 200 and 300 feet lower that it is today.

At that time, there was no San Francisco or Monterey Bay. The Bering Strait, which today separates Asia and North America, was a dry land bridge easily crossed by wandering herds of caribou in search of food.

Several times during this ice age, the weather warmed enough to melt an ice-free corridor through Alaska, western Canada, and into the upper United States. Scientists have long believed that during these warmer periods, waves of people from Asia moved into the Americas and spread to every part of this formerly uninhabited land.

More recently discoveries have suggested that North America's first settlers may have come by sea as well as overland. It is probable that additional evidence of these early peoples lies beneath water on an ancient shoreline that was once exposed and inhabited.

NATIVE CREATION BELIEFS

In contrast to scientific explanations of Native American origins, Native mythologies typically describe their creation as having occurred in the very places they lived. For example, Monterey area Ohlone stories describe the creation of people from the earth of the Monterey Bay region itself. Please take care not to present Native myths as quaint and unsophisticated. Let them stand as equals to modern scientific theories.

HOW PEOPLE WERE MADE

A RUMSIEN OHLONE STORY

TOLD & ILLUSTRATED BY LINDA YAMANE

From the book

When the World Ended/How Hummingbird Got Fire/How People Were Made

Published by Oyate, 1995

Once, a very long time ago, something happened to the world. The ocean rose up higher and higher, covering the land little by little, rising up and up until nearly everything was covered over with water. Eagle, Hummingbird, Crow, Raven and Hawk were together on a mountain top, looking out at the world and seeing how it had been destroyed. After many days, Eagle had an idea and used his magic, and help from Hawk, to dry up the waters. With help from Hummingbird, who stole fire from the Badger People underground, they were able to restore fire to the world, and eat a long-overdue meal.

They had eaten and were feeling contented, and they were talking when Eagle said, "How are we going to gather the people – bring back the people so we won't be alone? Let's see what we can do."

He said to Crow, "What do you know?" And Crow answered, "I know one thing we can do."

"What's that?" asked Eagle. "Well, look, we'll make figures out of wood – a man, a woman, anything we want to make."

But Eagle said, "No, that won't look good to make them of wood, and there aren't even any sticks we can use. Besides, it would be a lot of work. Something out of earth," he said, "that would be better."

Crow said, "Yes, I know a kind of earth that we can use to make people." And Eagle asked, "What type of earth is it? Or is it rock, or what?" "I'll bring some," said Crow. So he went and brought back a little and formed it like a person.

"No, no," said Eagle. "This doesn't look good, and it's too hard to work with. Which of you knows a type of earth that's called clay? It's very sticky, really nice and soft. Go on," he said, "go over there and ask those uncles of yours, the Badgers. Go over there and see if they know this kind of earth."

Hummingbird flew over there and asked the Badger People, "Do any of you know the kind of earth that's called clay – the kind you can make little figures and things with?" And they said, "Sure, let's go over there. We'll show you. With this clay you can make things – you can make little figures."

So they went there and they brought some of this earth to Eagle. And Eagle said, "Yes! This is the kind of earth I want! Bring more." So they brought a lot. They went and brought back a lot and they began making little figures. The made a little man, a little woman, a little deer – all the things they wanted. Everything they made the same way, with clay, and there the figures lay.

"Good," said Eagle, "but what are we going to do so that these people can speak or move around or anything? Do you know anything," he asked Crow, "that can make these people move?" And Crow answered, "Yes, of course." "Well, what do you know?" "Let's make a way to color their hair dark, and see how it looks." So they did that. They colored their hair dark.

"Alright," said Eagle, "that's good. They look like people. They're looking good," he said. "Let's watch and see what happens." They were there watching when the figures began to move a little. And Eagle said, "Well, it seems like they're getting strong, like they're gaining strength."

They were there watching until someone thought, "How are we going make their eyes?" "Oh, that's right, their eyes are made of earth!" said Eagle. "That's not good. Let's make them of rock."

"What kind of rock?" someone asked. "White rock," Eagle answered, "but a certain kind of white rock, not chalk rock." So they got little white rocks, and made the eyes. They made the eyes of little white-and-black rocks.

"Well then," said Eagle, "in three days their eyes will begin to move." And so it happened that they began to move and talk, everyone happy and contented.

THE EVOLUTION OF CULTURES

When people arrived on this continent, they found a land of many different environments. Each presented a unique set of resources and physical challenges that had to be met if these people were to survive. Thus, over time, cultures developed in many different ways.

The first people in California are thought to have lived as small bands of hunters and gatherers, moving about the land in search of plants and animals to eat. They would make a camp and stay only until the food or firewood started becoming scarce. Then they would move on a few miles and make another camp.

These very early peoples lived mostly on large game animals, collecting plant foods as they traveled. Without a means of preserving and storing food for future use, they were dependent on what foods they could find in any given season. The winter months were particularly difficult and older people and very young children often didn't survive.

These first people used round hand-stones on flat milling stones (*manos* and *mutates*) to grind hard seeds into flour, but they did not know how to process acorns to remove the tannic acid. They hunted a variety of animals, including mammoths, mastodons, giant bison, and the smaller horses and camels that lived here at the time. The men hunted these animals with spear throwers and spear (*atlatls* and *darts*).

A spear thrower was most likely made of wood, between 18 and 24 inches long, with a handle at one end for gripping, and a hook at the other that fit into the end of a spear. The spear thrower and spear were fitted together and held in one hand behind the hunter's head. As his arm came forward, the spear was released and the thrower remained in his hand. By extending the length of the hunter's arm, the spear thrower added considerable thrust to the spear. It was an ideal weapon for hunting large game animals.

Slowly, things began to change. As large game animals became harder and harder to find, the people began hunting smaller animals. They developed the bow and arrow, which was more effective for hunting elk, deer, and antelope, and a variety of traps, snares, nets and hooks for catching smaller game. They also utilized more resources from the ocean, like fish, shellfish and marine mammals, and learned to leach the tannic acid from acorns, making available an entirely new food source.

Linguistic and archaeological evidence has led some scientists to conclude that about 4,000 years ago the first Ohlone-speaking peoples began moving from the Sierra foothills, down the Sacramento River delta towards the Bay Area. By 1,500 years ago (500 A.D.), they had displaced many of the area's earlier peoples and dominated the region.

They lived in larger villages of between 50 and 500 people and, while they still made seasonal migrations to gather acorns, fish for salmon, harvest from the seashore, or hunt rabbits, they spent the greater part of the year in one location. This was possible because they knew how to dry and store acorns in granaries for use throughout the year. They kept dried seeds, nuts, bulbs and fruits in large storage baskets and they dried fish and meat to preserve it, as well.

With an abundant supply of food available in all seasons, many more people survived the winters and the population began to increase. It has been estimated that when Portola first arrived in San Diego, there were 300,000 native people living in California, and that perhaps 10,000 of these were Ohlone.

The Ohlone people not only survived, but thrived here in central California for thousands of years. The Ohlone are different from the buffalo-hunting peoples of the great plaines, the farmers and sheepherders of the southwest, or the totem-carving fishermen of the Pacific northwest. Their culture is unique and arises from the land we call California.

THE EARLY ENVIRONMENT

When the first people arrived here, the environment was much wetter than it is today. Greater rainfall caused rivers and streams to flow freely, forming ponds, lakes and wetlands. Marshes stretched for miles along the coastal lowlands and valleys throughout Ohlone territory, bordered by thick stands of tules and cattails.

The meadows supported dense bunch grasses. Hillsides were covered with oak, madrone and bay trees, and huge redwoods grew along the moist coastal slopes. Stream beds were filled with willows, cottonwoods and sycamores, while higher hills bore chaparral plants such as Manzanita, ceanothus and chamise.

Each of these habitats contained its own unique assortment of plants that the Ohlone could use for food and medicine, and for making baskets, hunting equipment and other necessities.

Animal life was also rich and varied. Wetlands were home to millions of ducks, geese and other birds that migrated through California each year. Great herds of deer, antelope and elk roamed the hillsides. Rabbits and quail ran freely through the brush. The rivers were swollen with salmon and trout, and coastal shores were teeming with shellfish. The ocean itself provided a variety of fish, as well as otters, seals, sea lions and whales.

With this abundance of plant and animal life, and the relatively mild climate, people have been making California their home for a very long time. Evidence of this can be seen in the linguistic map of California (see following page). Notice the number of different language stocks and hundreds of languages that were spoken here.

NATIVE LANGUAGES

Many different languages have been spoken in Native California. Some estimates are as high as three hundred, not including the hundreds of subdialects that also evolved.

The Ohlone people were actually several independent tribal groups distinguished by anthropologists because they shared a common root language distinct from the languages of their neighbors. However, within their territory, the Ohlone spoke perhaps eight separate languages, currently called *Karkin, Chochenyo, Ramaytush, Awaswas, Tamyen, Mutsun, Rumsien* and *Chalon.*

While each of these derived from a common root language, the speaker of one language might not have readily understood the speaker of another, especially if they lived a great distance apart. Some words would have been familiar, but communication was probably difficult, except among those of neighboring groups.

The Spanish called them "*costeños*" meaning "people of the coast." This later became Americanized to *Costanoan.* Today, they are known as Ohlone, or Costanoan/Ohlone. Ohlone is variously said to have been derived from "*Oljon*", a village and tribe name from the coast of San Mateo County, or from a Miwok word meaning "people of the west." Whatever its origin, most modern descendants prefer to be called Ohlone.

From *The Snake That Lived in the Santa Cruz Mountains & Other Ohlone Stories*
by Linda Yamane, Oyate, 1998

From *The Ohlone Way* by Malcolm Margolin, Heyday Books, 1978

THE PEOPLE

The Ohlone people have been described by many early visitors to this area. While Sebastian Vizcaino, who visited Monterey in 1602, described the native people as "strong-bodied with light complexion," in 1786, Jean Francois de la Perouse described their color as "nearly approaching that of the Negroes." In general, though, they were described as being fairly short in stature, with dark skin, broad noses, dark brown eyes, and dark hair. An exception to this seems to have been East Bay Ohlone people, whom Juan Crespi described as "very fair-haired." Pedro Fages described Indian men in the vicinity of present-day Martinez as "tall in stature" and "the whitest and fairest-haired of any that we have seen in these lands."

Their hair was worn long, unless it had been cut short in mourning for the death of a relative. Women often cut bangs in the front with the rest of the hair hanging free or braided. Men with long hair either braided it or tied it in a bunch on the top of their heads.

Some of the men wore long beards and mustaches, but many removed their facial hair with "tweezers." La Perouse wrote: "Many of them have beards, while others, according to the missionaries, have never had any. ...The governor...assured us that those who appeared without beards had plucked them out with bivalve shells, which they used as tweezers."

Because of California's relatively mild weather, little clothing was worn. The men and young children usually wore no clothing at all. Women wore a two-part skirt made of soft deerskin in the back and a front apron, made of strands of fiber. When the weather was cold, Ohlone people wore robes of woven rabbit fur or sea otter fur for warmth. There are also accounts of men smearing themselves with a layer of mud to keep warm. They normally went barefoot, and although there is a word for hat in the Monterey Ohlone language, there is no documentation that Ohlone women wore basketry hats.

NATIVE WOMAN OF MONTEREY, ATTRIBUTED TO JOSE CANDIDO, 1791

While there was some tattooing of the face, forehead and arms, this practice varied considerably among groups, and was not necessarily common among the Ohlone people. Ears were pierced to hold pendants of shell, feathers or flowers, or short reed sticks. Some people, possibly men of high social rank, wore disks carved of soapstone in their ear lobes, and some men wore a bone ornament through the nasal septum. Necklaces of olivella shells and pendants shaped from abalone shell were also worn.

VILLAGES

Villages are believed to have varied in size from about 50 to 500 people. They were located near fresh water and often in an area that divided two habitats, such as oak woodland and meadow, or river mouth and tide pool. This gave easy access to the plants and animals of both environments.

A small group of villages usually comprised a political unit, each with its own chief and shamans, and conducting their own business. The chief, either a man or a woman, maintained their power by the consent of the people. They were responsible for seeing that guests were fed and entertained. But most importantly, they acted as advisors to their community and spoke on behalf of the village when necessary.

Most of the people in a village were related to each other either by blood or through marriage. Because of this, marriage partners were often sought from nearby villages, and these bonds served to link neighboring villages.

TULE HOUSE, LIVIA YAMANE

Villages consisted of several structures. The most common was the tule house. These were built in different sizes, but many were large enough to house an extended family of 10 to 15 people. The doorway was rectangular and was "closed" by covering it with a tule mat. A fire place was in the center of the house.

These dome-shaped or conical houses were built by constructing a circular framework of willow saplings into the ground, then bending them in order to tie them together at the top.

These were supported by several horizontal rows of willow poles secured to the framework with strips of willow bark. The resulting frame was then covered with a thick layer of tules that was held in place with another set of horizontal willow poles attached to the outside. Other brush thatching was sometimes used. In some areas, houses were made from slabs of redwood bark leaned together to form a large inverted cone.

In 1929, shortly before her death, Mutsun Ohlone elder, Ascencion Solorsano Cervantes, told ethnologist John P. Harrington: "They spent the winter in the tule thatched houses; they did not leak at all. They knew how to live."

These houses were warm and dry places where baskets, weapons, dried foods, ceremonial equipment and other precious things could be stored, and where the people could sleep on cold nights. Most of the day's work, however, was done outside, under a shade shelter if needed.

By the end of a rainy season, tule houses needed to be repaired. During this time, the tules would absorb rainwater and become mildewed from the dampness. Smoke from the fire turned the ceiling black, and fleas and ticks from deer and other animals might also infest the house. As soon as new tules were available for harvesting, the old thatching was removed and burned, and new material attached to the framework.

While visiting Santa Clara Valley, Pedro Fages wrote: "They have their hemispherical houses of about four yards in diameter, and live very sociably, fixing their residences in large villages which, since they become infested with fleas in the springtime, they abandon for the purpose of passing this uncomfortable season in little brush houses which they construct at a short distance from their villages."

Sun shelters (*ramadas*) were simple four-legged structures, covered with tules, bracken fern fronds, or brush, to keep the sun off of those working below. This is where much of a village's daily work was done.

Granaries were built to store acorns and other foods. These large containers were designed to keep foods dry, free from insects and safe from marauding animals. Southern Ohlone granaries have been described as square or rectangular in shape, with a base that sat above the ground, and a flat roof made of tules. In other areas, the granaries may have been different in shape. In Monterey, a family stored their acorn meats in a large willow basket, 3 to 4 feet high, which they kept in their house.

Many tribes in central California added strongly scented leaves to their acorns, like those of the California Bay Laurel (*Umbellularia californica*), to deter insects. It is very likely that the Ohlone did so as well.

In each village there was a dance enclosure. It was either oval or round in shape. with one main entrance and a smaller one at the opposite end. It was made of boughs that were either woven or piled to make a fence about four to five feet high. This enclosure served as a gathering place for ceremonies and celebrations.

Although sparsely documented, some villages also had a large assembly house, a dome-shaped structure with a central fireplace and an opening in the roof to vent the smoke. This was a place where people could meet. One such house, along the coast north of Santa Cruz, was described as large enough to hold the entire village of 700 people!

Outside the village, near the river or lake, was a sweathouse (*temescal*). This structure was often partially dug into the bank of a stream and finished with a simple brush structure built around it. They were small, holding only six to eight people. A small fire heated the interior, and when those inside were sweating profusely and could stand the heat no longer, they would run from the sweathouse and jump into the cold water nearby. The sweathouse was used daily, but only by Ohlone men.

Ohlone people spent most of their time living in their village. But several times during the year many would leave for a few weeks to gather food resources that were ready to harvest. In the fall, when the acorns were ready to be collected, they would go to gather this important food. In the late spring when salmon were running in the rivers, they camped nearby in order to catch these rich and delicious fish. These temporary campsites were used year after year as the Ohlone moved throughout their territory gathering foods and other materials.

TULES

Tules are tall, grass-like plants that grow in wet, marshy areas – the same freshwater habitat in which we find cattails. They are found throughout the world and are common in California from the Oregon border to Mexico, wherever there is a freshwater marsh.

Tules, sometimes called bulrushes, are members of the sedge family. They grow from 6 to 9 feet tall, rising as single stems from thick rootstocks and rhizomes under the water. They can form large and dense thickets along the edges of lakes, ponds, and marshes.

Two of the more common tule species found in California are the California Bulrush (*Scirpus californicus*), with a triangular-shaped stem, and the Common Tule (*Scirpus acutus*), with a round stem. The outer surface of the tule is tough, fibrous and water repellent. This tough outer skin helps the plant stand tall. Moisture and nutrients travel up the stem just beneath this outer surface, leaving the inside of the plant dry.

The middle of the tule plant is filled with thousands of individual air pockets, each dry and sealed to keep the air trapped inside. It is this unique structure that gives the tule its lightweight strength, allowing it to stand tall, yet be flexible enough to bend and not break in a strong wind.

Because the Ohlone built their villages near a source of fresh water, it is no surprise that over the centuries they developed many different ways to use this versatile plant.

Their water repellence and abundance made them perfect for making dome-shaped tule houses. A framework of willow poles covered with a thick layer of tules made a warm and dry house for sleeping and for storing things away from the elements.

They may have been used to cover granaries filled with acorns or other food supplies, keeping them dry until they were needed. Long mats or bundles of tules could be tied to upright poles to make windbreaks in front of a house, or used to cover the roof of a sun shelter.

Because of their spongy interior air pockets, tules made soft mats for sitting on while working on a basket or straightening an arrow shaft. The air trapped inside also worked as an excellent insulator against the chill of the ground and it is possible that thick mats or bundles of tules were used as mattresses under bedding.

"Sawiy"—a simple basket made of tules, used by Mutsun and Santa Cruz area Ohlones for gathering blackberries.

The long and fibrous outer surface of the tule plant allowed it to be twisted into twine or rope. Rope, either from tule or cattail leaves, was likely used to tie bundles of dry tules together to form canoe-shaped boats. These air-filled tule boats were used on lakes, rivers, and estuaries throughout Ohlone territory, as well as on the quieter waters of San Francisco and Monterey bays.

In some parts of Ohlone territory, simple tule baskets were made for holding berries, and women's front aprons were sometime made of tules. Tules were cut with a serrated knife or saw made from the flat shoulder blade of a deer. The plants were cut green and usually allowed to dry or cure for a few weeks before being used.

SOCIAL ROLES

The Ohlone people were hunters and gatherers, which means that everything they needed had to be obtained from the environment around them. Even though central California was a land of great abundance, this took a lot of time and effort and everyone in the community who was able had to contribute.

As with all hunting and gathering societies, there was a division of labor between men and women. In general, the men hunted and the women gathered. This division evolved over the centuries, not because men are better hunters than women, but because women have the capacity to feed and care for infant children.

With crying and fussing children at their sides, women were only able to collect foods that wouldn't be frightened away by the noise - like nuts, seeds, berries, bulbs, and shellfish. Without children to tend, the men were able to quietly and patiently stalk game animals like deer, elk and antelope.

A child's training for adulthood began very early in life. Since boys and girls were expected to fill the traditional roles of men and women when they grew older, they were only taught the things they needed to know to fulfill that role. While it was possible for men and women to switch roles, it was uncommon and not readily accepted among the Ohlone.

MARRIAGE

Marriage among the Ohlone was a relatively informal process. If a man and a woman wanted to marry, the man would approach the woman's parents for their consent. If the marriage was agreed, he then gave her (and in some cases her parents) a gift, such as a rabbit skin blanket or shell beads, after which they were considered married. Divorce was an equally informal process and, if it happened, the children stayed with their mother.

Since most people in a village were related to one another, either by blood or through marriage, young people had to look outside their village for potential mates. There were opportunities for them to meet when people from several villages joined together to celebrate a harvest season or other special event. These celebrations were times of great feasting, singing and dancing, when families were reunited and potential mates were sought. Marriages between neighboring villages helped to strengthen the bonds between them and made for a more peaceful life.

INFANTS & CHILDREN

As soon as a child was born the umbilical cord was tied and cut and the baby washed in warm water. For the next several days it lay quietly with its mother in a specialty made bed, a pit that was dug into the floor of the house, lined with hot stones and covered with a thick layer of soft leaves and scented plants. The afterbirth and umbilical cord were burned.

For the next few weeks the child's mother followed a very careful diet, eating no meat or fish and avoiding salt and cold water. Infants nursed for close to two years, during which time their parents abstained from intercourse.

Babies were carried securely bound into cradle baskets. These were carried by the mother, but the exact method is not known. She may have worn a strap over her forehead or across her chest and shoulders. Or she may have carried it lashed so that it rested on her hip.

We know very little about the specific style of cradle basket used by the Ohlone, but throughout California, babies were typically wrapped in a soft leather blanket padded with absorbent diaper material such as grass or moss. In some California tribes, a small piece of soapstone was attached to the cradle. When scraped, it produced talcum powder to help keep the child dry.

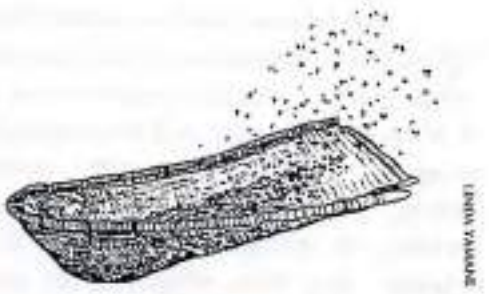
Parents, relatives, and other community members provided the child's education. A boy might have received his first bow and arrows from his uncle, and a girl might have been taught to weave baskets by her grandmother or aunt.

When they reached puberty, both boys and girls took part in special ceremonies to signify their entry into adulthood. There is some indication that boys may have undergone a vision quest that involved the hallucinogenic plant jimson weed. Special ceremonies were held for girls, as well, when they had their first menstruation. During this time they stayed inside their houses and avoided meat, fish, salt and drinking cold water.

BASKETRY

Ohlone people used many types of baskets in their daily lives, especially for collecting, processing, storing, and cooking foods. There were paddle-shaped seed beaters, used to knock seeds from

grasses and other plants into larger collecting baskets. Shallow winnowing baskets were used to remove the husks from seeds and nuts, or to toss the seeds and nuts with hot coals to parch them. A variety of other baskets were made for storing dried foods. A shallow, open-weave basket served the same purpose as a sieve or colander of today.



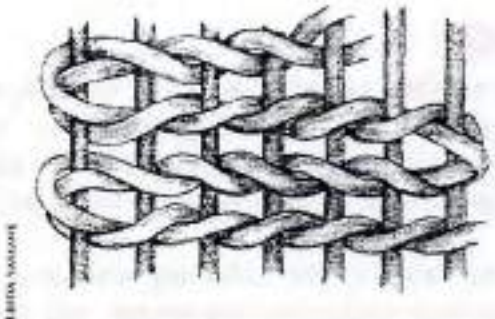
"Walaheen," a southern Ohlone winnowing & roasting basket.

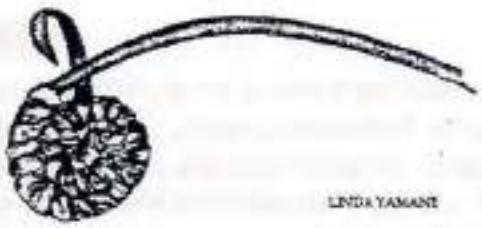
Large conical burden baskets were used to carry almost everything, from acorns to firewood. Some were closely-woven, while others were open-weave. These were carried by a strap which looped around the basket and over the carrier's forehead or across their shoulders. Large, bulky loads were also carried in big hammock-like nets.

In some Ohlone areas, simple baskets were made of tule or other material for collecting soft, ripe berries. Basket traps were used to catch fish and birds. There were even water baskets for storing or carrying water.

Hopper baskets (baskets without bottoms) were used to contain acorn flour as it was pounded in bedrock or portable mortars. Flat, tightly woven baskets were used for sifting acorn flour, and shallow loosely woven baskets served as leaching basins. In the Monterey area, acorn was sometimes leached, and even cooked, in the cone-shaped burden basket. Watertight baskets were used for boiling acorn or brewing tea, and smaller bowls were used as dippers, eating bowls, and drinking cups.

Very special baskets were made for storing trinkets and other valuable items, like jewelry or sewing materials. These beautiful baskets were elaborately decorated with colorful feathers such as red acorn woodpecker, green mallard, redwing blackbird, and quail topknot feathers, along with little shell beads and abalone pendants. Sometimes these baskets were burned as an offering or sacrifice when someone died.





For the Ohlone, there are two basic techniques for constructing a basket – twining and coiling. Twined baskets begin with a series of sticks that provide the framework. These sticks are attached together by twisting pairs of moistened weaving material around them. More sticks must be added to shape the width and depth of the basket.

Coiling is quite different from twining. Coiled baskets start out with a tight coil of flexible plant material. This becomes the center bottom of the basket. Later, when the basket has grown a bit, willow sticks are added as the foundation. As each dampened weaving strand is wrapped around the willow rod, the weaver pokes a small hole into the row below it with a sharp awl. In the past, the awl was made of sharpened bone. Before the hole closes up, the strand is pushed through and the stitch is pulled tight. In this way, the basket grows very slowly, stitch by stitch.

The Ohlone used several different plant materials to make their baskets. Among these were willow (*Salix hindsiana* or *Salix lasiolepis*) and hazel (*Corylus cornuta* or *Corylus californica*) shoots, sedge (*Carex barbarae*) and bracken fern (*Pteridium aquilinum*) rhizomes, bulrush (*Scirpus robustus* or *Scirpus maritimus*) and horsetail (*Equisetum spp.*) runners, and tule (*Scirpus acutus*). Willow and hazel provided the foundation material. Hazel was used for baskets that needed to be extra strong. Sedge is the cream or beige colored material that makes up the majority of the basket's surface. For patterns, the weaver used bracken fern, bulrush or horsetail runners. All of these are naturally very dark, ranging from dark brown to black. Sometimes they are blackened further by soaking in rich, black mud or some other dye solution.

Coiled Ohlone basket, part of Merriam Collection at U.C. Davis.

There are only two to three dozen old Ohlone baskets known to be left in the world. One is at the San Jose Historical Museum at Kelley Park in San Jose, another is on exhibit at the Santa Cruz City Museum of Natural History. There are two at the Pacific Grove Museum of Natural History, two at the Carmel Mission, and one at the Pacific House, Monterey State Historic Parks, near Fisherman's Wharf in Monterey. Others are housed in public or private collections within California, or scattered throughout the world, in places as far away as Washington, D.C., Paris, France and St. Petersburg, Russia.

GATHERING

Many different plant foods were gathered by Ohlone women, including a variety of nuts, seeds, berries, roots, bulbs and greens. They also gathered plants used for making medicines. At the shoreline, they gathered mussels, clams, abalone and other sea foods, as well as seaweeds and salt. They gathered the materials they needed for making baskets and other household items, and they gathered firewood.

Large, cone-shaped burden baskets were used for much of the collecting and carrying. As described earlier, these baskets were carried by a strap that ran around the basket and over the forehead, or across the chest and shoulders of the carrier. Very large loads of acorns, mussels or firewood could be carried this way.

A pointed digging stick was used to work roots or bulbs out of the ground. It was an inch or two in diameter and 2 or 3 feet long. The end was hardened by heating it in a fire and then sharpened to a point or a narrow bevel.

Special paddle-shaped baskets, called seed beaters, were used to knock grass seeds from the heads of plants into a larger collecting basket. In some parts of Ohlone territory, blackberries and other berries were collected in special narrow baskets that kept the berries from crushing under their own weight.

Many plants were available only in certain locations, and could be collected only during certain seasons. A young girl learned these things from the other women in the village, who intimately knew the territory in which they lived.

OHLONE PLANT FOODS

NUTS

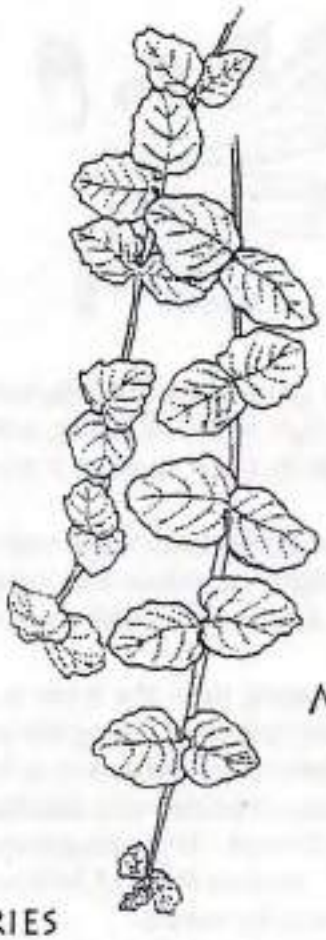
ACORNS
BUCKEYE NUTS
BAY NUTS
HAZELNUTS
BLACK WALNUTS

SEEDS

PINE NUTS
REDMAID SEEDS
TARWEED SEEDS
CHIA SEEDS

BERRIES

BLACKBERRIES
ELDERBERRIES
STRAWBERRIES
MANZANITA BERRIES
GOOSEBERRIES
HUCKLEBERRIES
WILD GRAPES



YERBA BUENA, LINDA YAMANE

ROOTS & BULBS

WILD ONIONS
CATTAIL ROOTS
BRODEIA BULBS
SOAP ROOT BULBS
WILD CARROTS

GREENS

CLOVER
MINER'S LETTUCE
BALSAM SHOOTS
THISTLE SHOOTS

MISCELLANEOUS

YERBA BUENA
TULE POLLEN
SEAWEED

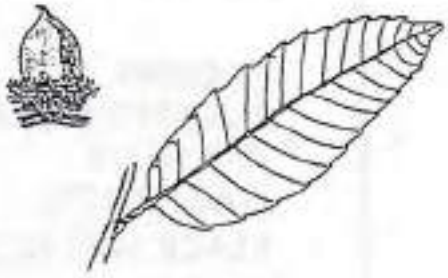
ACORNS

There are eight different species of oak trees native to California. The most common oaks in central California include the Coast Live Oak (*Quercus agrifolia*), the Interior Live Oak (*Quercus wislizenii*), the Valley Oak (*Quercus lobata*), and the Black Oak (*Quercus kelloggii*).

The Tanbark Oak (*Lithocarpus densiflora*), which also produces an acorn, is not a true oak. The leaves have parallel veining, unlike the leaves of true oaks, and the caps are "fuzzy," unlike the caps of other acorns. However, the tanbark acorn was not only used by the Ohlone people, but in some areas was preferred by them over many of the other species.


Live Oak


Black Oak


Tanbark Oak

Acorns are eaten by a number of different animals, including d.eer, squirrels, jays and acorn woodpeckers. But acorns contain high levels of tannic acid that make them toxic to humans. Fortunately, tannic acid has an extremely bitter taste so it would be very difficult to eat enough to cause any serious problems.

Thousands of years ago, native peoples devised a way to leach, or wash out, the tannic acid from the acorns. This resulted in a highly nutritious and incredibly abundant food supply. Acorns are a good source of protein and are high in fat, vitamins and minerals. They are also a good source of fiber.

Acorns mature and begin dropping from the trees in the fall. At this time, people from villages all around an area would gather together among the oaks to harvest the valuable nuts. This was probably a time of great excitement and celebration as family members were reunited, young people met and courted, and everyone celebrated with feasting, singing, and dancing.

However, this was also a time of work. First, the ground beneath the trees was likely cleared of any acorns that had fallen earlier. Acorns that fall before the main crop are usually ones that have not formed properly or are infested by insects.

People would then climb the trees and shake the branches or use long poles to carefully knock the acorns from the trees. Below, everyone helped to gather the nuts. They were loaded into large, cone-shaped burden baskets that, when full, were carried back to the village for drying and storage.

Before the acorns could be stored away, they had to be dried carefully. Reducing the moisture content made them less likely to mildew in storage, so they were spread out in the sun to dry. Once dried, the acorns were stored, most often in the shell, in granaries throughout the village. These granaries were specially made structures that kept the acorns dry, free from insects and away from marauding animals.

When needed, a supply of acorns was taken from the granary. The acorns were cracked open between two stones and the shells discarded. The thin papery husk was removed, or loosened and the acorns tossed in a winnowing basket to separate the nuts from the husks. As

they were tossed in the air, the breeze would blow away the lighter husks while the heavier nutmeats fell back into the basket. On windless days, a gentle breath from the woman doing the winnowing completed the job.

The cleaned acorns were pounded into a coarse flour using a mortar and pestle. These could be large portable mortars, chipped and shaped from round boulders or wood, or bedrock mortars chipped directly into an outcropping of bedrock. Shallow mortars, either bedrock or portable, were often surrounded with a bottomless "hopper basket" to help keep the flour contained in the bowl. The pestles were long, narrow stones that were carefully shaped and highly prized by their owners.

The coarse flour was then sifted to remove any of the larger particles. It was placed on a flat, closely woven basket and spread by hand. The basket was then tapped and shaken to loosen any of the larger pieces. These were dumped back into the mortar for more pounding. The remaining fine flour, which was trapped within the weave of the basket, was swept out with a soap root brush and saved until all the flour was pounded and sifted.

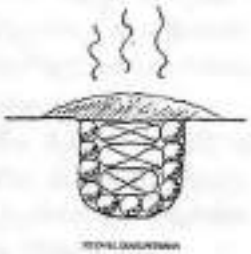
This finely processed flour was then taken to the leaching area, often at the edge of the nearby water, where a large, shallow basin was formed in the sand. This basin was lined with leaves and the acorn flour was spread on top. Water was then carefully poured over the flour, using a bundle of twigs or other plant material to break the flow of water. A basket was sometimes used instead of the sand basin for leaching acorns.

As the water slowly drained from the basin through the sand, it removed some of the water-soluble tannic acid from the flour. This process was repeated several more times until the bitter-tasting tannic acid was completely removed and the flour tasted "sweet."

Acorn flour was most often boiled into mush in water-tight baskets, using hot stones to cook the meal inside the basket. More water could be added to make a thinner soup, or the flour could be baked into a dense bread. Acorn "biscuits" were made from very thick mush that was congealed into hand-sized pieces.

COOKING

Boiling was done in special cooking baskets that were woven so tightly that they held water. The food was heated by placing hot fist-sized cooking stones inside the basket, one at a time, with a pair of wooden tongs. The hot stones were first dipped quickly into a basket of water to remove any ashes. Then they were stirred around in the cooking basket with a wooden paddle to evenly distribute the heat. When the stone cooled, it was replaced with another, and then another. It only took a few minutes to get a large basket of acorn mush to a rolling boil.



Baking was done in a pit oven. A hole was dug into the ground and lined with stones. Then a fire was lit inside the pit and allowed to burn down completely. When the ashes were removed, foods like meats, root vegetables and acorn bread were wrapped in leaves and placed inside. The oven was then covered with plant material and a capping of soil and left to bake for several hours.

Fish and meat were skewered on sharp sticks or spread on flat boards and propped near a fire to roast in the heat. Thin strips of meat might be placed on racks over a smoky fire to dry and cure into jerky that could be used throughout the year. Fish was also smoked in this way to preserve it for future use.

Seeds and nuts were parched by tossing them with hot coals in a shallow winnowing basket. The tossing kept the coals from burning the basket. After the coals were removed, the parched seeds could be ground and eaten dry (*pinole*), formed into seed cakes, or boiled into a soup (*atole*).

HUNTING

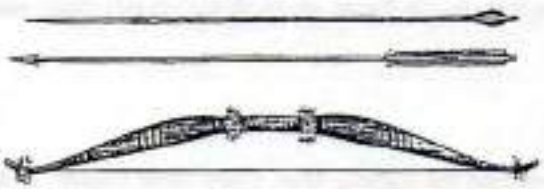
The earliest people to live in California used a spear thrower and spears to hunt large game animals like mammoths and mastodons. These were powerful weapons that were quite effective against very large animals. But, as these animals died out with the last ice age, hunters had to seek smaller game such as elk, deer, and antelope in order to survive. The spear thrower and spears became outmoded and were eventually replaced by the bow and arrows.

Unlike a spear, which had to be thrown standing up, bows and arrows could be used from a concealed position. This meant hunters could get much closer to the game and hence be far more accurate with their weapons.

Hunters spent time before each hunt in the sweathouse, preparing themselves for the task ahead. It gave them time to focus on the hunt and think about the prey they were seeking. The sweating also helped reduce their human scent and made it somewhat easier to sneak up close to the animal.

Deer hunters were masters of mimicry. They dressed in deerskin, wearing a stuffed deer head on top of their heads. Then they carefully approached a herd of deer from downwind, moving slowly and behaving exactly as the deer around them. It took years of training, but a good hunter could get within a few feet of his prey before he fired his bow.

Bow wood was carefully carved into shape, 3 to 3-1/2 feet long, about 1-1/2 inches wide, and with a relatively thin cross-section. To add strength to the bow, strips of pounded deer sinew were glued to the outside, or back surface, of the bow. When this dried, it pulled the bow into a forward arch. The bow was then bent back against this arch when it was strung, creating a short, lightweight, yet extremely powerful bow. Bowstrings were made of twisted sinew or plant fiber.



From *Tribes of California* by Stephen Powers

California bows were often painted in patterns of black, red or white. This paint may have helped to waterproof the sinew-backing on the bow and provided a form of camouflage by breaking up the bow's pattern.

Hunting arrows were made in two parts. The main shaft was made of light cane or other straight, narrow wood, with three feathers attached to the end to stabilize its flight. The shorter foreshaft was made of hardwood with the point attached. It fit into the main shaft and could easily be removed from the arrow. This short, hardwood foreshaft kept the lighter arrow shaft from splitting when it made contact with an animal. Also, when an animal was struck, the back half of the arrow would fall away from the foreshaft and could be easily retrieved by the hunter, leaving the point in the animal.

Another advantage of this removable foreshaft was that points could be changed on the arrow to match whatever game was encountered. For animals like elk, deer and antelope, sharp points of bone, obsidian or chert were needed to cut through the thick hide. But for smaller animals, a simple sharpened wooden point would often be enough.

Small birds could be shot with a "bird blunt," a rounded knob-like tip that killed the bird but caused no damage to its feathers, which might be needed to decorate a basket or for dance regalia. Birds are also thought to have been caught with light bolas, made with two bones tied to a cord, that were thrown to entangle the bird's legs and wings.

Rabbits were caught by driving them into long nets strung along one side of a meadow. Villagers would make noise and beat the grass and shrubs with sticks, or sometimes set fires to drive the rabbits towards the net. Once entangled in the net, the rabbits were struck with wooden clubs.

Fire was also used to drive woodrats from their nests, and smoke was blown into ground squirrel holes to bring them out into the open. Fire is thought to have been used to capture grasshoppers, as people encircled a meadow and drove the grasshoppers toward the center where a fire had been lit. Freshly roasted grasshoppers were then picked from the coals and eaten.

Decoys, formed from buoyant tules and covered with duck or goose skins, were used to entice ducks and geese to a hunter's location where bows and arrows, nets or slings were used to capture the birds.

Slings were made, presumably of a small patch of leather held between two long cords. A stone was placed on the patch of leather and was swung around the hunter's head until he released one of the cords and sent the stone flying. With practice, hunters became very accurate and slings were used to catch birds and a number of small animals.

Traps and snares were also used. A variety of basket traps were made for catching fish and birds, and deadfall traps were used for capturing small mammals. Deadfall traps were made by propping up a heavy stone or log with a baited stick. When the bait was taken, the heavy weight would drop and catch the animal. Snares were made of thin cords that were looped across regular animal runs. As the animal passed through, the loop closed around its head and held it until the hunter returned.

FISHING

California was a much wetter environment several hundred years ago and there were many more rivers, streams, lakes, ponds, marshes, and estuaries, each thriving with fish. The Ohlone took advantage of this abundant food supply and used a number of different techniques to catch fish.

Hooks were made from pieces of deer bone or carved from abalone or mussel shell. Some were made by tying two pieces of bone together at an angle to form a sharpened hook. Others, called gorge hooks, were simple straight pieces of bone tied to a cord that turned sideways and caught in the fish's mouth when pulled.

Spears were also used to catch fish. Those used by the Ohlone were made with one or two barbed points carved from bone. Nets, either weighted with small stone weights, or suspended by long poles to form a dip net, may also have been used.

Basketry fish traps were woven with a cone-shaped entrance that allowed fish to swim in, but prevented them from getting out. Weirs (underwater walls made of stones or sticks pounded into the riverbed) directed fish swimming upstream into holding areas where they could be collected by hand.

The Ohlone also used the soap plant (*Chlorogalum pomeridianum*) as a fish poison. The starchy bulb of the plant was crushed and spread on the surface of a still pond or quiet eddy in a river or stream. The soapy material in the plant dispersed in the water and made the fish unable to breathe. The fish then died and floated to the surface where they were easily collected. Fishweed or Doveweed (*Eremocarpus setigerus*) and buckeye nuts (*Aesculus californica*) were used in much the same way. This practice is illegal today because it is not selective and kills all the fish in the area, as well as other aquatic life.

Shellfish were also collected where available, including abalone, mussels, clams, oysters, chitons and snails. Villages near these resources were often built on huge shellmounds, large hills made of shell and other debris deposited by countless generations of people.

OHLONE ANIMAL FOODS

MAMMALS

DEER
ELK
ANTELOPE
GRIZZLY BEAR
MOUNTAIN LION
DOG
BOBCAT
SKUNK
RACCOON
BRUSH RABBIT
COTTONTAIL RABBIT
JACKRABBIT
TREE SQUIRREL
GROUND SQUIRREL
WOODRAT
MOUSE
MOLE

BIRDS

CANADA GOOSE
SNOW GOOSE
WHITE-FRONTED GOOSE
AMERICAN WIDGEON
PINTAIL DUCK
MALLARD DUCK
GREEN-WINGED TEAL
SHOVELER DUCK
AMERICAN COOT
MOURNING DOVE
ROBIN
CALIFORNIA QUAIL
HAWK

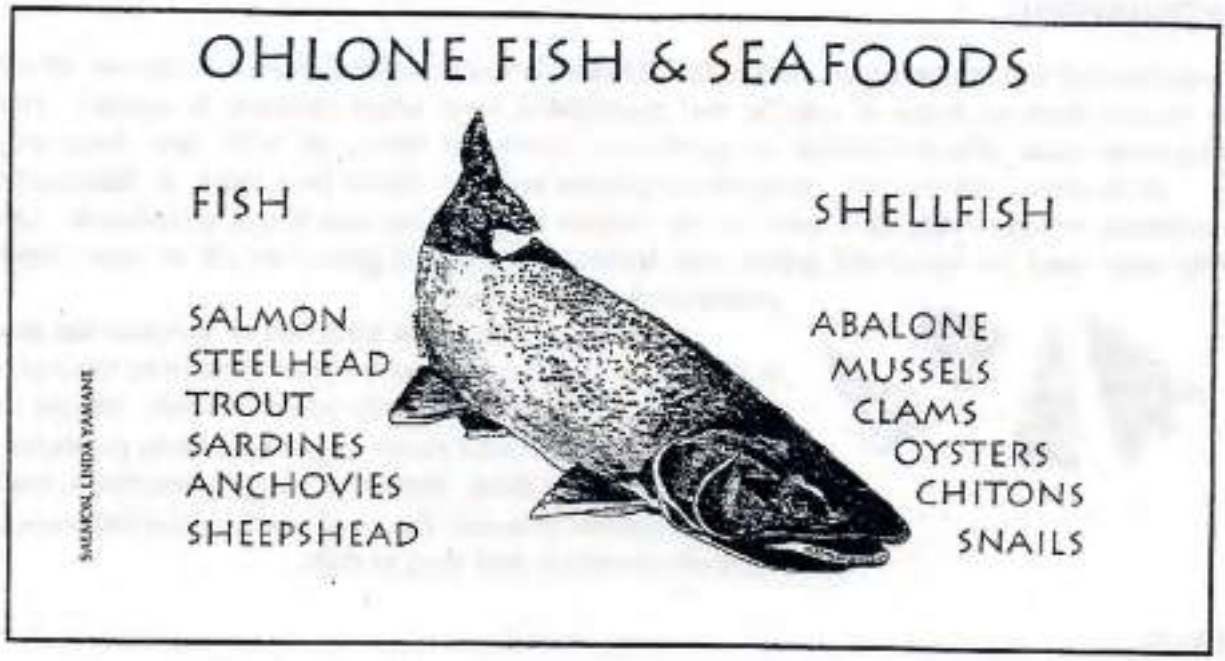
CALIFORNIA QUAIL, LINDA YAMANE

REPTILES

SNAKES
LIZARDS
TURTLES

INSECTS

YELLOW JACKET LARVAE
GRASSHOPPERS
CATERPILLARS



MISCELLANEOUS TECHNOLOGY

CORDAGE

The Ohlone made string, twine and rope from a number of different plant materials. String and twine for making hunting and fishing nets, and other uses, were made from the long fibers of the stinging nettle (*Urtica spp.*), dogbane (*Apocynum cannabinum*) or milkweed (*Asclepias fascicularis*). A coarser twine or rope is thought to have been made from tules (*Scirpus spp.*) or cattail leaves (*Typha latifolia*).

DOGBANE, LINDA YAMANE

FIRE MAKING

The Ohlone firemaking kit consisted of three parts – a hearth, a drill, and some dry tinder. The hearth board was a flat piece of soft wood with several shallow holes carved along one side edge. Each of these shallow holes had a notch cut into it that would allow charred sawdust and ash to fall from the hole. The drill itself was a long, thin stick of soft wood that was placed in the hole and spun rapidly, with great downward force, between the palms of the hands. This action produced a finely ground sawdust and sufficient heat to create a glowing ember. An elderberry drill and buckeye hearth work very well for making fire this way.

Dry tinder placed beneath the notch caught the charred sawdust and when the tinder began smoldering, it was carefully picked up and blown until it burst into flame. This burning tinder was then placed beneath a carefully constructed pile of sticks to produce a larger fire. Tinder had to be a dry, light, and easily flammable material such as cattail fluff, soap root fibers, shredded bark or old bird's nests.

Unless traveling, the Ohlone did not have to build a fire from scratch every day. They could simply pile ashes over the fire each night then blow the hot embers to life again in the morning.

FLINTKNAPPING

Stones like chert (a metamorphic rock) and obsidian (a volcanic glass) have a molecular structure that causes them to break in specific and predictable ways when pressure is applied. Native craftspeople used this knowledge to produce a variety of items, all with very sharp edges.

Arrowheads are the first thing most people envision when they think of flintknapping. Arrowheads were an important item for the Ohlone and required much skill to produce. Larger points were used for hand-held spears and arrows intended for game like elk or deer. Smaller points were used for birds.

Large blades could be attached to wooden handles to make knives. A deer antler tine might be used to flake off the edges and re-sharpen the knife when needed. Simple large flakes of stone with very sharp edges were easily produced for cutting things like meat, leather, or tough plant fibers, and for scraping leather or wood. Pieces of chert or obsidian were also worked into points and used as drills.

DRILLS

The Ohlone used drills for making many things, among which were shell beads. Each piece of shell was drilled so they could all be strung together on a cord. The whole string of "blanks" was then ground into a uniform circular shape on a rough surface such as sandstone.

Their drill was a hand drill consisting of a long, narrow stick with a sharpened stone point attached to the end. It was spun between the palms of the hand, just like the firemaking drill.

The pump drill that is so often seen today, with its suspended handle, flywheel and metal bit, was used by Native Californians for drilling shell beads as well. However, this device was introduced by the Spanish missionaries in the late 1700's. This new instrument worked well and pretty much replaced the older hand drill.

GAMES

In their leisure time, Ohlone people enjoyed a number of games. These fall into two basic categories-games of skill and games of chance. Games of skill include things like running, throwing, shooting, swimming, and various ball games, where the physical abilities of the players are tested. Games of chance, such as dice games or guessing games, involve a different factor, thought of as either luck or personal power. The spiritual world becomes involved when one seeks supernatural intervention in order to win.

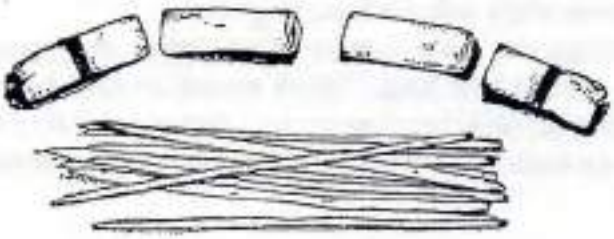
We know of two "field games" that were played by the Ohlone. One was a race between two teams, each kicking a wooden ball, a little larger than a baseball, along a course and then back again. These courses were sometimes several miles long. There were one or two players per side, and wagers were placed on the outcome of the game. In the Monterey area, it was called "tomash" (pronounce "toe-mawsh").

Another game was shinny, which is similar to field hockey. A wooden ball was moved towards the opponent's goal by teams of players with curved sticks. Both men and women played this game. The number of players on each side varied, but the sides were always even. This game often got rough, as wrestling was allowed. Southern Ohlone people called it "ils" or "hils" (pronounce "eels" or "heels" with a sharp "s" sound).

A hoop and pole game called "tikirsi" (pronounce "tih-KEER-sih") was played by men, one against another. A small hoop of approximately 3 inches in diameter was rolled on a cleared playing field surrounded by stakes. While the hoop was in motion, each man threw his 5-foot-long pole at the rolling target, attempting to strike it through the small hoop. If they succeeded, they earned two points, unless the hoop was lying on the stick. If that happened, one point was earned. Three points won the game.

HOOP & POLE, LINDA YAMANE

"Wunnuk" (pronounce "WUN-uck") was a guessing game played by hiding pieces of bone or shells in the hands. In English, this game is commonly called the "hand game." Some areas played with one game piece per player, and others with two. If playing with two, one piece was marked in some way to distinguish it from the other. Under the cover of a pile of grassy material or, later, a blanket, a player hid the game piece(s) in their hands and the opponent had to guess which hand held the piece (or marked piece). A correct guess won the privilege of doing the hiding. An incorrect guess won a point for the hider. The game continued, often for many, many hours, until one team had won a set number of points (usually 12, 15 or 24). This game was very popular, and involved more people than just the players. Bets were placed, and special songs were sung - it made for a lively time!



A dice-like game called "trallik' (pronounce "TRAWL-ick") in the southern Ohlone languages, is called the "staves game" in English. It was played using 6 (or sometimes more) split sticks about 8 inches in length and 3/4 inch wide. These game sticks were decorated with marks or solid coloring on one side, the other side being left plain. These were tossed on the ground and scored according to how they landed. Smaller point sticks were used to keep the score, as described above. The winner won the game, and any "prizes" that had been wagered on the contest.

Ohlone children played "jacks" with small stones, tossing one stone in the air and seeing how many could be picked up off the ground before the stone was caught again. They also made "buzzers" from acorns and twine, and used twine for playing various forms of "cat's cradle."

MUSIC

Ohlone people used a variety of musical instruments when singing or dancing together for ceremonial purposes, celebrations, or just plain fun.

The "drum" of central California was the split stick rattle, or clapper stick. The Ohlone did not use a rawhide or foot drum. This split piece of wood, such as Elderberry or California Bay Laurel, makes a loud "clapping" sound when struck against the palm of the hand. It is used like a drum to help keep rhythm.

CLAPPER STICK LINDA YAMANE

A rattle made of dried deer hooves was common among California native people and may have been used by the Ohlone. However, there is no documentation of its use and so we cannot be certain.

Another type of rattle was made by tying stone-filled cocoons of the ceanothus moth onto a wooden handle. In some California tribes, this rattle was associated with shamans. In post-mission times, it is known to have been used as a baby rattle in one Ohlone family. It is not clear whether it was traditionally used as a dance rattle, ceremonially, or for amusement.

A small whistle made of bird bone was worn around a dancer's neck and blown in rhythm while they danced. Sometimes these whistles were tied together in pairs to create dual tones when used.

A lesser known instrument is the musical bow, which was held near the mouth and plucked with the fingers. The player's mouth acted as a sounding hole, similar to the way a jaw harp is played today. Some tribes used their hunting bows, but Ohlone people made a special musical bow. They also used a wooden flute with holes drilled in the side to produce different notes. Sound was produced by blowing across the end. This flute is often called a "courting" flute.

The bullroarer is a short piece of wood that has been shaped with a slight curve on one side and is suspended from a heavy cord that is several feet long. When swung around and around above the user's head, the wood spins, creating an eerie buzzing sound. This is not a true musical instrument, and was used by some tribes in a ceremonial context. The Ohlone used it as a means of entertainment.

THE SPIRITUAL WORLD

Prayers and offerings were an important part of Ohlone religious life. Prayers to the sun were accompanied by smoke blown into the sky. Offerings of seeds, tobacco or shell beads were made, and poles, sometimes quite tall, were decorated with feathers, tobacco and foods and planted in the ground. In1776, the De Anza expedition traveled along the banks of Llagas Creek northwest of San Martin. Pedro Font wrote:

> "At this place we found...that the Indians had made a fence of little poles around them, and in the middle had set up a thick post about three spans long, decorated with many feathers tied in something like a net, as if dressed, and with an arrow stuck through them. On one pole many arrows were tied and from another were hung three or four balls of grass like tamales, filled with pinole made of their seeds and of acorns.... In the middle of a long stake there was hung a tuft of several goose feathers, but we were not able to understand what mystery this decoration concealed."

Smaller feathered sticks were used as good luck charms for hunting and fishing.

Shamans, who were usually men but sometimes women, were spiritually powerful people. They brought good food crops, game animals and fish, could foretell the future, and find lost objects. One of their jobs was to cure the sick. They first diagnosed the illness by singing or dancing, then removed the disease or contamination by sucking an offending object out of the patient's body.

Weather shamans could make rain start and stop, and grizzly bear doctors could transform themselves into a bear and back into a man. Some shamans used their powers for witchcraft. They sometimes, for example, would blow a sickness on their breath to harm their enemies.

The Spanish missionaries worked diligently to obliterate these traditional practices, and so there is much we do not know about these ancient Ohlone spiritual beliefs.

DEATH & BURIAL

When an Ohlone person died, they were either cremated or buried on the day of death. If they were buried, the body was flexed into a fetal position, then wrapped in skins and tied before interment. A net with some of their possessions was part of the burial, along with a container holding a good supply of edible seeds to serve them as food on their journey west to a place across the ocean. When a person died, his or her possessions were burned. This is one reason why so few things have survived into the modern world..

In 1814, Fray Juan Amoros, of Mission San Carlos at Carmel, wrote:

> "...All the relatives throw beads and seeds upon the dead in token of their love for the deceased. ...As a sign of mourning the father, mother, child, husband or wife, or brother or sister cut off their hair...or burn it bit by bit. Moreover they throw ashes over their entire bodies, weep bitterly, abstain from food, and the old women smear their faces with pitch...the effects of this remains for months....It is also their habit to go to the woods to drown their sorrow."

Annual mourning ceremonies are thought to have been held for all the members of a village who had died during that year.

Cemeteries were outside but near the village. Pedro Font described what appeared to be a cemetery just south of present-day Gilroy:

> "On passing near the village...we saw on the edge of it something like a cemetery. It was made of several small poles.... on the poles were hung some things like snails and some tule skirts which the women wear. Some arrows were stuck in the ground, and there were some feathers which perhaps were treasures of the persons buried there."

THE MISSION PERIOD

Europeans first discovered California when Juan Rodriguez Cabrillo sailed up the coast in 1542. He went as far as Mendocino but recorded nothing of the Ohlone people or their territory.

In 1602, Sebastian Vizcaino sailed the coast in search of suitable ports for Spanish ships returning from the Philippine Islands. He sighted Monterey Bay and described it as a wonderful port with tall pines that could be used for ship's masts. "The land is well populated and the people gentle, affable and intelligent," he wrote.

These Spanish ships, known as the "Manila Galleons" followed the winds and currents of a southerly route when sailing to the Philippines. But when they sailed eastward again, the currents carried them in a more northerly route to the coast of California. Spain wanted to establish ports that could provide fresh water, fruits, vegetables, and meat for their ships, and a safe place to make repairs.

By 1760, Sir Francis Drake had sailed up the coast and claimed California for England, the Russians had begun moving down the west coast in search of seal and sea otter pelts, and the English and French were talking about dividing the entire "new world" between themselves. So Spain decided to take action to secure their claim to Alta California.

The Spanish government felt that if they could establish a series of missions in Alta California, they could convert the native people to Catholicism, and "teach" them to become Spanish-speaking farmers and herdsmen. These new Spanish colonies would then help to solidify Spain's claim to this part of the world.

In 1769, Gaspar de Portola led the first land expedition into California, and traveled as far north as San Francisco. In 1770, the first mission was established in Ohlone territory at Monterey, then moved in 1771 to Carmel. By 1797, a total of seven missions had been founded within Ohlone territory.

Mission San Carlos Borromeo de Carmelo (1770)
Mission San Francisco de Asis (1776)
Mission Santa Clara de Asis (1777)
Mission Santa Cruz (1797)
Mission Nuestra Señora de la Soledad (1791)
Mission San Jose (1797)
Mission San Juan Bautista (1797)

By 1810 there does not appear to have been any Ohlone people still living the "old way".

The Ohlone were first attracted to the missions by the new things the Spanish brought with them, like glass beads, mirrors, fabrics and metal. But they were soon put to work building the mission itself, the outbuildings, waterworks, and more. They tended fields, herded cattle and sheep, wove cloth, and made pottery. The missions needed these native people as a labor force to maintain themselves and support the priests and military personnel. When there were not enough local native people to do the work, more were brought in from the surrounding areas by force. If they left the mission without permission, they were chased down, retuned, and severely punished. They were also punished, by whipping and being locked in stocks, for other more minor infractions.

Life in the missions was very different from the one they had known for thousands of years before. They now awoke, prayed, ate, worked, and rested by the priests' schedules. For the most part, they were not allowed to speak their languages, practice their ceremonies, or gather the plentiful foods that had sustained them for so many generations.

It was not a happy way to live, and it wasn't long before overwork, malnutrition, abuse, depression, and severe culture shock began to take their toll. Introduced diseases like measles, mumps, small pox, influenza, and syphilis killed thousands of native people. In the years between 1770 and 1832 – the mission period – it is believed that the Ohlone population declined from over 10,000 to less than 2,000 people.

Although Spain succeeded in settling coastal California, it wasn't long before the missions could no longer find enough labor to sustain themselves and seriously deteriorated.

SECULARIZATION

In 1821, Mexico gained its independence from Spain. It soon became apparent that the mission system wasn't self-sufficient and was costing too much money to maintain. The mission's vast land holdings were attractive to the increasing numbers of people settling coastal California and so, in 1834, the missions were secularized, or turned over to civilian control.

When the missions closed, some land allotments were given by the priests to the native people who had labored throughout their lives for the mission establishments. In fact, according to the secularization decree, half the mission lands were to have been reserved for Indian people who wished to remain. But most of the former mission lands were in fact granted to private citizens by the new Mexican government. Ohlone people had little or no social or political clout, and even those with land allotments were eventually swindled, intimidated, or even killed to get them off their land.

Their former means of living, by hunting and gathering, was now difficult if not impossible. Introduced plants and animals had changed the land they had depended upon for countless generations. The land was now claimed by others, and there were few places they were welcome.

Some groups, formed of survivors from different tribes, established new villages in an attempt to build lives for themselves and their families. But their world was changed forever, and these settlements eventually disappeared. Most Ohlone people went to work as ranch and farm hands or as domestic servants, cleaning and cooking for the people who had taken their land.

THE GOLD RUSH & CALIFORNIA STATEHOOD

The discovery of gold in 1848, and the massive immigration of thousands of new people into the state, led to even further abuses of Ohlone and other native California people. Some Ohlone people were taken to work in the Sierra gold fields. San Jose's sheriff, Harry Bee, took ten Indian men from jail in order to work his mines. The Murphy brothers of Santa Clara Valley are reported to have returned home from the gold fields with 16 burros loaded with gold - gold pulled from the earth by the 150 Indians from Mission Santa Clara they had taken with them.

Under Spanish and Mexican rule, California Indians were considered citizens, although voting privileges were reserved only for land-owning citizens. At the time of California's constitutional convention in 1849, it was decided that citizenship was open only to whites and that only white males could vote.

On April 22, 1850, the California State Assembly and Senate passed "An Act for the Government and Protection of Indians." The law mandated humane treatment of minor Indian children, but in spite of its title, this new law was little more than legalized slavery. It outlines the means by which a person could obtain a minor Indian child, complete with certificate entitling the holder to the "care, custody, control, and earnings" of the minor until he or she reached "the age of majority," which was 18 for a male, and 15 for a female.

This same document stated that, "Complaints may be made before a Justice of the Peace, by white persons or Indians; but in no case shall a white man be convicted of any offense upon the testimony of an Indian."

In addition, any Indian person found "loitering and strolling about" could be arrested on the complaint of any citizen of the county, then hired out within 24 hours to the highest bidder, for a period of up to four months.

In 1860, the Act of 1850 was amended so that Indian children could be legally indentured for longer periods. If under age 15, a male could be indentured until age 25, and a female until age 21. If over age 14, a male could be kept enslaved until 30 years of age, and a female until age 25.

Even though California was a non-slavery state, there was no limit to the number of Indian people that could be indentured in this manner, creating a free and abundant source of labor which many people took advantage of. In fact, in many cases the men who profited most from this law were the very ones who helped to create and implement it.

An 1861 San Francisco newspaper article proclaimed: "This law works beautifully. A few days ago V.E. Geiger, formerly Indian Agent, had some eighty apprenticed to him. We hear of many others who are having them bound in numbers to suit. What a pity the provisions of the law are not extended to greasers, Kanakas, and Asiatics. It would be so convenient to carry on a farm or mine, when all the hard and dirty work is performed by apprentices!"

Soon after California's admission to the union, three federal Indian commissioners paid a visit. These three commissioners negotiated 18 treaties involving approximately 25,000 California Indians. In these treaties, the native people acknowledged the jurisdiction of the United States, agreed to refrain from hostilities, and relinquished claims to the territory they had held. At least one of these treaties appears to have involved Ohlone people, although it is impossible to know who they represented or on whose authority they had entered this agreement. In return, they were promised food and supplies, cattle, and tracts of land to be set aside as reservations.

These eighteen treaties were rejected by the United States Senate because of opposition by California's congressional delegation. Simply put, Californians did not want to "give" valuable land over to the exclusive jurisdiction of Indian people.

THE OHLONE PEOPLE OF TODAY

Although no reliable population figures are available, there are certainly thousands of Ohlone descendants living today. Many still live within their traditional ancestral territory, while others live elsewhere throughout California, or in other states. There are no federally recognized Ohlone tribes, but several groups are formally seeking federal acknowledgment through a process established by the Bureau of Indian Affairs.

Many descendants have become active in the monitoring of construction activity on cultural sites, especially those containing Native American burials. California state law has established a process whereby "most likely descendants" are notified upon the discovery of these burials, and can then make recommendations as to their proper treatment. It is a positive step that Ohlone people are included in making decisions on the treatment of these ancestral remains.

Language, songs, folklore, basketry, and other traditional skills are being revived through the efforts and participation of many contemporary Ohlone people. Several public events take place annually that celebrate Ohlone people and culture. These events are an opportunity for modern Ohlone people to deepen their connections to their cultural heritage, and to share their knowledge and these very special connections with the public. Above all, Ohlone people want you to know that

"WE ARE STILL HERE."

Beyond the Stereotypes

BEV ORTIZ

Teaching in northwest California, Vivien Hailstone (Karuk, Yurok, and a member of the Hupa Tribe) has noticed three prevalent stereotypes about California Indians among nonIndian grammar school students for whom she makes presentations (1) all Indians lived in tipis; (2) they only ate acorn; and (3) they only lived in the past. About the latter, she says,

I think that sometimes they want to put us back there. And teachers especially, when you talk about Indians, they want to put a feather in your hair and put you in buckskin and take you back 200 years and talk about Indians. So they don't know there's anybody alive today...

Vivien's presentations, which are designed to counteract such stereotypes, include displays of the rich variety of native foods. Once, when Vivien was showing these foods, a student proclaimed in astonishment, "Why, that's people food!"

A skilled weaver and traditional artisan, Vivien also teaches students that modern ways of producing old-time food baskets, and ornaments are as legitimate as methods used a long time ago. Such methods reflect who people are today; they show that tradition isn't static, but exists on a continuum from past to present. They let non-Indians know, "We use the things that everyone else uses. We weren't that dumb that we didn't take advantage of things."

Recalling a one-time Patrick's Point State Park exhibit which ostensibly compared Indian and non-Indian methods of doing things, Vivien gives an example of how stereotypes are perpetuated. In the exhibit, mortars, elk antler wedges, and stone mauls were labelled, "This is how Indians do it." Electric grinders, stoves, and chain saws were labelled, "This is how we do it," as if Indian people don't use the latter and aren't part of "we." "Why do they think Indians don't do that?" Vivien wonders.

Things can change in a positive way. As a California Department of Parks and Recreation Commissioner at the time, Vivien helped change this exhibit. To teach students who Indians are, Vivien demonstrates such techniques as processing acorn into flour using an electric coffee grinder. During her presentations, she wears a basketry medallion necklace, a creative, lovely, contemporary basket style she innovated using old-time materials and methods. It honors her heritage while also letting children know she is a person who lives today.

To teach students who Indians are, Vivien Hailstone demonstrates such techniques as processing acorn into flour using an electric coffee grinder... it honors her heritage while also letting children know she is a person who lives today.

While teaching non-Indians in the greater San Francisco Bay Area, Genny Mitchell (Karuk and Yurok) hopes to impart respect and recognition for Indian people. Her experiences with attitudes on the part of teachers and students have been similar to Vivien's. The notion that California Indians were gone a long time ago comes up repeatedly. As Genny explains,

That's the way the attitude is with the teachers, that there are no California Indians. That they're gone. They're no more. But there are a lot of us around. The teachers should know that. Whether [the teachers] say it or not the attitude is that they're [Indian people] only in the books.

Even after meeting her, many teachers don't let go of their misperceptions:

They don't get it anyway because I'm sitting in my street clothes. I don't usually wear a lot of Indian clothing to my presentations. I just wear my [basket] hat. It takes more than just telling them I'm here... because the books didn't say it... I think they believe the books more than they do me.

Some non-Indian children Genny has met act out their stereotypes by skipping around and making whooping sounds when the subject of Indians comes up.

They also lack knowledge of the diversity of Indian cultural systems and traditions. Instead, they think in terms of popularized images of painted faces and feather headdresses, lacking knowledge of which groups did and didn't do these things and the special circumstances in which they were done.

Through her work, Genny has concluded that the most important thing that could be done to improve programs designed to teach about California Indian cultures, and other cultures, is to require educators to take a course which fosters sensitivity toward other ethnic groups. Genny also feels it's imperative that California Indian education programs not confine themselves to what happened prior to 1850; teachers should "...study and read the research about what happened since then."

Vivien also emphasizes the teaching of history. As she explains,

All kids should know who they are and be proud of who they are... Before it was so bad to be an Indian that you were ashamed, or you had to be somebody else. Many of the people would say I'm Filipino, or I'm from Canada. I'm from the dark French or whatever. They'd be anything except Indian. At one time, being Indian was so bad, if you got an education, it didn't do any good anyway. They wouldn't hire you... You think anybody would go to a doctor? The banks wouldn't hire you. Nobody would hire you because you were an Indian. And so in our minds being Indian was so bad, and we didn't really know why. Why was it so bad to be an Indian? But it's because of what they did to us, and they portrayed us that we were the savages. We were this and we were that. And we thought maybe we were...

[....] The truth will set you free. We can talk about the Holocaust. We can talk about all the things that happened other places, but you can't talk about what happened to the Indians. Our kids know it. We tell our kids. We all know it. And the hurt is still here. So how do you get rid of that hurt? The way to get rid of the hurt is to put it out. Let everybody know, and after awhile it will become history... The truth will set you free And our kids won't be so angry.

Such teaching is important at all grade levels and instills pride in children. As Vivien concludes, "Once you're proud of who you are, you don't have any more problems."

Bev Ortiz is a park naturalist, free-lance writer, and ethnographic consultant living in the East Bay. She has compiled a bibliography of teaching resources about the Indians of Central California.

Teaching Respect for Native Peoples

• Do present Native peoples as appropriate role models with whom a Native child can identify. • *Don't single out Native children, ask them to describe their families' traditions, or their people's cultures.* • *Don't assume that you have no Native children in your class.* • *Don't do or say anything that would embarrass a Native child.*

• Do look for books and materials written and illustrated by Native people. • *Don't use ABC books that have "I is for Indian" or "E is for Eskimo."* • *Don't use counting books that count "Indians."* • *Don't use story books that show non-Native children "playing Indian."* • *Don't use picture books by non-Native authors that show animals dressed as "Indians."* • *Don't use story books with characters like "Indian Two Feet" or "Little Chief."*

• Do avoid arts and crafts and activities that trivialize Native dress, dance, or ceremony. • *Don't use books that show Native people as savages, primitive craftspeople, or simple tribal people, now extinct.*

• *Don't have children dress up as "Indians," with paper-bag "costumes" or paper-feather "headdresses."* • *Don't sing "Ten Little Indians."* • *Don't let children do "war whoops."* • *Don't let children play with artifacts borrowed from a library or museum.* • *Don't have them make "Indian crafts" unless you know authentic methods and have authentic materials.*

• Do make sure you know the history of Native peoples, past and present, before you attempt to teach it. • Do present Native peoples as separate from each other, with unique cultures, languages, spiritual beliefs, and dress. • *Don't teach "Indians" only at Thanksgiving.* • Do teach Native history as a regular part of American history.

• Do use materials which put history in perspective. • *Don't use materials which manipulate words like "victory," "conquest," or "massacre" to distort history.*

• *Don't use materials which present as heroes only those Native people who aided Europeans.* • Do use materials which present Native heroes who fought to defend their own people. • Do discuss the relationship between Native peoples and the colonists and what went wrong with it.

• *Don't speak as though "the Indians" were here only for the benefit of the colonists.* • *Don't make charts about "gifts the Indians gave us."*

• *Don't use materials that stress the superiority of European ways, and the inevitability of European conquest.* • Do use materials which show respect for, and understanding of, the sophistication and complexities of Native societies.

• Do use materials which show the continuity of Native societies, with traditional values and spiritual beliefs connected to the present. • *Don't refer to Native spirituality as "superstition."* • *Don't make up Indian "legends" or "ceremonies."* • *Don't encourage children to do "Indian" dances.*

• Do use respectful language in teaching about Native peoples. • *Don't use insulting terms such as "brave," "squaw," "papoose," "Indian givers," "wild Indians," "blanket Indians," or "wagon burners."*

• Do show Native societies as living in a delicate balance with nature. • *Don't portray Native peoples as "the first ecologists."*

• Do use primary source material—speeches, songs, poems, writings—that show the linguistic skill of peoples who come from an oral tradition. • *Don't use books in which "Indian" characters speak in either "early jawbreaker" or in the oratorical style of the "noble savage."*

• Do use materials which show Native women, Elders, and children as integral and important to Native societies. • *Don't use books which portray Native women and Elders as subservient to warriors.*

• Do talk about lives of Native peoples in the present. • Do read and discuss good poetry, suitable for young people, by contemporary Native writers.

• Do invite Native community members to the classroom. • Do offer them an honorarium. Treat them as teachers, not as entertainers. • *Don't assume that every Native person knows everything there is to know about every Native Nation.*

Photograph of Sharon Williams, age 6, by Dorothy Hoogert from *Children of the First People*, published by Tillicum Library. We thank Brian Lam for permission.
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RESOURCES

The following is a listing of resources within the San Francisco and Monterey Bay areas that you may wish to visit for further enrichment in Ohlone culture.

COYOTE HILLS REGIONAL PARK

Programs at the main shellmound site allow visitors to see a reconstructed tule house, shade shelter, pit house, and sweat lodge. Public access to the site is by reservation only.
Annual public event, "A Gathering of Ohlone Peoples," in early October.
Located at 8000 Patterson Ranch Road, Fremont, CA 94555 (510) 795-9385

HENRY COWELL REDWOODS STATE PARK

Celebrate the Ohlone People of the past with those of the present at Ohlone Day in late September. Ohlone dancers and demonstrators share traditional basketry, songs, stories, tools, musical instruments, soap root brushes, and history.
Located at 101 North Big Trees Park Road, Felton, CA 95018 (831) 438-2396

CHITACTAC ADAMS HERITAGE COUNTY PARK

The park includes a self-guided interpretive walk, bedrock mortars and an interpretive shelter focusing on Ohlone Indian culture.
Located at 10001 Watsonville Rd., Gilroy, CA 95020 (408) 323-0107

SANTA CRUZ CITY MUSEUM OF NATURAL HISTORY

Framed by an enormous mural depicting every day life in an Ohlone village, the Native Peoples of Santa Cruz exhibit explores life in Santa Cruz prior to the arrival of Europeans. Artifacts, baskets and images bring to life the cultural traditions of local native people, both past and present.
Located at 1305 East Cliff Drive, Santa Cruz, CA 95062 (831) 420-6115

SANTA CRUZ MISSION STATE HISTORICAL PARK

Misión la Exaltacion de la Santa Cruz was the 12th mission built in California. It was completed during the 1790s. Mission Period Exhibit.
Located at 144 School Street, Santa Cruz, CA 95060 (831) 425-5849

SUNOL REGIONAL PARK

Bedrock mortars used by Native Americans for pounding acorns that were found in the area are reminders of Sunol's first inhabitants.
Located at 1895 Geary Road, Sunol, CA 94586 (925) 862-2600

SAN JOSE HISTORICAL MUSEUM

Displays include an Ohlone basket.
Located at 1650 Senter Road, San Jose, CA 95112 (408) 918-1047

BOOKS

HOW THE WORLD ENDED/HOW HUMMINGBIRD GOT FIRE/HOW PEOPLE WERE MADE
Rumsien Ohlone Stories told & illustrated by Linda Yamane, 1995
Oyate, 2702 Mathews St., Berkeley, CA 94702 (510) 848-6700

THE SNAKE THAT LIVE IN THE SANTA CRUZ MOUNTAINS & OTHER OHLONE STORIES
Told & illustrated by Linda Yamane, 1998
Oyate, 2702 Mathews St., Berkeley, CA 94702 (510) 848-6700

TJATJAKIYMATCHAN (COYOTE) - A LEGEND FROM CARMEL VALLEY
By Alex O. Ramirez, 1991
Oyate, 2702 Mathews St., Berkeley, CA 94702 (510) 848-6700

NATIVE WAYS: CALIFORNIA INDIAN STORIES AND MEMORIES
Edited by Malcolm Margolin and Yolanda Montijo, 1995
Heyday Books, PO Box 9145, Berkeley, CA 94709 (510) 549-3564

THE WAY WE LIVED: CALIFORNIA INDIAN STORIES, SONGS & REMINISCENCES
Edited with Commentary by Malcolm Margolin, 1981, 1993
Heyday Books, PO Box 9145, Berkeley, CA 94709 (510) 549-3564

IN FULL VIEW - THREE WAYS OF SEEING CALIFORNIA PLANTS
By Glenn Keator & Linda Yamane, 1995
Heyday Books, PO Box 9145, Berkeley, CA 94709 (510) 549-3564

IT WILL LIVE FOREVER - TRADITIONAL YOSEMITE INDIAN ACORN PREPARATION
By Bev Ortiz with photographs by Raye Santos, 1991
Heyday Books, PO Box 9145, Berkeley, CA 94709 (510) 549-3564

THE COSTANOAN/OHLONE INDIANS OF THE SAN FRANCISCO & MONTEREY BAY AREAS - A RESEARCH GUIDE
By Lauren S. Teixeira, 1997
Ballena Press, PO Box 2510, Novato, CA 94948

THE OHLONE PAST & PRESENT - NATIVE AMERICANS OF THE SAN FRANCISCO BAY REGION
Compiled & Edited by Lowell John Bean, 1994
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WEAVING A CALIFORNIA TRADITION: A NATIVE AMERICAN BASKET MAKER
By Linda Yamane with photographs by Dugan Aguilar, 1997
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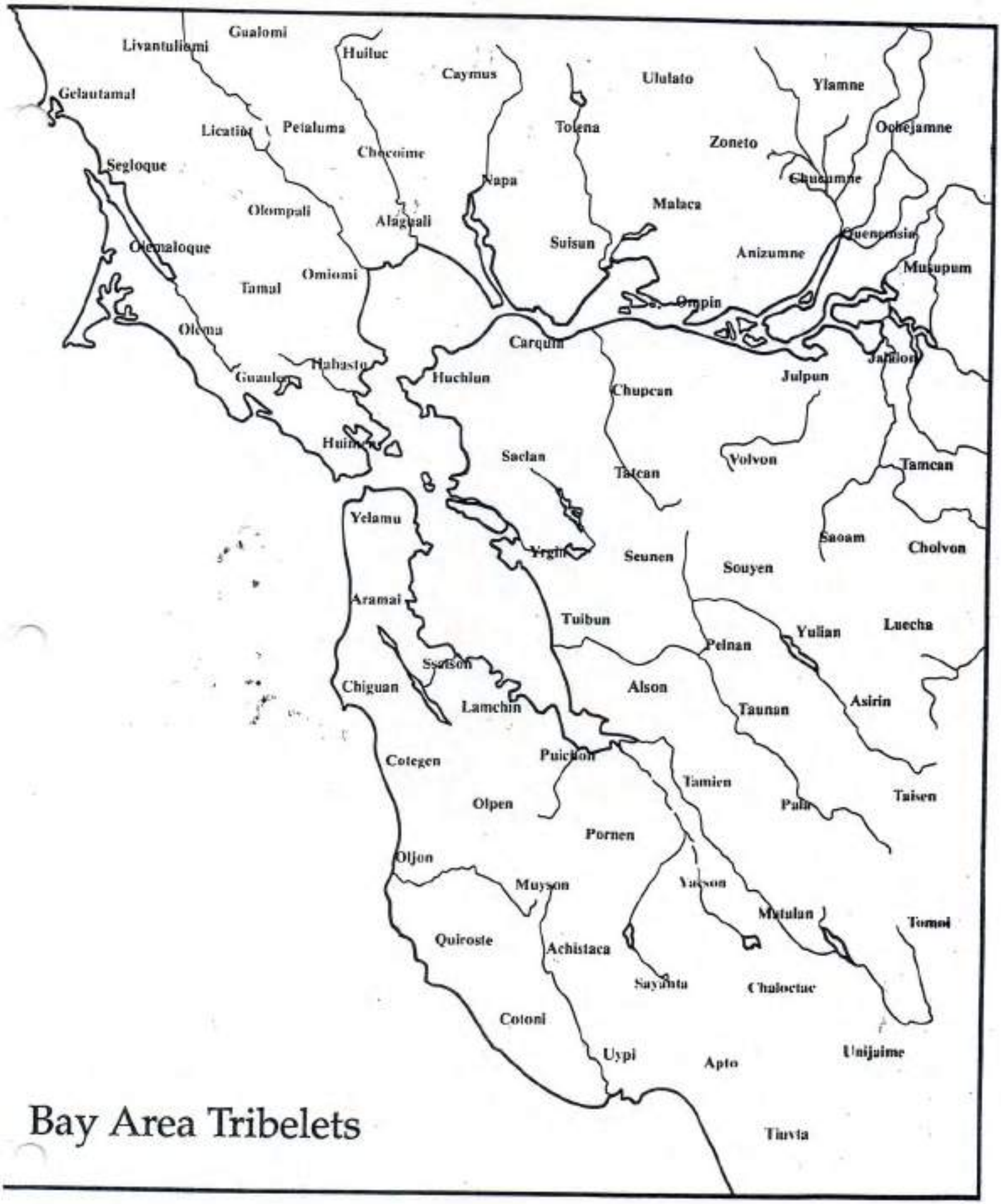


Bay Area Tribelets

EDIBLE FOOD

DOGBANE

CORDAGE

9. Activity Center Description

- Predators & Prey
- Birds & Nests
- Ohlone Staves Game

Activity Center Descriptions

From time to time a program will include some activity center items. All docents use these items in different ways and highlight different aspects of the materials. Find what works for you.

Predators and Prey:

The kit contains a skull, plastic scat, replica pelts, and a large laminated photo of each animal as you talk about predators and prey. As you become more familiar with the material, alter the presentation to fit your style.

Every skull tells a story. We can look at an animal's skull and tell whether it is predator or prey and we can look at its scat as well and see what it eats.

In nature there are animals that hunt and eat other animals (predators) and those that are eaten by predators (prey). All animals need to eat to survive, just like us. If there are too many of one kind of animal, it is bad for all the animals in the forest. Some animals eat only other animals (carnivores), some animals eat only vegetation (herbivores) and some animals eat both (omnivores). Predators can be as tiny as a ladybug or as big as a bear. Predators have keen senses (seeing, hearing, smell). Prey are often good at hiding or can camouflage, are very fast runners and may have other defense mechanisms.

Eyes

"Eyes on the side I hide, eyes in front I hunt." Predators have eyes in the front which makes their eyes like binoculars to find and track its prey (have children make binocular eyes on themselves). Both eyes can focus on the prey. Prey animals have eyes on the side so they can see all around them to look for predators.

Ask the children to put their two thumbs and index fingers together with their palms facing out. Lift their hands to the bridge of their noses. Be sure eyes are not covered but merely obscured. This is what deer see. They cannot see what is directly in front of them.

Teeth:

Predators have sharp teeth for catching and holding prey. Their teeth are like knives and forks. Prey animals often have flatter teeth to grind up the vegetation that makes up their diet. Omnivores have a mix of sharp and flat teeth.

Scat:

If the animal is a prey animal and eats vegetation, its scat is in small balls or pellets, predator carnivores have scat that is long like a tube and pointed at both ends. Omnivore scat appears more like an oval or plop.

Show the children a skull and have the children tell you what they know about the animal just by looking at the skull (predator or prey based on eyes and teeth). Show examples of scat and have them guess which scat matches the skull. Finally, show them the picture of

the animal. Presenting in this order contrasts features of the skull and scat: Deer, Mountain Lion, Rabbit, Coyote, Woodrat, Bobcat, and Raccoon.

Deer
Deer have long legs that are good for running and jumping. Male deer grow antlers each year. Male deer are called “bucks,” females are called “does,” and babies are called “fawns.” By looking at their prints on the ground you can tell whether it is a male or female, whether walking or running, and what directions they are going.

Mountain Lion
Mountain Lions are also known as pumas and cougars. Their main food source is deer, but they also eat coyotes and raccoons. They are very fast hunters. Mountain lions are solitary and do not like to be around people.

Jack Rabbit
Jack rabbits can hop really fast – as fast as a car! They have very big ears to stay alert to predators. Their eyes are on the side. Jack rabbits eat mostly grass and shrubs and they eat at night. Jackrabbit teeth are always growing because their food grinds down their teeth.

Coyote
Coyotes have a very good sense of smell that helps them find food and avoid predators. Coyotes eat mostly small mammals like rabbits, squirrels and mice. Coyotes hunt at night and can run very fast. Coyotes hunt and live in groups. Native American tales often feature the coyote and he was thought to be very smart and cunning. Coyotes communicate with each other using howls and yelps (the children might want to try howling like a coyote).

Woodrat
Ask the children if they were able to see a woodrat nest if they hiked already or tell them to keep an eye out when they do hike. Woodrats are also known as pack rats because they like to collect things in their dens. They eat many of the leaves, nuts and berries from plants living in the park.

Bobcat
Bobcats are about twice as big as a house cat. Bobcats prefer to eat rabbits but will dine on rodents, birds and bats. Bobcats like to be alone. Bobcats live in a den and are very territorial. Their coats are always spotted and they got their name from their short tail.

Raccoon
Raccoons are nocturnal omnivores. They like to eat insects, worms, fruit, nuts, fish and eggs. They will scavenge for food, even in the trash! Raccoons are very smart animals.

Birds and Nesting:

The kit has a wide variety of bird nests, eggs and plush birds. Have children handle materials carefully as you talk about how birds make nests. Have children tell you what they think the bird used to make each nest.

Birds make their home in nests and also lay eggs and care for babies in them. Birds build their nests from things all around them in nature. Nests are often made from grass, twigs, leaves, feathers, animal hair, and mud. Nests have to be strong to stay together under any type of weather. Nests can be found in many places-on the ground, in trees, in cliffs on mountains, and even inside holes in trees.

Birds have beaks instead of teeth so they are light enough to fly. Different beaks on birds tell the story of what they eat. Long beaks are good for probing, hooked beaks are good for tearing, thick beaks crunch seeds, and thin beaks allow for catching bugs to eat.

Western Scrub Jays

Western Scrub Jays like to live in Oak and Redwood forests. Some people call them blue jays, but their correct name is Scrub Jay. They like to eat insects, spiders, snails, nuts and berries. Jays usually forage in flocks for food. They are noisy in their calls to each other. They can mimic the sounds of a hawk and use it to warn or even trick other species. Jays are in the same family as the crow.

Great Horned Owl

This owl has tufts of feathers on its head that makes it look like it has horns. This owl likes to hunt at night and eats rabbits, hawks, snakes and rodents. The owl looks for prey from far up in a perch and then swoops to catch its dinner. It has very good hearing and eyesight. Owls will sometimes eat their prey whole and then regurgitate (throw up) bones, fur and other undigested materials (show the children the owl pellet).

Woodpecker

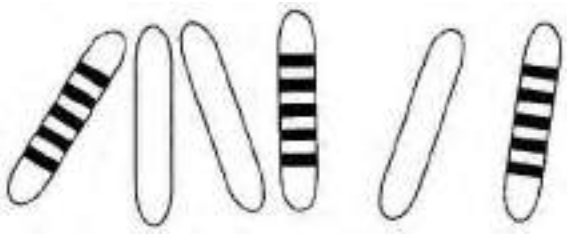
Eats mostly insects and looks for them by scraping away bark and digging with its beak. They also eat acorns and other seeds and berries. They make holes in dead tree trucks and store acorns in them for the winter. This is called a granary. Woodpeckers have very long tongues that coil up inside its skull. Nests in a cavity inside a dead limb or tree. Woodpeckers don't make calls like many other birds, they drum with their beaks to communicate. The Acorn Woodpecker, Pileated and Common Flicker are most seen in Huddart Park.

Hummingbirds

Hummingbirds are among the smallest of all birds and are named that because of the sound their rapidly beating wings make. Hummingbirds drink nectar from flowers (that's why they usually have a long bill). Hummingbirds are expert flyers – they can hover, fly backwards and even upside down.

Red-tailed Hawk
Eats rats, rabbits, squirrels, birds and reptiles. Hawks are beautiful to watch when flying and soaring in the sky. Red-tailed hawks have a pouch above their stomachs. When the stomach gets full, the food stays in the pouch and is released slowly over time into the stomach to be digested. Because of this pouch a hawk doesn't have to hunt as often, it can "store" some of its food!

Robins
You will often see robins in your neighborhood. They are easy to spot with the reddish-orange breast. Eats mostly insects, worms, berries and hunts in flocks.



The Stave/Stick Game

History

The stave game is an Ohlone game of chance. It was played with six sticks, usually made from an elderberry or willow tree; the sticks were small sections of branches cut in half. The round side of the stick was decorated and the flat side was left plain. The Ohlone created geometric patterns using red, black and white.

Rules

The stave game is played with six wooden staves. The staves are each round or marked on one side, flat or plain on the other. Counting sticks are used for keeping score, one stick for each point The player or team who wins all the sticks wins the game.

- One player takes all six staves in their hands and tosses them lightly.
- If they land three up and three down, the player gets one point and another turn
- If they land all up or all down, the player gets two points and another turn
- If they land any other way, the player gets no points and the staves go to the next player.

THE GAME OF STAVES
By David W. Peri

Of the many games played by California Indians, games of chance were among the most favorite. There were separate gambling games for men and women and games in which they participated together. Such games were not simply recreational, but had important roles in the overall culture. They were often the means by which disputes were settled, they functioned to relieve tension and anxiety between individuals and groups; they served to redistribute wealth and provided opportunities for persons to achieve status because of their skill, and they served as a means whereby individuals received recognition for their ability to restrain their personal desires, since success at gambling demanded the adherence to special rules in order to acquire and ensure a person's luck.

Some groups came to be known for their gambling skills; for example, the Kashaya or Southwestern Pomo were known by the Coast Central Pomo of Point Arena as the "Expert Gambling People." The stave game, although a women's game for most California Indians, was always played by both men and women among some groups, and today is played by many without regard to gender. In general, the game is played by two opposing players or sides and consists of tossing six wooden staves, accompanied by the singing of special gambling or "luck" songs to ensure a player's or team's success. And, depending upon how the staves land, points, twelve in all, are won or lost until one player or side has them all and wins the game, including the bets.

Various items were used as bets or wagers, which was especially the case from the 1800s to the early 1900s. A bet could be anything from clamshell beads to magnesite or "Indian gold", hides, bows, baskets, belts of shell beads or feathers, blankets, guns, ironware, wagons, buggies, gold and silver coins, clothes, or almost anything else that the players could agree upon. Bets were made between the two sides and could be contributed to by onlookers and supporters of each side. Side bets between individual bystanders were also made. Players and bystanders could also wager on individual throws as well as on the outcome of the game. Attention was focused on each throw of the "sticks", and points were won or lost depending upon how they fell.

Elsie Allen, Makahmo Pomo weaver, told of an event, which took place around 1915. "When I was a little girl, maybe about ten, the Cloverdale people and the Dry Creek people got together for a doings. There was a hand game and a stick game going on. I don't know just how many games they played, but it seemed like they played all the time; they went all night too. There was this woman married to a Dry Creek man who was playing too. They had lots of money because she came in a two-horse buggy, had an umbrella, lots of good blankets on the seat, and a suitcase (most had flour sacks for our clothes when we traveled), and she had on clothes like the white ladies would wear, and a purse that sounded like she had bells in it".

“This lady, sometimes she would get almost all the sticks (counters), and then she would just about lose them all. Before the people had something to eat in the morning, she’d lost just about everything: her money, the horses, the buggy, her shoes, hat, underskirts, even her blouse. She said she wanted to play one more game and give her luck a chance to win. The other side wanted to know if she was going to bet her skirt since she didn’t have anything else. She said no; she wasn’t going to bet that. She said ‘How much will you give me for my husband; I’ll bet my husband. He’s worth something. How much will somebody give me?’ All the ladies and the young women laughed at this; they thought to themselves that he must not be very good if this lady wants to bet him. Everybody laughed about her bet; but, you know, they were probably right; he probably wasn’t much good.”

10. Supplemental Materials & Articles

- Chaparral, Riparian, Broadleaf & Evergreen communities
- How does the chaparral do it?
- Why do some trees lose their leaves?
- Spider Webs
- Arthropods of Huddart Park
- Logging in the redwoods
- Environmental Volunteers Guide to Huddart Park

How The Chaparral Does It!

Stepping from the shady woods into the area where chaparral grows, feel the difference in temperature. It's hotter, usually drier. Notice the single layer of dense bushes with very little growing under this canopy; tall trees are lacking. This is chaparral; not a single species, but a community of plants adapted to California's dry summers, and often found on steep slopes where the soil is thin and rocky. The word "chaparral" comes from Spain, where "Chaparro" is an evergreen scrub oak (not the same species as our California scrub oak). The suffix "-al" means "the place of." When the Spanish explorers arrived, they saw a type of vegetation that reminded them of home.

Chaparral (or an analogy of our chaparral) is found only in a handful of places on earth. All have mild winters followed by warm, dry summers, and are near oceans (modifiers of extreme temperatures). These places include coastal California, around the Mediterranean Sea, the west coast of Spain and Portugal, South Africa, the west coast of Chile, and southwest Australia. Although these places are widely separated geographically, their plants have responded in similar ways to the common climatic patterns (co-evolved). As a result, the plants look amazingly alike although the species are different.

Question: If the soil is sandy or rocky and thin on the steep hillsides and therefore doesn't hold water very well, how do plants get needed moisture—what sort of root systems might they have?

Answer: The roots grow very deep to tap ground water or they may be shallow and wide spreading to capture the available surface water.

Question: If wilting can cause irreversible damage to plant cells, how might a plant prevent wilting?

Answer: By having tough, rigid stems—notice the ceanothus. If possible, compare a large, soft leaf from a streamside tree (carry one with you) with a small, chamise leaf. A large leaf surface is not needed here where there is lots of light for photosynthesis. Water loss is the problem here!

Question: How can leaves cut down on the amount of water vapor lost during transpiration?

Answer: a) By being small, leathery, and, b) waterproofed with a waxy or resinous coating or heavy cuticle, or, c) insulated with a dense mat of hairs (see with a hand lens), or, d) shiny or covered with white hairs to reflect sunlight, e) by presenting leaf edges rather than larger leaf surface to the sun(eg, manzanitas), f) by having fewer or recessed stomata (pores where gas exchange takes place and water vapor is lost), , or, g) curling leaves (coffee berry) or even leaf dropping (eg, California Buckeye) during drought periods reduces surface area where water can be lost.

Question: Why is it advantageous for a plant to be evergreen if the growing season is short (because of the brief period when there is enough water and warmth for growth)?

Answer: The plant is ready when conditions are right to grow and reproduce, and time and energy is not expended in the production of a new crop of leaves.

Question: How do plants compete successfully where water and nutrients are in short supply?

Answer: a) Some plants, eg, yerba santa, send out long underground stems which sprout new plants in neighboring areas where the competition for water would be too great for a seedling to survive. Proof that the young plants are not seedlings has been demonstrated by placing radioactive compounds on the parent plant and monitoring radioactivity soon afterwards in the distant young sprouts.

b) Some plants engage in a kind of "chemical warfare" (allelopathy). They accumulate toxic, water-soluble compounds as a result of normal metabolic processes. Fog drip and rain carry these toxins to the soil where they inhibit the growth of competing plants.

Question: How do plants attract insect pollinators but avoid being eaten by the insects and animals such as deer?

Answer: a) By having spines, thorns, or prickles that might discourage browsers. **b)** The silica in coyote brush leaves and the hard (sclerotic) leaves of chamise can wear down the teeth or chewing mouth parts of predators, and the life span of their teeth is critical to the life span of deer and other animals. **c)** Sticky monkey flowers produce volatile compounds called terpenes which discourage consumption by certain butterfly larvae.

Fire in the chaparral

The adaptations of chaparral which make it drought tolerant also make it very fire-susceptible. The plants are full of oils, waxes, and resins. The interlocked, dead, dry twigs—and in 30 year old stands of chaparral up to 50% of the organic material may be dead—fuel hot, quick-spreading, even explosive, fires.

But chaparral is thought by some to be "fire dependent." Now, land managers, instead of always suppressing fires, sometimes conduct "prescribed burning" to reduce fuel load and the danger of wildfires and to increase the "vitality of the chaparral."

Question: How do chaparral plants survive and, in many ways, benefit from periodic fires?

Answer: a) Some species recover quickly after a fire by crown sprouting. Chamise, scrub oak, and many manzanitas have a large burl below the soil surface which doesn't burn. It

can sprout without rain, drawing on food stored in the extensive root system so the plant can regenerate right away, even in a dry summer.

b) Species such as ceanothus and some manzanitas reproduce by seeds that need heat to sprout. Fire mechanically damages the seed coat or breaks down its oils, making it more permeable to water and permitting it to germinate. **c).** Fire clears an area, allowing light to enter and nutrients to be returned to the soil. The toxic substances given off by the chaparral species to inhibit competition are not volatilized. In studies where soil beneath chaparral plants is removed, heated and then returned to its original location, herbaceous annuals and grasses grow where previously they were absent. Distinctive "fire flowers" make their appearance after a fire, sprouting from seeds lying dormant in the soil since the last fire. There follows a succession of plant species until, after about seven years, the preburn chaparral plants dominate the landscape again.

Common plants of the chaparral community are:

Chamise	Manaznita	Coyote Brush
Ceanothus	Toyon	Scrub Oak
Yerba Santa	Holly Leaf Cherry	Deerweed
Coffee Berry	Poison Oak	Tree Poppy
Red Berry	Silk Tassel	Virgins Bower
Soap Plant	Fremont's Star Lily	

Birds often seen or heard in chaparral (Many are brown and drab to blend into their surroundings)

Wrentit	Thrasher	California Quail
Brown Towhee	Scrub Jay	Rufous-sided Towhee

Mammals are small to slip through the thicket and benefit from the protective cover:

Grey Fox	Mice	Dusky-footed Wood Rat
Brush Rabbit	Gopher	Ground Squirrel

Reptiles:

Pacific Rattlesnake	Gopher Snake	Fence & Alligator Lizards

WHY LEAVES CHANGE COLOR

If you are lucky, you live in one of those parts of the world where Nature has one last fling before settling down into winter's sleep. In those lucky places, as days shorten and temperatures become crisp, the quiet green palette of summer foliage is transformed into the vivid autumn palette of reds, oranges, golds, and browns before the leaves fall off the trees. On special years, the colors are truly breathtaking.

How does autumn color happen?

For years, scientists have worked to understand the changes that happen to trees and shrubs in the autumn. Although we don't know all the details, we do know enough to explain the basics and help you to enjoy more fully Nature's multicolored autumn farewell. Three factors influence autumn leaf color-leaf pigments, length of night, and weather, but not quite in the way we think. The timing of color change and leaf fall are primarily regulated by the calendar, that is, the increasing length of night. None of the other environmental influences-temperature, rainfall, food supply, and so on-are as unvarying as the steadily increasing length of night during autumn. As days grow shorter, and nights grow longer and cooler, biochemical processes in the leaf begin to paint the landscape with Nature's autumn palette.

Where do autumn colors come from?

A color palette needs pigments, and there are three types that are involved in autumn color.

- *Chlorophyll*, which gives leaves their basic green color. It is necessary for photosynthesis, the chemical reaction that enables plants to use sunlight to manufacture sugars for their food. Trees in the temperate zones store these sugars for their winter dormant period.
- *Carotenoids*, which produce yellow, orange, and brown colors in such things as corn, carrots, and daffodils, as well as rutabagas, buttercups, and bananas.
- *Anthocyanins*, which give color to such familiar things as cranberries, red apples, concord grapes, blueberries, cherries, strawberries, and plums. They are water soluble and appear in the watery liquid of leaf cells.

Both chlorophyll and carotenoids are present in the chloroplasts of leaf cells throughout the growing season. Most anthocyanins are produced in the autumn, in response to bright light and excess plant sugars within leaf cells.

During the growing season, chlorophyll is continually being produced and broken down and leaves appear green. As night length increases in the autumn, chlorophyll production slows down and then stops and eventually all the chlorophyll is destroyed. The carotenoids and anthocyanins that are present in the leaf are then unmasked and show their colors.

Certain colors are characteristic of particular species. Oaks turn red, brown, or russet; hickories, golden bronze; aspen and yellow-poplar, golden yellow; dogwood, purplish red; beech, light tan; and sourwood and black tupelo, crimson. Maples differ species by species-red maple turns brilliant scarlet; sugar maple, orange-red; and black maple, glowing yellow. Striped maple becomes almost colorless. Leaves of some species such as the elms simply shrivel up and fall, exhibiting little color other than drab brown.

The timing of the color change also varies by species. Sourwood in southern forests can become vividly colorful in late summer while all other species are still vigorously green. Oaks put on their colors long after other species have already shed their leaves. These differences in timing among species seem to be genetically inherited, for a particular species at the same latitude will show the same coloration in the cool temperatures of high mountain elevations at about the same time as it does in warmer lowlands.

How does weather affect autumn color?

The amount and brilliance of the colors that develop in any particular autumn season are related to weather conditions that occur before and during the time the chlorophyll in the leaves is dwindling. Temperature and moisture are the main influences.

A succession of warm, sunny days and cool, crisp but not freezing nights seems to bring about the most spectacular color displays. During these days, lots of sugars are produced in the leaf but the cool nights and the gradual closing of veins going into the leaf prevent these sugars from moving out. These conditions-lots of sugar and lots of light-spur production of the brilliant anthocyanin pigments, which tint reds, purples, and crimson. Because carotenoids are always present in leaves, the yellow and gold colors remain fairly constant from year to year.

The amount of moisture in the soil also affects autumn colors. Like the weather, soil moisture varies greatly from year to year. The countless combinations of these two highly variable factors assure that no two autumns can be exactly alike. A late spring, or a severe summer drought, can delay the onset of fall color by a few weeks. A warm period during fall will also lower the intensity of autumn colors. A warm wet spring, favorable summer weather, and warm sunny fall days with cool nights should produce the most brilliant autumn colors.

What triggers leaf fall?

In early autumn, in response to the shortening days and declining intensity of sunlight, leaves begin the processes leading up to their fall. The veins that carry fluids into and out of the leaf gradually close off as a layer of cells forms at the base of each leaf. These clogged veins trap sugars in the leaf and promote production of anthocyanins. Once this separation layer is complete and the connecting tissues are sealed off, the leaf is ready to fall.

What does all this do for the tree?

Winter is a certainty that all vegetation in the temperate zones must face each year. Perennial plants, including trees, must have some sort of protection to survive freezing temperatures and other harsh wintertime influences. Stems, twigs, and buds are equipped to survive extreme cold so that they can reawaken when spring heralds the

start of another growing season. Tender leaf tissues, however, would freeze in winter, so plants must either toughen up and protect their leaves or dispose of them.

The evergreens-pines, spruces, cedars, firs, and so on-are able to survive winter because they have toughened up. Their needle-like or scale-like foliage is covered with a heavy wax coating and the fluid inside their cells contains substances that resist freezing. Thus the foliage of evergreens can safely withstand all but the severest winter conditions, such as those in the Arctic. Evergreen needles survive for some years but eventually fall because of old age.

The leaves of broadleaved plants, on the other hand, are tender and vulnerable to damage. These leaves are typically broad and thin and are not protected by any thick coverings. The fluid in cells of these leaves is usually a thin, watery sap that freezes readily. This means that the cells could not survive winter where temperatures fall below freezing. Tissues unable to overwinter must be sealed off and shed to ensure the plant's continued survival. Thus leaf fall precedes each winter in the temperate zones.

What happens to all those fallen leaves?

Needles and leaves that fall are not wasted. They decompose and restock the soil with nutrients and make up part of the spongy humus layer of the forest floor that absorbs and holds rainfall. Fallen leaves also become food for numerous soil organisms vital to the forest ecosystem.

It is quite easy to see the benefit to the tree of its annual leaf fall, but the advantage to the entire forest is more subtle. It could well be that the forest could no more survive without its annual replenishment from leaves than the individual tree could survive without shedding these leaves. The many beautiful interrelationships in the forest community leave us with myriad fascinating puzzles still to solve.

http://www.na.fs.fed.us/fhp/pubs/leaves/leaves.shtm

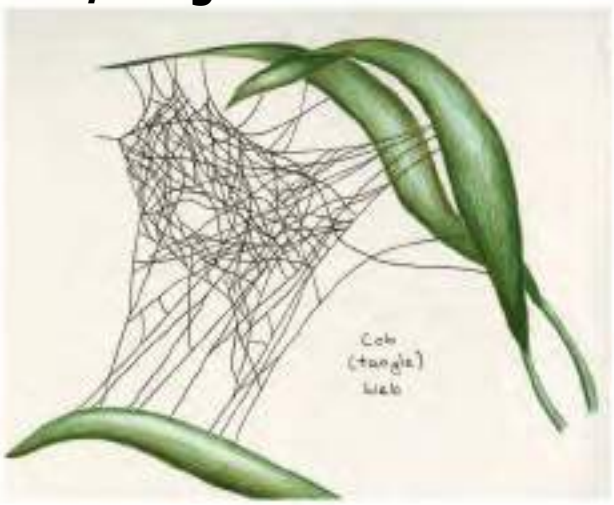
Your Guide to Spidering

Know your spider webs!

Read the story at:
BayNature.org/Spiders

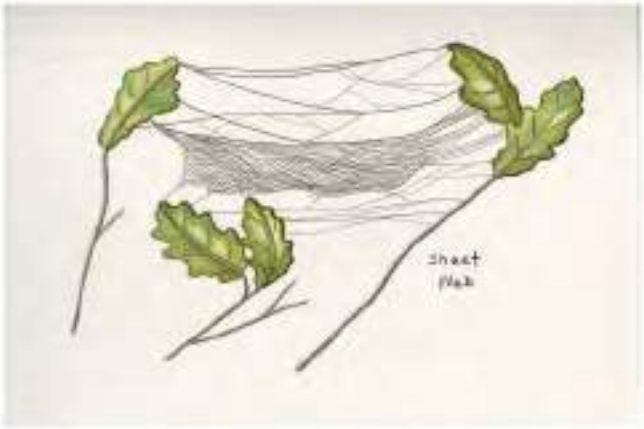
BAYNATYPE

Cob/Tangle Web



Cob, or tangle webs, may look messy but there's a strategy. The littery web is secured in space by an upper trellis with strands of high-tension catching threads that reach to a substrate and are lined with sticky droplets. A crawling insect breaks the strand and is drawn up into the web.

Sheet Web



Illustrations by Rachel Diaz-Bastin

Sheet webs are like deadly hammocks, strung across grass or leaves. They consist of a dense mass of threads with a maze of crisscrossing trip threads strung above the sheet. An insect flies into a thread and is knocked off course into the net below

Orb Web

Orb webs are wheel-shaped webs designed to capture flying insects. The frame is made of durable silk, while the spokes are of an elastic capture thread lined with sticky droplets to secure the victim.

Woolly Web

Woolly webs capture with electrostatically-charged silk nanofibers, rather than adhesive silk — kind of like cling wrap. The organ that produces this silk, the cribellem, is a primative

Funnel Web

Funnels can be a main feature of web design and pretty impressive. Typically a sheet spans the exterior of the funnel, which is used to entangle prey, and the spider waits in its funnel retreat for the springy web to vibrate.

Get up close with a spider:

Here's what you'll need if you want to take spidering to the next level and examine one:

- Pooter
- Hand lens
- Trowel
- Headlamp or flashlight
- Plastic vials or zip lock bags for safely inspecting specimens BUT PLEASE DON'T COLLECT THEM!

California Bumble Bee
Bombus californicus

*Honey Bee
Apis mellifera

Spiny Leaf Gall Wasp
Diplolepis polita

Tarantula Hawk Wasp
Pepsis sp.

Western Yellowjacket
Vespula pensylvanica

*European Paper Wasp
Polistes dominula

Silvery Field Ant
Formica argentea

Carpenter Ant
Camponotus sp.

Yellow-spotted Millipede
Harpaphe haydeniana

Millipede
Paeromopus angusticeps

Funnel Weaver
Agelenidae

Sierra Dome Spider
Neriene litigiosa

Wolf Spider
Lycosidae

California Turret Spider
Antrodiaetus riversi

* Non-native species

For more info on iNaturalist:
https://www.inaturalist.org/observations?place_id=50082&subview=grid

Photo credits: Jennifer Rycenga (grasshopper), Merav Vonshak (rest)

For more info on BioBlitzes: merav.von@gmail.com

Huddart Park
Arthropods

Skimmer Dragonfly
Libellulidae

Cardinal Meadowhawk
Sympetrum illotum

Common Water Strider
Aquarius remigis

Giant Water Bug
Belostomatidae

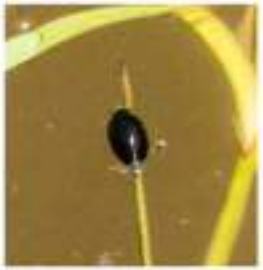
Bristletail
Archaeognatha

Wing-tapping Cicada
Platypedia sp.

Dancer Damselfly
Argia sp.

Pacific Forktail
Ischnura cervula

Isopod (aquatic)
Ligidium latum



Whirligig Beetle
Gyrinidae

Jerusalem Cricket
Stenopelmatus sp.

Camel Cricket
Pristoceuthophilus sp.

Stream Mayfly
Heptageniidae

Caddisfly larva and case
Trichoptera

CA Night-stalking Tiger Beetle
Omus californicus

Snail-eating Beetle
Scaphinotus sp.

Fontana Grasshopper
Trimerotropis fontana

*European Mantis
Mantis religiosa

Water Boatmen
Corixidae

Backswimmers
Notonectidae

Convergent Ladybeetle
Hippodamia convergens

Black-tailed Jackrabbit
Lepus californicus

California Sister
Adelpha californica

Red Admiral
Vanessa atalanta

Logging in the Redwoods

Until the gold rush in 1849, San Francisco was a relatively quiet port, handling cargo and delivering supplies for the European and Mexican settlers and the missions and presidios in the greater Bay Area.

With the gold rush came thousands of settlers from all over the world looking for their pot of gold and they needed a place to live. The tall redwood forests in the Woodside area was soon tagged as a prime source for lumber to build San Francisco. Near the borders of Huddart Park, five saw mills operated between 1853 and 1860 and one of these was Richards Sawmill, located on Skyline Ridge. From this mill, Richards Road followed a route south along Skyliine Ridge to the northern slope of McGarvey Gulch and then down to West Union Creek and south to the Tripp Store a total distance of about four miles.

Many redwood trees in the area were massive..eight feet or more in diameter and 200 plus feet tall. For the larger trees it would take a crew up to a week or more to fell the tree, strip the bark and limbs, cut it into sections eight to ten feet long and drag them to the mill. Most of the milling was close to where the trees were cut to avoid dragging long distances. Often the log sections were brought to the mill using "skid rows" , a trench about eight feet wide lined with small logs four feet or so long and placed horizontally in the trench. Then, in the early days, oxen were encouraged by the bull master to drag the sections down hill to the mill.

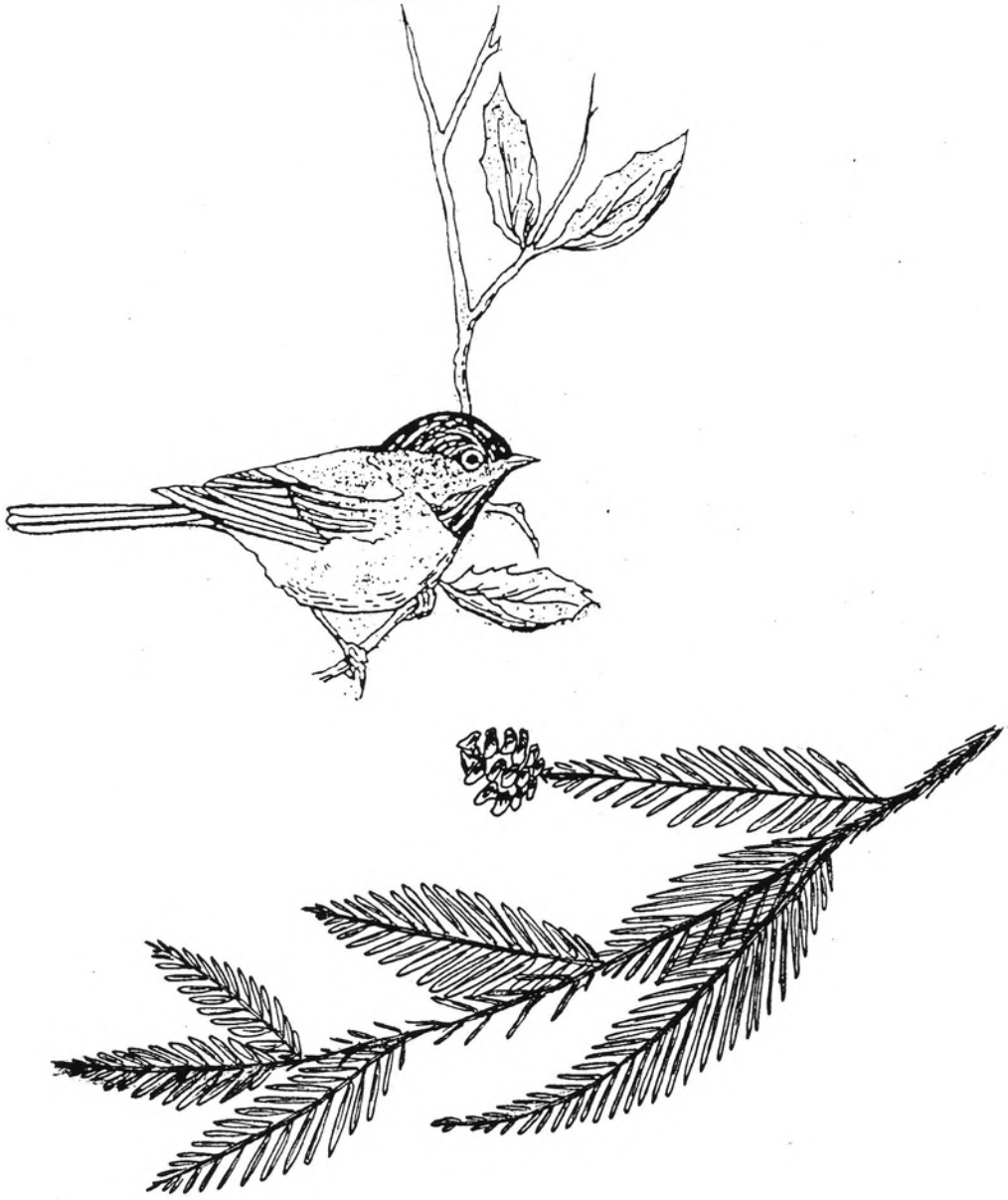
Richards Rd. may, in fact , have served as a "skid row" but more probably, the road was used to transport wood in large wagons down from Skyline to Redwood City for shipment on barges to San Francisco or perhaps San Jose. Much of the wood so transported was cut for rail road ties, fence posts and wide shakes used for roofing and house siding.

So, when hiking down Richards Rd., imagine a wagon 20 ft.long, or a double wagon twice as long, loaded with fence posts and rail road ties pulled by 4 to 6 teams of horses or mules down steep Richards Rd (now a hiking trail and fire road) the driver standing on the brake and the mules a bit worried that the loaded wagons will run over them.. Ah, those were the days.

By Tom Davids (03/2017)

Huddart County Park

Chickadee and Redwood Nature Trails Site Guide



September 2001

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and posthumously, Harry Dean, whose spirit lives on in our continued work to make this park accessible to everyone.

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INTRODUCTION

The Chickadee Nature Trail in Huddart County Park allows the interested observer to experience a wide variety of ecosystems within a small area. The entire loop trail is 3/4 mile long. The Redwood trail offers a self-guided trail walk complete with labeled trees and brush. This trail is a 1 1/4-mile loop. Information about the history of this area, including human impact, a tour of the trails with suggested activities, additional activities from which a docent may choose those appropriate to the group being served, and a catalog of California Indian uses of native plant and animal species are included in this guide.

HUDDART PARK TRAIL GUIDE OBJECTIVE

This guide is intended to supplement the Environmental Volunteers' Forest/Foothill Program for the EV North County area, and to provide some understanding of the native flora and fauna, as well as the ecosystems present along this trail. The guide was developed for use by trained docents of Huddart County Park and the Environmental Volunteers, but may also be used to those who have a simple understanding of, and love for, the environment. It is intended to enhance the educational experience of these trails for anyone from age 5 to age 105. The Chickadee trail itself is accessible to almost everyone, being nearly level and finely graveled. It is one of the few wheelchair accessible trails. The Redwood trail is an easy to moderate hiking trail on compacted dirt.

EV MISSION

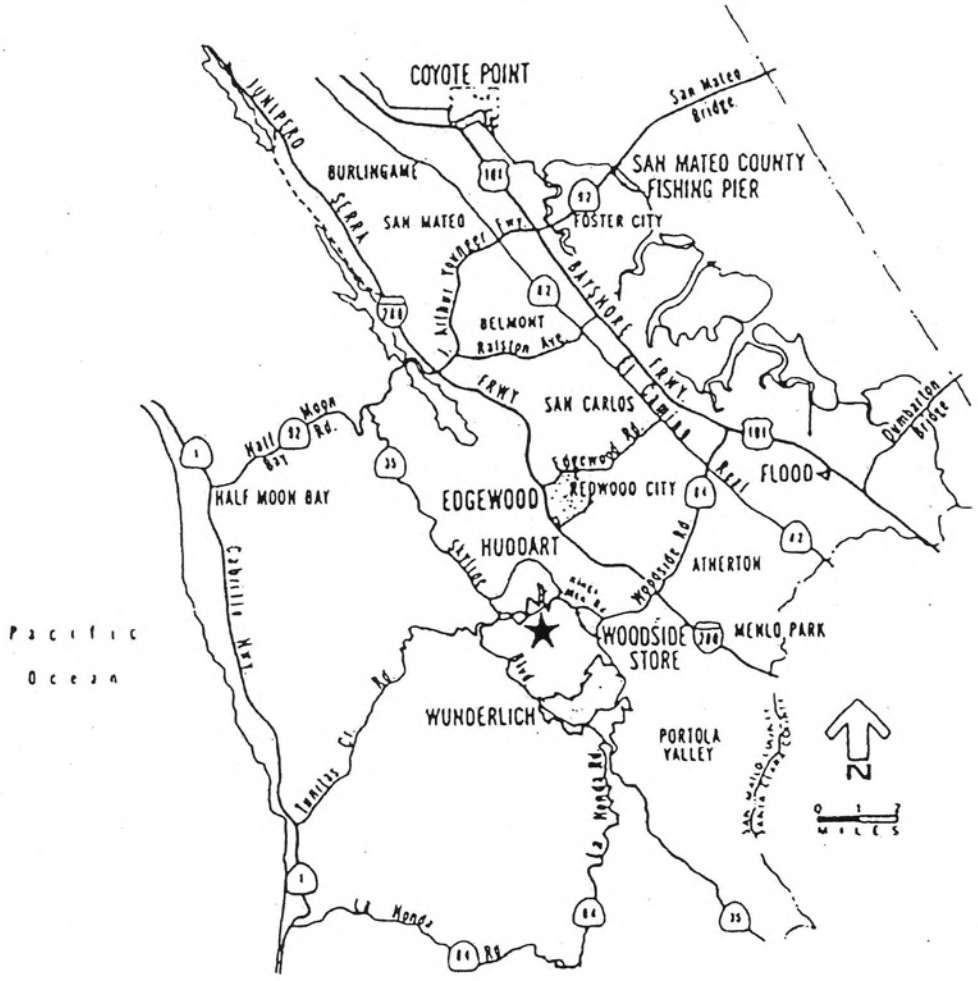
The Environmental Volunteers' mission is to promote understanding of, and responsibility for, the environment through hands-on science education.

The Environmental Volunteers works to achieve this mission by:

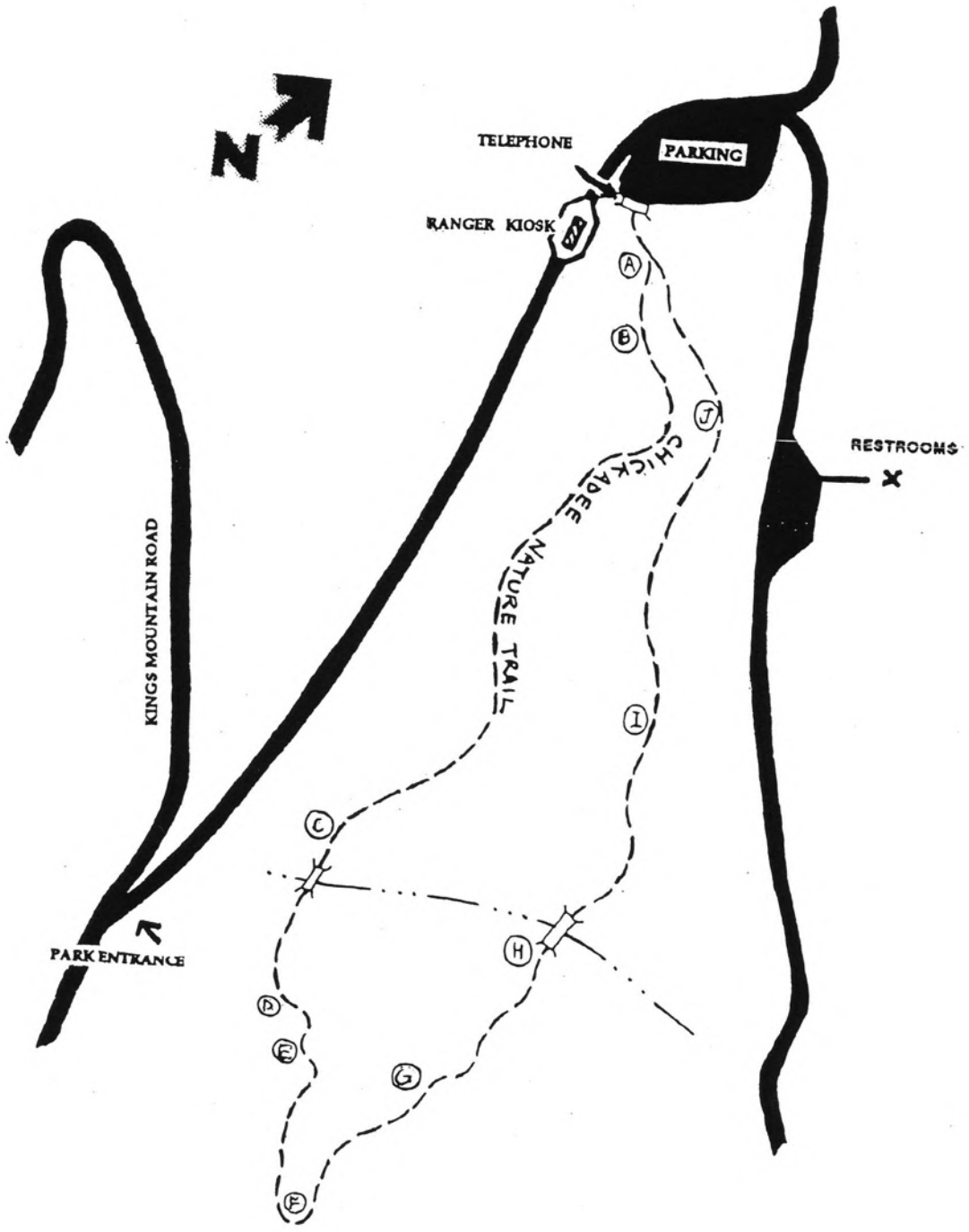
- Encouraging community awareness of the interrelationships of humans with the environment,
- Giving those reached the tools to be able to make informed decisions about the environment,
- Fostering in the community an attitude of stewardship and responsibility for the environment.

DIRECTIONS TO HUDDART COUNTY PARK

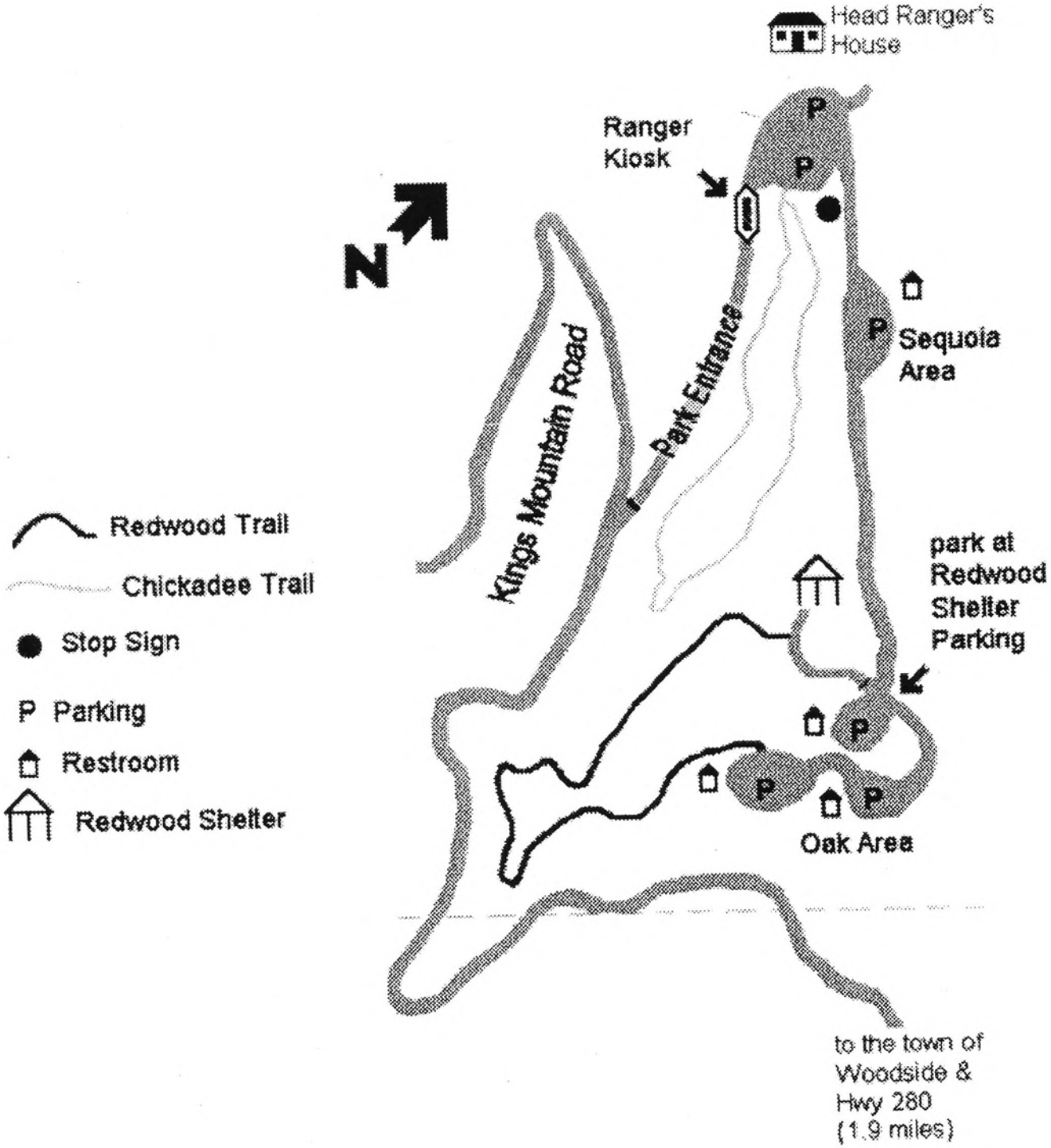
From 280, take Woodside Road west, drive through the community of Woodside, and turn right on Kings Mountain Road. Follow Kings Mountain Road past the Old Woodside Store, stay to the right at the fork (Patrol Road) and continue on Kings Mountain up into the redwoods and mixed evergreen woodlands. On the right, a sign will indicate 200 feet to the Huddart Park entrance. The park entrance is on the right. Slow down when entering the park. For the Chickadee trail, park in the first big parking lot on your right after you pass the rangers' kiosk.
The trail head for the Chickadee Nature Trail is at the top of the parking lot across a small bridge and through a small redwood grove.
For the Redwood trail, pass the first set of parking lots and turn right at the first sign continue past the Sequoia area on your left, and follow the road down to the Redwood shelter area. Turn right into the parking area and park. EV docents will guide the children to the trailhead from this point.



MAP OF CHICKADEE NATURE TRAIL



MAP OF REDWOOD NATURE TRAIL



PARK RULES AND REGULATIONS

1. To preserve the natural beauty of the park, all plants, animals, and natural features are protected. The cutting and gathering of wood is prohibited. *Docents leading hikes may remove a leaf or small portion of a plant for examination by the group they are leading. Banana slugs may be picked up and handled carefully by the docent and touched gently by the group. Everything that is picked up and handled must be gently returned to the environment from which it came. We must respect this place and leave it in the condition in which we found it or better (docents may pick up garbage left by other humans along the trail).*

2. Fires are permitted in park barbecue pits only. No ground fires or portable barbecue pits.

3. Pets are NOT allowed.

4. Picnicking and camping are permitted only in designated areas. *Docents will not allow those in their group to eat or drink along the trail. Snacks and drinks should be saved until they get back to the parking lot or picnic area.*

5. Loud radios and playing of musical instruments, amplifiers, and other loud noises are not permitted.

6. Motor vehicles are permitted only on paved roadways and in established parking areas.

7. Horses are permitted only on designated trails.

8. Adult supervision is required for all persons under 18 years of age.

9. Firearms and other weapons are prohibited. *Docents should not allow members of their group to use any sticks or rocks as weapons either against their fellow hikers or against wildlife.*

10. Campers please observe 10 PM to 7 AM quiet hours.

11. Bicycles are allowed only on paved roads.

12. Some facilities are accessible to people of all abilities. *This includes the Chickadee Nature Trail.*

ENVIRONMENTAL LEARNING GOALS

Environmental education leads students to discover that all living things, including people, are interdependent. We must cooperate in using and reusing our limited resources, which give and sustain all life on earth.

The following five-fingered approach to environmental education is the basis of the EVs teaching goals. Finger one is **sensory awareness** for the diversity of the world around us; finger two represents the **values** we hold, as well as those that need to be developed; the third finger is an **awareness of historical changes** and a sense of continuity; finger four symbolizes the **interdependency** of all things in our world; and finger five reminds us of our need to foster a sense of **stewardship** toward all life.

The EVs believe that the best method for learning is through hands-on and other participatory methods of teaching. EVs materials are organized to enhance this style of teaching. Our learning materials foster the process skills of: observing, comparing, ordering, relating, inferring, applying, categorizing, and communicating. The California State framework themes (big ideas) of: energy, stability, evolution, patterns of change, scale and structure, and systems and interactions can be readily presented through our programs. Given the diversity of how teachers use these themes, not applying any particular theme to any particular grade level, the flexibility of EVs programs lend themselves well to this newest approach to science education.

HISTORY OF HUDDART COUNTY PARK AND THE NATURE TRAILS

The first inhabitants of the area were the California Indians who had inhabited the peninsula and south bay areas for approximately 4,000 years. We sometimes refer to these Indians as *Ohlone*, which is a name derived from a tribelet that inhabited the area along San Gregorio Creek. There was a village near Woodside at one time that was named Oromstac. This name includes the Indian word for "bear". In the pre-Mission days the coastal range was well inhabited by grizzlies, and there are many accounts of human/grizzly encounters from that time. The tribe inhabiting most of San Mateo County was known as the Shalshones. These people were hunter/gatherers. They lived off of the land. Their numbers in San Mateo County before the Missions came were approximately 2000 (or about 4 to 5 people per square mile). They had a limited amount of agricultural activity from occasionally burning back an incursion of undergrowth in order to keep a favored grassland open, to weeding certain areas to promote their favorite food plants and scattering seeds of favored plants in preferred areas. (See the Section on Indian uses of plants and animals in the appendix for more information on how these people lived.)

The first Europeans to arrive on the peninsula were members of the Portola party in 1769. In 1774 another expedition brought Father Francisco Palou who later established Mission Dolores in San Francisco. He became a chronicler of Indian history through the Mission period. In 1776, it was reported that Indians from the San Mateo area traveled north to battle Mission Indians in San Francisco over the wounding of one of their men. The Padres became concerned about their own safety traveling between their three missions, Dolores, San Mateo, and Santa Clara. By 1782, they had established peace between the tribelets and for themselves by converting the majority of the Indians and encouraging them to intermarry. Between 1786 and 1791, there was a major uprooting of the Indians' way of life, as many chiefs and whole tribelets became converted and lived near the Missions.

By 1793, only half of those that had been baptized up to that time were still alive. Many Indians had died of introduced diseases, notably tuberculosis and smallpox.

The Church started 5 or 6 large ranching operations in what is now San Mateo County. By 1835 these had passed into private hands. The Indians began working for Californio ranchers. It was reported that there were some Mission Indians who would take "vacation" to return to their original homes. Some became "runaways" and "outlaws" living in the coastal hills.

Note: In 1857 a surveyor along Skyline came across some Indian huts. These people were believed to belong to remnants of unknown tribelet(s). In 1859, most of them went to work for a Basque sheep rancher, Jose Mendico, and became known throughout the area as "Mendico's Indians".

By 1860, every one of the native settlements in San Mateo County had disappeared. By 1870, only 8 Indians were recorded to be living in the area. A well-known book on California Indian culture entitled Tribes of California by Stephen Powers (1877) does not even mention any of the tribes of the peninsula or south bay area. They were, for all intents and purposes, gone by the time he had arrived in 1875.

On August 4, 1840, the Governor of Spanish California granted John Coppinger, an Irishman who had become a naturalized Mexican citizen, the land that would later be called Rancho Canada de Raymundo. The 973 acres, which are now Huddart Park, were contained in this vast 12,545 acre rancho.

In 1850, when the California gold rush was booming, there was a demand for lumber to build San Francisco, which resulted in the beginning of extensive logging operations in the rancho area. Some logging had occurred earlier in that area to supply building materials for the Missions. Between 1853 and 1860, five sawmills operated near the present borders of the park. Richard's Sawmill, which was built in 1853, operated outside of the present park boundary west of Skyline Boulevard. From the mill, Richard's road led down the mountain. Teams of oxen pulled wagons loaded with lumber down Richard's Road to the Redwood City embarcadero. From there, the lumber was barged to San Francisco. Today, Richard's Road Trail follows the route of this old road.

The Woodside Store, near the park on King's Mountain Road, was built in 1853 by Dr. Orville Tripp. Tripp's store was the hub of activity during the logging boom. Fifteen sawmills were within five miles of its door.

It has been over one hundred years since the Huddart Park area was logged. A new forest of redwoods and other trees has grown. Much of the evidence of the logging has been covered, but still visible are large stumps of the virgin redwoods that were cut and "skid roads" over which teams of oxen dragged the logs to the sawmills.

The lands of Huddart Park have had many owners through the years. In 1944, the will of James M. Huddart bequeathed the present 973 acres to San Mateo County for a public park.

Prior to the 1970's, in the vicinity of the present Chickadee and Redwood Nature Trails, a troop of boyscouts had laid out the trails. In the early 1970's, a soft-spoken, gentle man named Harry Dean began working for San Mateo County Parks. He had a passion for trails and a particular interest in developing trails that would be accessible to everyone. His background as a landscape architect with both the National Park Service and the State Park Service (20 yrs.) gave him the credentials to pursue his passion. In the 1970's alone 60% of the trails in San Mateo County Parks were installed. Dean and his associates, Dave Moore (previous head ranger at Huddart Park) and Leon Souza, were responsible for the layout of the Chickadee Nature Trail. It was selected as an ideal spot for an accessible trail. The 3/4 mile trail is nearly level. A variety of ecosystems are visible along the trail, as well as evidence of the earlier logging that went on in the area. One of the two memorial benches along the trail has Harry Dean's name on it. His friend, Dave Moore, says Harry probably wouldn't have cared for the notoriety.

The Redwood Nature Trail has been changed very slightly over time. Less strenuous pathways have been chosen for their ease and part of the trail has been diverted for restoration purposes. Trees, bushes and vines have been labeled along this trail.

Source: Dr. Diane Conradson

1. **ALL LIVING THINGS DEPEND (directly or indirectly) ON EARTH, AIR, SUN, AND WATER FOR SURVIVAL**
   EARTH: soil type, topography, degree of slope, pH, exposure, and nutrients
   AIR: oxygen, other gases, wind, and wind-born particles
   SUN: degree of heat, light, and energy
   WATER: as contained within earth and air, as interacting with heat and light, as a solvent for nutrients and gases, as a medium for life forms, as a chemical to maintain internal physiological functions.

2. **LIVING THINGS ARE ADAPTED TO THEIR ENVIRONMENT; THEY CAN CHANGE AND MAKE CHANGE (change occurs over time)**
   Living organisms adapt, are modified by, and interact with their physical environment.
   Living organisms modify their physical surroundings through their various interactions.

3. **LIVING THING DEPEND (directly or indirectly) ON OTHER LIVING THINGS FOR SURVIVAL**
   Organisms interact with other organisms in order to survive.
   Organisms are interdependent.

4. **ALL LIVING THINGS HAVE A NICHE WITHIN AN ECOSYSTEM**
   Organisms have specific roles within an ecosystem; this creates a niche (special role and space) within their habitat.
   The variety of organisms in their niches and habitats within an ecosystem comprise a community.

5. **LIVING THINGS ARE PRODUCERS AND CONSUMERS**
   Producers provide the basic energy within a food web. These are usually plants and are eaten by first order consumers.
   Consumers may eat live producers, other live consumers, or dead or decayed organic matter. The highest order consumers are predators and in a food pyramid they are at the top.

6. **MATERIALS ARE RECYCLED, AND ENERGY IS TRANSFERRED IN DIFFERENT FORMS**
   Organic and inorganic matter is transferred through a variety of methods and forms.
   Plants through photosynthesis to first order consumers transfer original energy from the sun.
   Dead matter is broken down into simpler material by decomposers.
   Energy not utilized by various forms such as invertebrates, fungi, and bacteria is released as heat.

7. **HUMANS ARE DIRECTLY RESPONSIBLE FOR THE HEALTH OF THE PLANET**
   Humans serve a role within each individual's community and therefore affect global environments.
   Since humans are capable of manipulating the environment, we can become aware of our impact on the community.
   Each one of us, to the best of our ability, must make our impact positive by minimizing or eliminating environmental degradation.

CHICKADEE NATURE TRAIL GUIDE

The trail head of the Chickadee Nature Trail is located at the south end of the first parking lot on the right as you pass the ranger kiosk at the park entrance. The trail begins at a small bridge which crosses a seasonal stream and leads into a small redwood grove. In the winter and early spring, there are a variety of interesting fungi to be seen among the redwoods on the forest floor. As the length of day and light increases and the moisture decreases, the fungi also decrease both in numbers and variety.

Coming out of the redwoods, you will encounter a fork in the trail. Take the right arm of the fork. There is a post to the right of the trail marked **A**. (The posts along this trail are referred to in a small green trail guide which is sometimes available in the box nearby.) This post refers you to the variety of natural communities you are about to see and walk through as you traverse this trail. The three main communities you will encounter are the coastal redwood forest, the mixed evergreen forest, and the chaparral. Each is unique, and has its characteristic plants and animals. Soil, moisture, and microclimate keep the plants and many of the animals in their own distinct communities.

Before proceeding down the trail, caution your group about the dangers of contact with **poison oak (*Toxicodendron diversilobum*)**. There is a lot of it along this trail. It thrives in both the chaparral and the evergreen woodland. Caution them to not touch something if they are not familiar with it, and if they think that they have had contact with poison oak, not to rub their eyes or face with the affected body part or article of clothing.

Activity for children:
Color Detectives

Pass out colored paint chips, a different color to each child. Ask the children to try to find the color that is on their paint chip somewhere along the trail. When they find something that matches their color, discuss that thing with them. Is it living, non-living, or once living? Try to discern what it is and talk about it, if you can recognize. For instance, a yellow leaf fallen from a bay tree. How does it resemble a banana slug? Does it have the same smell as the green leaves? Did you expect to see something this yellow and not a flower out here? Then encourage them to discover a different thing along the trail to match their paint chip. (Be sure to collect the paint chips at the end of the hike, and let the children know ahead of time that you will do so as you will need to use them again. This may discourage littering along the trail.)

poison oak
(Toxicodendron diversilobum)

Man-made disturbances such as logging, soil compaction, and canopy removal have disarranged the hillside, but nature is capable of healing itself.

The confusion of communities and the succession process are evident here. On the right there are old manzanitas. Eight kinds of manzanita are known in San Mateo County. Two can be seen in Huddart Park. The one that we see on this trail is known as the **Santa Cruz Mountains Manzanita (*Arctostaphylos tomentosa ssp. crinita*)**.

These have lots of dead wood and huge root burls indicating that they are old-timers on their way out. They thrive in the dry open chaparral, but here live oaks and madrones are overtaking them. The mixed evergreen forest is succeeding the chaparral. Low growing yerba buena and bunch grasses as well as an occasional wood fern are finding the increase in moisture and shade to their liking. The post marked **B** calls attention to this forest in transition. Eventually the redwoods behind you at post **A** and the redwoods ahead of you on the trail will be one huge stand. It may take another century. If you come back here year after year, you will be able to see this happen.

Activity:

What Does This Smell Like?

You may pick a leaf off of the low growing yerba buena to share with your group. **Yerba buena (*Satureja douglasii*)** is a native plant which is a member of the mint family. European settlers used it in a tea to ease stomach problems. It has a pleasant minty smell. It is fairly particular about where it grows and is not easy to cultivate unless you have the right microclimate for it

Enter the second redwood grove across a little half bridge that crosses another seasonal stream.

Activity:

What's Yellow, Slimy, And Eats Dead Leaves?

Look for banana slugs near the streams and in the shade of the redwoods. Caution everyone not to step on them.

Fun facts about banana slugs:

1) They are the official **California State Mollusk**, (Mollusks include all snails, slugs, oysters, clams, mussels, squid, octopi, whelks, etc. which are characterized by a soft unsegmented body, gills, a foot, and a mantle.)
2) They are **hermaphroditic**. That means that when two banana slugs mate, they both lay eggs. The are both male and female.
3) They have the ability to **regenerate**, or regrow, non-essential body parts, such as an antenna or tail.
4) They like to **live in moist shady areas**, and are rarely seen out in the open on warm dry days.

Notice the sudden change in the atmosphere as you enter the redwoods. The **coast redwood (*Sequoia sempervirens*)** requires a cool moist environment for survival. The canopy above captures nearly all of the light. There is little if any undergrowth. This is partially due to the lack of light and also due to the *alleotrophic* agent present in the dead leaves bark and roots of the redwoods. They chemically inhibit the growth of other plants. A few plants are resistant to this when there is sufficient light, moisture, and nutrition. Redwood saplings come up from the roots of a mother tree. They are parasitic on the mother tree for several years. Many dead saplings are present because not all of them survive after they are "weaned" and must live on their own. They need to have reached a height where they can compete for sunlight in order to survive. Coast redwoods can reach up to 360 feet in height with a root system that spread 40-60 feet across and 4-6 feet deep.

redwood
(Sequoia sempervirens)

Redwood seeds have a very low sprouting rate and are not well dispersed. Much of the growth in a redwood forest is from sprouting from the roots of the older trees. This even occurs when an area is clear-cut, although other shrubs will move in for a time, and many of the sprouts may not survive if the ground does not hold sufficient moisture for them.

There is a thick duff on the ground underneath the redwoods. Duff is the accumulation of the dead leaves that have fallen from the redwoods. In combination with the lack of light, the duff keeps undergrowth from getting established in this grove.

Activity:

Digging Duff, or How Thick Is It?

Find a place near the path where you can dig into the duff with your hands, a trowel or stick and measure how thick it is. Look for signs of arthropods, amphibians, and small mammals here. You may want to pull out a bug box to take a closer look at some of your smaller discoveries. Be cautious about handling centipedes, spiders, or unknown bugs barehanded. Use your trowel or a slip of paper to capture them and scoop them into the box, or just get them temporarily out in the open where you can take a look at them. You may want to use a small flashlight to illuminate your discoveries if you are working in a dimmer area. **(Note: Please return all critters to their habitat when you have finished observing them, and replace the duff as nearly as possible to its original state.)**

Duff is decomposing into good, rich soil. In moist, cool weather many fungi choose the redwood forest as a home. How many different kinds of creatures can you find living in the duff?

Exiting this redwood grove, you will cross another half bridge. Always look into the streambeds for interesting inhabitants. **Maidenhair ferns (*Adiantum* sp.), orb spiders (Family Araneidae)**, bay trees, live oaks, and madrones.

turret spider's home

Activity:

Spider Jewels

If you carry a spray bottle of water, spray the web lightly so that your group can see the extent and intricacy of the workmanship. Early morning dew will often collect on the webs in just this way. The moisture will soon dry and the spider's trap will again be invisible to its prey.

On the right side of the trail is the remnant of an old fence. Note the lichens and moss growing on the post. Everything is decomposed, recycled, used again. Even the old barbed wire will eventually rust away and become part of the soil. There is a **hound's tongue (*Cynoglossum occidentale*)** plant at the base of the post. This particular wildflower blooms mainly in March and April.

Now the path winds through semi-shady oak woodland. Look for **deer trails**, **deer tracks**, and **coyote scat**.

coyote

Activity:

Coyote Ways

Coyotes **(*Canis latrans*)** use their scat to mark the intersection of two trails. We think this is their way of telling other coyotes who is in this territory. **1)** See if you can spot the game trail that crosses your path here. **2)** If the scat is dried enough to see the fur, point this out to the group. **3)** If the scat is very dry, you may even use a couple of sticks to pull it apart and look for bones. Coyotes eat small mammals, bones and all. In order not to risk piercing their gut with small bones, they have adapted an intestinal system that keeps the hair wrapped around the bones in their feces. If you find any small bones or pieces of bones, use a piece of paper to pick them up and view them in the bug box. What kind of small animal might this be from? Any small rodent is a good guess.

On the downhill side of the trail, look for **woodrat nests**. These are somewhat obvious piles of sticks and branches, sometimes cone shaped, sometimes built against a tree trunk or beside a fallen branch. There is no clear entrance or exit, the rat constructs the nest so that a predator has trouble locating the rat before it can escape out another way. Even after a predator has broken into the nest, the surviving rat will usually come back and make repairs and continue to live in the nest.

dusky-footed woodrat

Along this part of the trail there are many other interesting things to be seen. Along the ledge on the uphill side of the trail, look for the burrows of the **turret spider** (*Atypoides riversi*). They dig a small burrow into the ground and line it with silk, then extend it by constructing a turret of moss, dirt, leaves, or whatever is available. Turret spiders deposit their egg sac about halfway down their burrow in the summer. Spiderlings leave the burrow the following summer. Turret spiders eat ants and other small insects. The males wander from November through February, especially after a heavy rain.
(Note: There is another spider or insect common in these woods that also has small burrows in the ledges, but does not build the turret. The author has not as yet determined it's species - and is not willing to dig them up to find out!)

There are also **ants** at work in this forest. They are busy scavengers working on everything from a dead bug to a sweet honeysuckle flower to a rotting log. They might even be responsible for "growing" fungi in dead wood.

Activity:

How Fast Was It Going?

Find an ant trail. Have each person in the group "adopt" an ant and figure out how fast it is moving.
Measure out a foot along its trail, time how long it takes the ant to travel that distance. With paper and pencil, or a small calculator, figure the ant's MPH. Do the following calculations:
1 (foot) /# sec. to travel 1 foot x 3600 /5280 = approx. mph
Example: If it takes the ant 5 seconds to travel 1 foot, then that ant is traveling approximately .14 miles/hour. Pretty slow.
(Note: 3600 is the number of seconds in an hour, and 5280 is the number of feet in a mile.) A small calculator might be handy for this.

Periodically along this path you will see a small circle of redwoods in the forest. These trees all originate from a single tree, a single root system. When the "mother" tree has died or fallen or been cut down, the daughters continue to grow in a circle around the location of the original tree. Eventually some of these daughters will die as well, and granddaughters will continue to expand the grove until it joins others like it and they form a forest. The network of root systems of these related trees adds stability to the earth surrounding the trees. (Redwoods are not unique in sharing a root system. Scientists have identified a grove of aspens covering several tens of acres all growing from a single root system in the Rockies. The California Bay Laurel often grows in "groves" originating from one "parent" root system.)

Fallen and standing oaks will exhibit an interesting array of mosses and lichens. There is one type of lichen on many of the oaks in this area that appears as a hard black knob. Occasionally, an insect larva will eat out the interior of one of these knobs and use it as a home. (You may break one off of a fallen piece of wood and pass it around for the group to examine.)

oak branch with lichens and moss

Mosses, lichens, and fungi are all **decomposers**. That is to say that aside from their individual function to grow and reproduce, they serve a role in the ecosystem in which they help convert dead plant, animal and rock materials into soil. **Mosses** are themselves a simple plant.

Lichens are composed of two organisms in a relationship called ***symbiosis***. One of these organisms is a fungus that creates the structure of the lichen and provides for absorption of minerals and moisture. The other organism is a one-celled algae, which uses photosynthesis along with the moisture and minerals provided by the fungus to make food for both of them. **Fungi** come in many forms. Shelf fungi can be seen on the bark of trees and fallen logs. A variety of mushrooms and toadstools can be seen on the forest floor during the rainy season, helping to decompose leaf litter. Hairy, feathery looking molds also work on dead, decaying matter when moisture is present. Many unseen bacteria also work as decomposers. Imagine how messy the forest would get if all the plants and animals that died just lay there and piled up.

GOLDEN BACK FERN

Activity:

Snooping In The Woods

Conduct a mini-scavenger hunt. You may want to list the five items below on a separate sheet of paper or a 3x5 card or cards. Ask members of your group to find the following:

1. A plant that looks like a feather
2. Three different decomposers
3. Something that would give you a rash
4. Something an animal left behind
5. Something that has been partially eaten by an animal

They should be able to find all of these things within a few feet of where you stand along the trail. Most common answers would be: 1) a fern or damp moss, 2) a shelf fungus, a lichen, moss, or a beetle, 3) poison oak, 4) a track or scat or a feather or fur, 5) a leaf or the tip of a branch that has been chopped off or has holes or a piece missing, or the shell of an acorn or bay nut.

Another plant in the mint family that grows three to four feet high on tough stems is the **pitcher sage (*Salvia spathacea*)**. The unusual name refers to the shape of the blossoms which appear in April and May.

Along the ground you will see **soap root (also known as Amole, *Chlorogalum pomeridianum*)** plants, **hound's tongue (*Cynoglossum grande*)**, **star lily (*Calochortus* sp.)**, **trillium (*Trillium ovatum*)**, **wood strawberry (*Fragaria californica*)**, **douglas's iris (*Iris douglasiana*)**, **bracken fern (*Pteridium aquilinum*)**, **goldback fern (*Pityrogramma triangularis*)**, **native wood rose (*Rosa gymnocarpa*)**, **yerba buena(*Satureja douglasii*)** , **mountain sweet cicely (*Osmorhiza chilensis*)**, **hedge nettle (*Stachys bullata*)**, **blackberry (*Rubus ursinus*)**, **poison oak (*Toxicodendron diversilobum*)**, and **maidenhair fern (*Adiantum jordanii*)**.

Activity:

So What's A Soap Root?

Take out the soap root bulb you always carry in your pack and pass it around as you tell the group about the many uses the Indians had for this plant. Also known as Amole, soap root was used for shampoo, fish poison, a brush for cleaning out baskets, glue, and food. (You should let your group know that it is now illegal in California to use amole or any other chemical to stun fish to catch them.) See the section in the back of this guide, and references listed in the bibliography for more details.

Here the post marked **C** denotes that this area is the mixed evergreen forest. The **coast live oak** (*Quercus agrifolia*) is the dominant tree here, but along this section of the trail you will also see **douglas fir** (*Pseudotsuga menziesii*) and **California bay laurel** (*Umbellularia californica*), as well as the occasional **madrone** (*Arbutus menziesii*) and **coffee berry** (*Rhamnus californica*). There is a memorial bench here. Look along the trail side for deer trails and turret spiders.

There is a bridge spanning a deep ravine that crosses the trail. The ravine is full of rainwater in winter, but by early summer it will probably be little more than a trickle. Look for **banana slugs**, **orb spiders** (another opportunity to make "spider jewels"), **ferns**, and **wood roses** (*Rosa gymnocarpa*).

Past the bridge, you will approach another redwood grove. Here there is a post marked **D** denoting the **redwood forest**. The **coast redwood** (*Sequoia sempervirens*) is a *monotypic* tree. That means that there is only one species in this genus. These trees require a cool moist environment. They do particularly well in the fog belt throughout our coastal range, using the condensation on their leaves and stems to provide needed moisture through the summer months. The dead leaves and stems, which are shed year round, build a layer of duff on the forest floor that collects this moisture providing a nutrient rich environment for microorganisms, fungi, insects and small ground mammals. Other plants such as **sword fern** (*Polystichum munitum*) and **wood fern** (*Dryopteris arguta*) grow well in this environment. This moist environment is also ideal for banana slugs. Up the hill you may notice the soft fuzzy green leaves of the **California hazel or hazelnut** (*Corylus cornuta* **ssp.** *californica*).

In the next turn the post marked **E** draws attention to the **burned redwood stump**. The trees surrounding it are continuing growth from the burl wood of this stump. They are in effect the same tree. Notice that redwoods compete well with other trees to dominate the forest ceiling. The redwoods in this area, though once cut down for Victorian houses in San Francisco, are again becoming the dominant species on this hillside.

At the far end of the loop on this trail, there is a narrow U- turn. There is a **wild pea** growing in the brush to the right of the trail which begins blooming in April. The post marked **F** refers to the very large bay tree growing within the U. The **California bay laurel** (*Umbellularia californica*) is also monotypic. The bay tree has many aliases - **California laurel**, **California bay**, **pepperwood (Northern California)**, and **Oregon myrtle (Oregon)**. Visitors to the northwest can purchase lamps and clocks from myrtle wood which is said to "grow only in Oregon", but our bay tree is the exact same species. The European or Mediterranean laurel which is used to produce commercial bay leaves is a different genus and species, but the same family. The California bay leaves are twice as strong as the European variety. The bay nuts are also quite tasty once roasted.

california bay laurel

Activity:

What's That Smell?

Pick a leaf from the bay tree and tear the edge slightly to release more of the pungent odor. Pass it around the group so that everyone has a chance to smell it. Ask them what it reminds them of. Tell them that it is used in spaghetti sauce. (Warn them that they may not collect leaves in the park, but if they do collect them elsewhere they should remember to use only half the amount that they would of the store bought variety, and only pick young fresh, unblemished leaves.)

In the spring, mole mounds can be seen along the side of the trail. The trail may seem soft and spongy in places as a result of their work. Small ground dwelling mammals live very well in the redwoods and the surrounding mixed evergreen forest. As we pass the bay tree, we return to a **mixed evergreen forest**. There are a few non-native plants along this trail. One of them is the **olive tree**, also an evergreen. Among the oak trees, on the ground you may see bracken ferns. The **bracken fern (*Pteridium aquilinum*)** is deciduous, so if it's too dry the fronds will turn yellow, then brown, curl up and fall off. The young unopened fronds are called "fiddlenecks" and are edible. Please don't pick them here, though.

Activity:

Bug Boxes

Fallen branches on the ground are often a haven for ants and other bugs. Use bug boxes to share up close looks with members of your group, but remember to look out for **poison oak** and that some critters, such as the centipede have a nasty bite. Use a pocket knife blade or the tip of a trowel to capture the bug and get it into the box. Remember to release bugs carefully back into their environment.

The forest thins a little as you proceed along the trail. The post marked **G** suggests that this is an area of disturbance where there has been long term **damage done by logging**. The **soil here is compacted** and the trees have had difficulty reestablishing themselves. The open canopy allows other opportunistic plants to move in, among them **toyon (*Heteromeles arbutifolia*)**, **coyote brush (*Baccharis pilularis* ssp. *consanguinea*a)**, **California coffeeberry (*Rhamnus californica*)**, and **poison oak**. You may notice that there is **English ivy** trying to take over this portion of the forest. Volunteers periodically come in and cut back what they can to keep it under control. Many **thistles** and an occasional **Scotch broom (*Cytisus scoparius*)** plant may be seen.

The post marked **H** stands near an **old skid road**. The deep gully under this lower bridge as well as the previous one uphill is not natural, but results from the logging done here. These deep roads were made to haul logs out of the forest. Over the years runoff has flowed down this road and eroded it into a stream channel that we see today. The channel on the downhill side of the bridge still shows much of the "U "shape of the original road.

The bridge on the lower part of the loop trail is a great place to observe spiders and insects. Beginning in mid-spring and lasting through the summer you will see evidence of **oak moth worms**. These are the larvae of **moths** from the family **Plutellidae**, representing several species. Some eat oak leaves, while other focus on the blossoms of oak trees. They often hang in mid air by a slender silk that is attached to a leaf on the tree. You will see different sizes and shapes of these "worms" and may encounter them throughout the woodland area. **Ants** can often be seen crawling along the hand rails. **Spiders** have their webs up to catch whatever flies by. **Stone flies (whose wings in flight resemble the blades of a helicopter) and hover flies, grasshoppers**, and other flying insects can be seen here at various times. All are probably attracted by the water and whatever food source lives near it. The mixed evergreen forest is more open through here. The compacted earth and erosion damage, after the area had been logged, have caused a slow comeback. There is enough light for grass to thrive among the other

ground covers. Here the **two-eyed violet (*Viola ocellata*) grows,** blooming from late March through June. It is one of seven varieties native to the coastal hills.

Activity:

Penny Hike

Pass out a penny to each child in your group, including those over eighteen years of age if they are interested, and challenge each of them to find at least three different things that will fit on their penny. They do not have to collect these, but can come and show you each item then put it back. Ask them not to pick any parts off of plants. Make a list of the different items found. When they have finished, ask if they are surprised to find so many small treasures on their hike. Which of the items they found were living or once living? Which were non-living?

Bunch grasses and **quaking grass (also known as rattlesnake grass)** can be seen growing along the uphill side of the trail. The post marked **I,** stands near an outcropping of **sandstone**. The sandstone throughout this area was formed some fifty million years ago from sand accumulating in the sea that covered this area at that time. These hills have been lifted up from sea level since that time, and natural erosion has caused the steep landscape of these mountains.

coffeeberry
(Rhamnus californica)

As you proceed along the trail the woodland will open up into a drier, sunnier area. The shrubs growing here are typical of the ecological community we refer to as **chaparral**. Some of the characteristic plants are **manzanita, yerba santa, coyote brush, chamise, coffee berry, toyon, ceanothus (blue blossom, *Ceanothus thyrsiflorus*, and wart leaf, *Ceanothus papillosus*, varieties are the most common, but there are at least four varieties here)**. You may also identify **chaparral clematis (also known as pipe stem or virgin's bower, *Clematis lasiantha*), wild blue rye grass, bunch grasses, chaparral pea, perennial bedstraw**, and **tanbark oak (or tan oak, *Lithocarpus densiflorus*)**. **Yerba santa (*Eriodictyon californicum*)** in this area is all infected with a **black mildew** that probably limits the growth of these shrubs, but does not appear to kill them. Bunches of pale pink bell-shaped blossoms show April-July.

Activity:

Smell another medicine plant?

Pinch off an uninfected Yerba santa **leaf and share the smell with your group.**

The **coyote brush** in this area seems to host numerous **leaf galls**. Some are yellowish, some pink. These are caused by tiny **wasps (family Cyriipidae)** which lay an egg in the leaf or stem and secrete a hormone which creates the gall. The gall both protects and feeds the larva. These generally do no real harm to the plant. 85% of Cyriipidae wasp species inhabit oaks (Quercus). The **California oak gall wasp (*Andricus californicus*)** causes the large galls or "oak apples" with which we are all familiar.

Activity:

Deer Walk

Explain to the children that deer walking normally always step in the same spot with their back foot as they stepped with their front foot. This is called "registering". Lead the children down the path asking them to see if they can step only on the spot where the person in front of them stepped. Many deer trails on a hillside exhibit an appearance of having steps, because many deer have stepped in the same place. Remind them that deer are very quiet, turning their big ears in all directions so that they can detect danger coming. Have the children cup their hands behind their ears to make "deer ears". Walk quietly down the trail and listen for what you may hear. You may proceed in this way until you come to a spot where there is a new plant to point out or until you get to the bench. Be sure to praise them for doing a good job as quiet cautious deer.

Notice the living (deep red) and dead (gray) wood on the manzanita. These shrubs are quite old. Many in this area have large burls near the ground. Some chaparral plants require fire to clear out old dead wood and make room for new growth. A few plants have seeds that can only germinate after a fire. In a protected area such as this, the chaparral is a transitional environment. It follows the open grassland that first covered the logged area. Wildflowers, such as the **buttercup (*Ranunculus californicus*)** can still find a place along the trail here. The compacted soil and subsequent erosion left the soil too poor and dry for the redwoods to immediately reestablish themselves. As these manzanitas die out they will slowly be replaced by madrones and live oaks. In some places these trees are already beginning to establish themselves. The ground will then be more shaded and cooler, and will retain moisture longer. The bay trees will spread into this area. Finally, in another century or so, the redwoods will fill in and cover this hillside as they once did one hundred and fifty years ago.

Along this stretch of trail is a wooden memorial bench with the name Harry Dean carved on it. Harry Dean was one of the rangers working for San Mateo County Parks who developed this trail. He died in 1994. He is fondly remembered by those who worked with him. The bench is situated in a place where one can sit and look out over the Peninsula. The **red tailed hawk (*Buteo jamaicensus*)** can often be seen circling over the canyon below on the lookout for likely prey. You may also observe the common **fence lizard** sunning itself on the sandstone scattered near the trail or a **western skink (*Eumeces skiltonianus*)** slinking through the grass (if it's early in the morning). A scurrying sound in the dry undergrowth may be a lizard running from the vibrations of heavy feet, or, if persistent, might be a bird, such as the **brown towhee (*Pipilo fuscus*)** or **rufous sided towhee (*Pipilo erythrophthalmus*)** searching the leaf litter for an insect or two. Also listen and look for the **California thrasher** (with the curved bill) and the **chickadees** up in the trees.

The J post marks the heart of the **chaparral** here. The soil is shallow and rocky in this area with little leaf litter or humus. Chaparral is the dominant vegetation type in the lower foothills surrounding California's Central Valley. Because this area has much more moisture than an area where chaparral would normally occur, the **chamise** and other plants are somewhat larger than they would be near the Central Valley.

chamise
(Adenostoma fasciculatum)

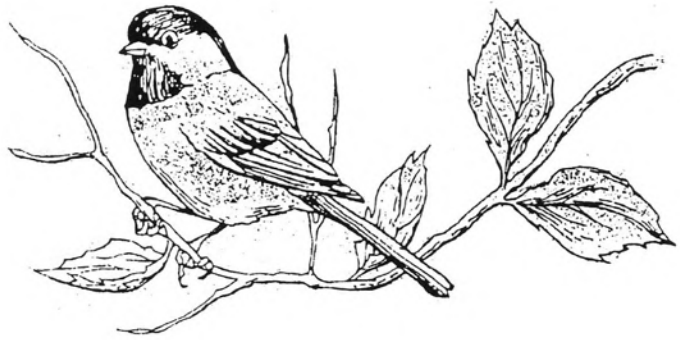
Activity:

Parfum de Chamise

Pinch off a bit of chamise, crush it between your fingers and have everyone take a whiff. Another interesting smell. Tiny white flowers bloom in May and June, later turning orange as they dry on the bush. One source says that the young shoots can be tenderized by boiling for several hours, then seasoned and eaten as a vegetable.

Here, in places, the chaparral and the redwoods exist side by side, vivid testimony to the extent of the disturbance that logging in this area has caused. As you approach the original fork in the trail, look for wildflowers in bloom, lichens on the oak tree bark, coyote scat, deer trails, and poison oak.

This trail is changing constantly. **Coyote brush** blooms in the fall. This plant has male blooms on one bush and female blooms on another bush. This is called **sexual dimorphism**. **Sticky monkey flower** (*Diplacus aurantiacus*) blooms from April into July, if moisture allows. **Bracken ferns** are deciduous. They dry up in the summer heat. **Blackberries** may bloom and fruit through the summer. **Poison oak will turn red in late summer and fall.** Be careful, as you can still contract a rash from handling the bare branches in the winter. Look for **rose hips** on the wood rose in fall and winter. They are known to be a good source of Vitamin C. If you come here often, take notes. If you keep coming back year after year, you will soon learn when to come to see the bay trees in bloom, and when the acorns are ready to fall.



BIBLIOGRAPHY & SUGGESTED READING

Armstrong, Margaret, *Field Book of Western Wildflowers*, 1915, 1925, C.P.Putnam's Sons, NY.

Balls, Edward K., *Early Uses of California Plants*, 1962, University of California Press

Brown, Vinson and George Lawrence, *The California Wildlife Region, 1965*, Naturgraph Publishers

Brown, Alan K., "Indians of San Mateo County", *La Peninsula, Journal of the San Mateo County Historical Association*, Vol. XVII No. 4, Winter 1973-74

Clarke, Charlotte Bringle, *Edible and Useful Plants of California*, 1977, University of California Press

Ferris, Roxana S., Native Shrubs of the San Francisco Bay Region, 1968, University of California Press

Grillos, Steve J., Ferns and Fern Allies of California, 1966, University of California Press

Heizer, Robert F. & Albert B. Elsasser, *The Natural World of the California Indians*, 1980, University of California Press

*Lyons, Kathleen and Mary Beth Cooney-Lazaneo, *Plants of the Coast Redwood Region*, 1988, The Looking Press

Murphey, Edith Van Allen, *Indian Uses of Native Plants, 1959*, 1987, Mendocino County Historical Society

National Audubon Society, *Field Guides to North American Insects and Spiders*, 1994, Knopf

Niehaus, Theodore F., and Charles L. Ripper, *A Field Guide to Pacific State Wildflowers* (Peterson Field Guide Series), 1976, Houghton Mifflin Co.

Peterson, Roger Tory, *A Field Guide to Western Birds*, 1961, Houghton Mifflin Co.

Powers, Stephen, *Tribes of California*, 1877, 1976, University of California Press

Rambo, Ralph, *"Lo, the poor INDIAN" of Santa Clara Valley*, 1967, Pioneer Series No.2, Ralph Rambo

Storer, Tracy I. and Robert L. Usinger, *Sierra Nevada Natural History, An Illustrated Handbook*, 1963, University of California Press

Pamphlets available from Save the Redwoods League, 114 Sansome St., San Francisco, CA 94104: *The Story Told By A Fallen Redwood, Redwoods of the Past, A Living Link In History,* and *Other Plants in Redwood Country*

Environmental Volunteers, *Jasper Ridge Biological Preserve Site Guide*, Environmental Volunteers, revised 1995

The Redwood Trail of Huddart Park

This trail begins in the Redwood shelter area and ends in the same area. The restrooms are directly across from the parking lot in the west corner. Begin your walk in the east corner of the lot on the road heading up to the Redwood shelter.

Once you are on the actual trail many trees and bushes will be labeled with signposts. The signposts are underlined in this guide to make it more convenient for your use. Many of the plants in this guide are seasonal, therefore the guide will indicate in which season they are likely to be found.

Walking up the hill toward the trailhead you will be surrounded by grasslands. In the spring, you will find many types of wildflowers or upon their absence you will note the prevalence of various kinds of wild grasses. This part of the walk has the steepest terrain of any part of the trail, if the children become tired, stop along the way to discuss the non-native grasses or the different zones they are likely to see along their walk. Have the children walk backwards for a period (which will change major muscle groups in their legs) and ask them if they can see the difference between the two zones of grasslands and broadleaf evergreen. Be sure to point out the two zones before continuing the hike.

#1 At the Redwood trailhead there is a signpost, which has a very good example of shelf fungus on the back. Ask the children to describe the reason for decomposition and different types of decomposers. As you hike the trail continue to point out decomposers or ask the children to point them out. Next to the signpost to your right, is a chaparral pea shrub (*Pickeringia montana*). This plant has small, tough, water conserving leaves and stiff branches. Watch out for sharp spines. This shrub is commonly found in chaparral areas and open wooded forest. Across from the sign you will note a large toyon bush (*Heteromeles arbutifolia*). Observe the serrated edges of the leaves. The toyon is the official shrub of the State of California.

TOYON OR CHRISTMAS BERRY

#2 At the coast-live oak (*Quercus agrifolia*) have the children touch the small, prickly, leathery-like leaves. This is a good place to discuss the variety of species of oaks native to this area. Discuss transpiration and how the live oak is especially well adapted to dry arid areas. The small size of the leaf, as well as the leathery coating prevents large amounts of water being lost through transpiration.

Vaporlocked (A transpiration activity)

Bring two small plastic ziplock baggies. Into the first baggie put a small or waxy coated, arid adapted leaf. Into the other, put a riparian broad leaf. Seal the bags and expose them to sunlight as you hike. Compare the moisture in the bags at the end of the hike. There will be a visible difference in the amount of water loss between the two leaves. The larger leaf will lose more water. This activity will work with grades 4-6.

The docent should take an oak leaf for further comparison to other oaks along the trail. A downed log provides an excellent opportunity to explore the insects involved with decomposition. Striped, purple irises with red berries (*Foetidissma spp.*) are also found on the ground around the fallen tree. They are not native to this area and were most likely planted or dispersed by birds here. Wood strawberries (*Fragaria californica*) found spread liberally on the ground, are composed of leaflets in threes, which arise directly from the ground. In the spring white, rose-like flowers grow singly and ripen into edible berries in early summer.

#3 Around a soft curve in the trail you will find lovely samples of hound's tongue (*Cynoglossum grande*), its blue flowers are evident in the late winter and early spring. As winter departs look for the red, white and blue wildflowers which indicate the beginning of spring. Hounds tongue is the blue, Indian warrior (*Pedicularis densiflora*) is the red and milkmaid (*Cardamine californica*) is the white. Alongside the trail, is a large bay laurel tree (*Umbellularia californica*). Dried leaves from the bay tree were used by California Indians in their bedding as a means of repelling insects. The dried leaves are also commonly used in the making of spaghetti sauces. Medicinally, the California Indians would make a crown of these leaves to relieve mild headaches. Further along the trail look for California hedge nettle (*Stachys bullata*), which has a very distinctive smell, and belongs to the mint family. The stems and leaves of this plant are covered with small hairs which unlike the true nettle, don't sting. In spring and summer look for it's small purple flowers.

#4 You are now in the coast redwood area. Notice the circle of coast redwood trees (*Sequoia sempervirens*) surrounding a stump. Ask the students if they can guess the height of any tree. These surrounding trees are the tallest in the world and can reach heights of over 300 feet. Discuss the height of the redwood trees, then find a cone and note the small size. Although redwood trees may sprout from their seeds, the seeds do not germinate well. As much as 80% of all redwoods arise as sprouts from the roots of their mother stump. This forms a "fairy circle" around the mother tree. As the stump decomposes, it feeds the new trees. In the center of this particular stump, you will find an iris growing. Fibers from the leaves of the iris were often used as cordage. Examine the *duff* (decomposing plant matter) under the trees and note the lack of plant growth which is due to shade and a higher soil acidity produced by the redwood trees.

As you exit the redwood forest, you will come to a streambed (small riparian area).

Along the way look for Western sword (*Polystichum munitum*) and coastal wood ferns (*Dryopteris arguta*) as well as blackberries (*Rubus ursinus*), and non-native ivy. In the spring look for newts mating in this stream. Also look for signs of erosion along the bank.

Newt News (Taricha spp.)

Newts begin to migrate to their place of birth just after the rainy season begins in October or November. Breeding begins in March or April. The males arrive before the females. Newts undergo physiological changes before mating occurs. The male's skin thickens and becomes smooth. Their tail fin enlarges and flattens to adapt these terrestrial creatures to swim in the water where they mate. The females develop a rougher, darker skin. During mating the male mounts the female's back and rubs the underside of his lower jaw on her snout. A substance secreted from his chin quiets the female. He lets go and walks in front of her depositing packets of sperm in a gel-like substance. The female follows him and selects the packets to store in her vent. Females then attach their eggs to any firm support, encased in a jelly. Babies then hatch three weeks to a month later. The small larvae live in their aquatic environment for one full year after birth. Scientists are uncertain what they eat when they first hatch but as they develop, they eat mosquito larvae. As terrestrial adults they eat earthworms, snails, slugs, and insects. After mating most species become terrestrial once again and can be found in the summer months hiding under bark, inside decaying logs, in rock crevices or burrowing in other animal's homes.

#5 Big leaf maple (*Acer macrophyllum*) and a toyon bush dominate the next area. Big leaf maple is one of the most common trees found in a mixed evergreen forest. It has an easily recognizable five or three finger shaped leaf, and seedpods that are shaped like "helicopters". Toyon, also called "Christmas berry", has edible red berries in the late fall and early winter but they are so bitter that sources suggest roasting them before eating. A little further along the trail goldback ferns (*Pentagramma triangularis*) spring up along the damp banks in the winter and spring. Their black stems were used by local Indians for weaving intricate patterns into baskets.

Goldback Glamour

Docents should take one goldback fern and place it gold side down onto the clothing of a student who is wearing dark colors. Give the leaf a small pat, and you will get a perfect picture of a fern print. This leaf can be used two or three more times on other students before the spores run out. Try not to use more than one leaf, the other students can participate in other activities.

#6 At the next station the sign reads madrone (*Arbutus menziesii*). This tree is very conveniently placed across from a manzanita bush (*Arctostaphylos ssp.*) Here is an excellent place for a compare and contrast lesson in basic observations. Note the difference in the size and the shape of the leaves. Manzanita berries were used by California Native Americans to make cider. Both madrone and manzanita berries are edible and are high in vitamin C. The flowers on both may be eaten and are very sweet. Both tree and bush are from the same Heath family and have a similar red, peeling bark. This is a good spot to look around for mosses and lichens to compare. Evident on many trees is a mix of gray/white flat crustose (crust-like) lichens, which are usually seen along with foliose (*Parmelia*) lichen, which looks like small leaves. Lichens are often confused with mosses, but lichens are not plants at all. Lichens are a ***symbiotic*** relationship that occurs between a fungus and an alga. The fungus provides water, minerals and shape, while the single celled alga provides food through the process of photosynthesis. The mosses are usually very springy and have a vivid green color. Mosses, lichens, and fungus are all-important decomposers. Lichens chemically break down the surfaces they attach to. Those lichens with a blue-green algae partner provide important nitrogen-fixing components beneficial to the soil.

I've taken a lichen to you!

An easy way to remember the components of lichen is to teach the children a simple rhyme.

"Alice Algae took a lichen to Freddie Fungus."

#7 Further along the trail, you reach the sign for Coyote bush (*Baccharis pilularis*). Coyote bush occurs throughout the park. It can be noted that this plant is an indicator species, usually located between zones. Note the transition between the evergreen and redwood forest area. Coyote bush is unusual because the plant has two distinct reproductive bushes, a male and a female (This is referred to as a ***dioecious*** condition. Most plants have both male and female parts on the same plant). During the fall the male of the species produces a small, cream colored flower while the female produces a larger, white flower. Find a coyote bush with galls on the leaves. Explain that different insects, nematodes, and mites make galls and are attracted to different plants. The majority of the gall-making insects are wasps.

Galls in All Their Glory

Compare an oak gall and a leaf gall. Gather the children and slice open an oak gall. Look for larvae or larvae tunnels leading to holes on the outside. The gall serves as a shelter against predators and desiccation and acts as a source of food. The larval and often the pupa stages are spent within this shelter. The gall insect lays its egg either on or within the tissue of the host plant. Upon hatching, the larvae find their way to a developing part of the plant. The gall develops with the larvae. An enzyme produced by the insect, changes plant starch into sugar, feeding the plant protoplasm, which then causes the cells to multiply and produce the gall rich in protein. The exact physiology of gall formation is still obscure.

RATTLESNAKE OR QUAKING GRASS

At the sign for manzanita (*Arctostaphylos spp.*), ask who can remember one fact about this shrub. Just after this sign, is a young Douglas fir (*Pseudotsuga menziesii*), which stands across from a young bay, which has been twisted by a vine climbing up it towards the light. Also found in this fertile area look for yarrow (*Achillea millefolium*), sticky monkey plant (*Mimulus aurantiacus*) coffee berry (*Rhamnus californica*), and rattlesnake grass (*Briza maxmia*).

#8 The next sign reads poison oak (*Toxicodendron diversilobum*). Stop to explain about the inflammatory oil of this plant. Recite the old rhymes of "leaves of three let it be" and "when in doubt go about". Ask the children to compare poison oak to the blackberry bushes found further along the trail. Point out that both plants grow in leaves of three, but that the berry leaves are serrated and the poison oak leaves are lobed. Show them that berry vines have thorns and poison oak does not. "If it's hairy it's a berry." Ask if they might think of some uses for poison oak. Then mention it's the preferred food staple for deer. They love the berries and leaves. Deer have no allergic reactions to the plant. Their scat is a combination of seeds and fertilizer and this explains the proliferation of poison oak in the forest. California Indians used poison oak leaves to wrap their acorn meal in before cooking. Both the Chumash and the Ohlone Indians used the sap from the poison oak to make body tattoos.


POISON OAK

#9 At the sign for the coffee berry bush (*Rhamnus californica*) show the children the leaves, which may look similar to the toyon leaves, but which have no serration and do have "parking lot" venation. The ripe black berries are edible and nutritious. The bark can be dried, boiled, and used as a laxative. Across the trail, on your right, is a stand of blackberry bushes, which can be compared to the poison oak. Also look for a stand of pearly everlasting (*Anaphalis margaritacea*), which can be identified by its small white flowers and "butterscotch" or "maple syrup" odor.

#10 The next sign is for a California bay laurel tree (*Umbellularia californica*). Remind the group that this tree was discussed at the beginning of the trail. Ask the children what one fact they can remember about this tree. Across from this sign, on your right, is a ***snag*** (dead tree). Have the children look for evidence of decomposition. Ask who made the holes in the tree. Observe the bark beetle trails. This is a wonderful place to stand quietly and watch birds, or to simply listen and count how many different songs can be heard.


JUNCO

CALIFORNIA BLACK OAK

#11 California black oak (*Quercus kelloggii*) is the next sign. Compare its leaves (large, lobed and spiked) to that of the California live oak (*Quercus agrifolia*). Ask which tree would do better in a dry, arid area? Why?

Across the trail, on your right, is yerba buena (*Satureja douglassi*) which can be made into a tea to ease stomach ailments. Above the yerba buena is another Douglas fir, but one that is old enough to produce cones. Choose a child to pick up a cone that you will use later along the trail.

#12 As you walk further up the trail you began to see large, fuzzy leaves, which are leathery and brittle with coarsely toothed edges. These belong to the tan oak tree (*Lithocarpus densiflorus*), which is not a member of the true oaks (Quercus). However, the tan oak acorn was especially prized by the local Native Americans both for its large size and the mild flavor of the nut. The nuts make wonderful tasting soups and mashes. The tan oak acorn can be distinguished from other acorn nuts by its large size and the shaggy cap on the top of the nut. You may wish to compare the tan oak leaves' size and shape to the other oak species' leaves.

TAN OAK

The Story of the Acorn Spirit People

Native Americans believe that everything is alive, and therefore everything has a history. They believe that before the time of humans, another world existed where there were other kinds of divine beings. This is the story of the Acorn Spirit People:

The Acorn Spirit people were told "You will soon have to leave the spirit world. You are going to Earth. You must all have nice hats to wear. You will have to weave them." So they started to weave good-looking hats. Then all at once they were told, "You will have to leave now. Go quickly." Black Oak Acorn did not have time to finish her hat, so she picked up her big bowl basket. Tan Oak Acorn did not have time to clean her hat and make it smooth. But Post Oak Acorn and Maul Oak Acorn finished their hats perfectly, and even had time to clean them. Tan Oak Acorn noticed this and was jealous. She said: "Though my hat is not clean, I will be the best acorn soup." Then they left. They spilled from the heavens into the humans' world. Today nobody likes to eat Post or Maul Oak Acorns.

Ask why do you think this story might have been important for the people of the Karuk tribe who told this story? This is an excerpt from a story called "All Things Are People" from the book Native Ways (Margolin, M. and Y. Montijo, 1995).

After you pass the tan oak, you will enter a riparian area with many moisture loving tall redwoods. Down along the creek, *when it is wet*, you will find sword and polypoidy ferns, along with small redwood cones and often several species of mushrooms. Stand on the bridge and observe the riffles and pools of the running creek water. A riffle is the fast moving part of a stream. Because the water is moving quickly, it picks up more oxygen from the air. Many oxygen loving fish and insects are found only in this part of the stream. The pools are the quiet, still parts of the stream which contain a different selection of fish and insects which require less oxygen. Water moves much more slowly in pools and movement is easier for animals. Along a stream you will often find overhanging banks (undercuts) this is often where the fish like to hide. Point out the different species of plants, which are specific to riparian zones. Ask the children to describe how this environment differs from the grassland and chaparral environments.

#13 Just over the bridge to your right you will find a sword fern sign (*Polystichum munitum*). This is a good place to compare the western sword fern, with its hilt and blade, to the California polypody (*Polypodium californicum*), with its lobed leaves that the children can observe in the creek. Ask the children if they've seen any other types of ferns along the trail. Ask them to count types of ferns they have seen so far along the Redwood trail.

Fern facts

The fern family is located between the "lower" plants, the bryophytes and the "higher" plants, the flowering plants (*angiosperms*). While the ferns have a vascular system with internal tubes for transporting fluids like other plants, they reproduce by spores not seeds. Reproduction by spores requires that the organism have abundant amounts of moisture available. Therefore, most ferns are found in wet or damp areas. Spore sacs are congregated together in groups called "sori". Fern identification is often based on the arrangement of the sori and where they are located on the plant. In the past there have been many uses for ferns. Ferns were used for scouring pads, decorations in baskets, thatch for cabin roofs, and to line baskets and ovens for food preparation. The young "fiddle heads" of some ferns are edible, however the older leaves of all ferns are not edible and may even be considered toxic.

#14 Remind or test the memory of your group about the various facts about tan oaks at the tan oak sign. Between this sign and the next sign is an excellent place to play a few trail games. Look for different lichens or closely examine the *duff* for insects.

#15 If your group hasn't taken the time to examine the coastal wood fern (*Dryopteris arguta*) along the trail, stop now to compare this fern to the others, or simply add it to a count of ferns seen along the trail.

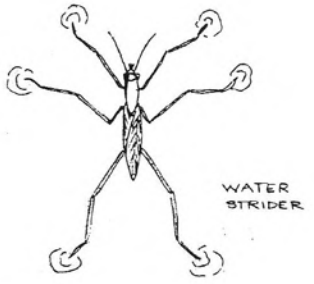
#16 The Douglas fir (*Pseudotsuga menziesii*) has been called one of the most prominent members in the mixed evergreen forest. It is second in height only to the redwood tree and has the distinguishing cones containing "mice tails and hind legs." This tree has many uses. California Indians used this tree medicinally for the treatment of rheumatism and tuberculosis. Shafts made from branches of this tree were also used for salmon spears. Today the Douglas fir is the most important lumber tree for the State of California. Examine the cones (collected earlier) and look for mice tails and back legs. The following is a story of how they came to be there.

How Mice Were Saved from Certain Death

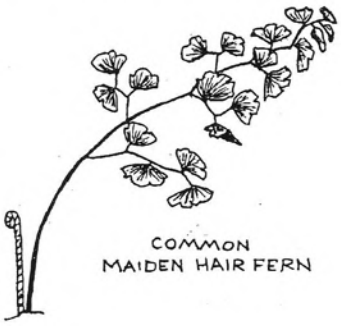
There once was a kingdom in the sky. Here everything was allowed to live and breed naturally. It was a beautiful place with only one problem. Mice. The mice you see had overpopulated and everywhere you looked there were mice. Mice were in the fields, the forests and the rocky crevices. But the biggest problem for the giants that lived in the sky, was the fact that the mice were in their houses. They were in their kitchens, their cellars, and even their bedrooms. One day one of the giants awoke, and stretched widely. In doing so he squished two mice sleeping in his bed with him. Mildly peeved he rolled over squishing five more. Angrily he sat up, swung his legs over the side of the bed and shoved his feet into his slippers. Three mice squealed and ran out of the holes they had made in the toes of his slippers. The giant bellowed and declared "I've had enough! Something has got to be done about you mice." He said, "I'll count to ten and then I'll begin to clear my house of every mouse who ever dared to cross my lair." The mice, in total terror, ran outside for the nearest hiding place they could find. They ran across a clearing, and into the forested area where they climbed the closest, largest tree they could find. It was a tall, old, Douglas fir tree. Hearing the giant come out of his house, and cross the clearing toward the tree, they scurried into the pinecones as far as they could. There they stayed, shaking in fear. The giant approaching the tree could not see them and was satisfied, until, one last mouse crossed over his foot, and scurried up the tree. Angrily, the giant picked up the tree, and threw it down to earth with such force that it replanted itself within the soil. In a while the mice crept out of their cones to explore their new surroundings, but every time they hear a loud noise they hurry for the safety of their cones. This is why, whenever people are near; one can usually find the tail of a mouse in the Douglas fir pinecone.

17 The next labeled tree is the California hazelnut (*Corylus californica*). This tree may also be known as the "toilet paper" tree. The leaves are wonderfully soft and fuzzy. The nuts this tree bears are very edible and require no preparation before eating. As you head for the larger running stream, which lies ahead of you on the trail ask the children if they feel a difference, if they can hear the stream?

Further along the trail, on your left, notice a sandstone rock. Here is your opportunity to discuss a little about the nearby fault zone, and the fact that this sandstone rock was uplifted from the ocean floor, probably about 3 million years ago if it is from the same formation as the Whisky hill formation. Continue down the path until you see the next bridge over the creek. Stop to look for water striders (*Gerris spp.*) Ask the children what they think keeps the insects afloat? Discuss the insects' adaptation to water surface tension.



Past the bridge on the left bank you will find California maidenhair ferns (*Adiantum jordanii*). Local Native Americans pounded the black stems of these ferns until flat, and then wove them into their baskets as designs.



Also look in this area for wild rose bushes (*Rosa spp.*) and the orange urn shaped rose hip left after the flower has bloomed. Rose hips are very high in vitamin C. and can be boiled to make a nutritious tea.

Continue on to any of the various decaying tree limbs. Turn them over to look for slender salamanders, beetles and other insects. Various fungi will also be evident. Small stands of sticky monkey plant can also be found in this area. Continue down the trail to a stand of redwoods. On the right side of the trail, a set of restrooms is located. If you are short of time, you may cross the parking lot, climb the trail on the left and be back in the parking lot where you began.


VALLEY OAK

#18 If you continue on the main trail, you will come to a sign for valley oak (*Quercus lobata*). These oak leaves are lobed *without* spikes. Compare these leaves with those of the black oak located just east of the tree.
Across from this tree, up the trail, you will find another oak with many vines of poison oak climbing up the tree. Ask the children about adaptation in plants. In the upper branches you will find several good examples of mistletoe (*Phoradendron villosum*), a parasite. This is a good example of a *symbiotic* (parasitic type) relationship, where one organism benefits and the other does not.

#19 Cross the bridge over a streambed and, in the spring look for the bright red flowers of Indian warrior growing along the banks. Point out the lack of ground cover and the evidence of erosion. The next bush on your right, with small green leaves and red berries is a (*Cotoneaster spp.*) bush. Cotoneaster is a non-native plant from Russia, brought in as an ornamental. Along this part of the trail is a good place to tell a little of the history of Huddart Park. See the Chickadee trail portion of this guide for the Huddart Park history.
Stop on the next bridge. Here plants surround the streambed and there is less erosion evident. Wild ginger (*Asarum caudatum*) can be seen here in spring. The roots and stems of this plant are widely used in cooking. Examine the tips of the surrounding redwood trees, the lighter green is the new growth needles. Early in spring, these are very tender and high in vitamin C although they have a very strong flavor when eaten raw. Notice the black button fungus, which covers a nearby downed tree.

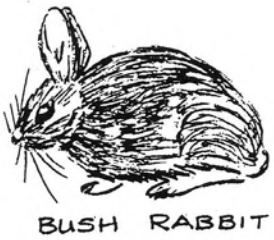
#20 Cross over the small grassland area, look for wasps flying low to the ground and observe where they have made their homes in burrows. Talk about the wild grasses and the fact that many of them are not native and were brought here during the time of the Spaniards. Non-native grass seeds were transported in the hooves of cattle, the grass itself was brought over and was used as feed for livestock, ingested and then the undigested seeds were deposited in their dung. Looking directly ahead you will see a log sitting on the grass. This is a favorite hang out for Western fence lizards (*Sceloporus occidentalis*). Have students search for gopher mounds in the grass, when the lizards are especially active you can observe them using gopher burrows.


WESTERN FENCE LIZARD

You have now completed the loop. You may wish to use the following activity as a way to focus the group and end the hike. Before they depart be sure to give students the opportunity to ask any final questions. Ask a few wind up questions of your own. Give students the opportunity to use restrooms.

Pass the Magic Rock

Carry a favorite (colorful) rock in your pack. Tell children it's a magic rock. Whoever holds it will remember one great thing they saw or learned on the hike (Ask different children to use one of the five senses for something new they saw, smelled, etc.). After their turn, they pass the rock to someone else. When the magic rock holder speaks everyone must quietly give his or her full attention.



BIBLIOGRAPHY

Borror, D. J., Triplehorn, C.A., and N.F. Johnson. (1992). An Introduction to the Study of Insects. (6th ed.). Harcourt Brace College Publishers, San Diego, CA.

Cooney-Lazaneo, M. and K. Lyons. (1981). Plants of Big Basin Redwoods State Park. MountainPressPublishingCompany, Missoula, MO.

Elpel, T.J. (2000). Botany in a Day. (4th ed.). HOPS Press, Pony, MT.

Kirk, D. (1975). Wild Edible Plants of Western North America. Naturegraph Publishers, Inc. Happy Camp, CA.

Lyons, K. and M.C. Lazaneo. (1988). Plants of the Coast Redwood Region. Looking Press, Boulder Creek, CA.

Pickwell, G. V. (1972). Amphibians and Reptiles of the Pacific States. Dover Publications, Inc. NY.

Pojar. J and A. MacKinnon. (1994). Plants of the Pacific Northwest Coast. Lone Pine Publishing, Redmond, WA.

Stebbins, R. C. (1966) A Field Guide To Western Reptiles and Amphibians. The Riverside Press, Cambridge, MA.

Stebbins, R.C. (1974). Reptiles and Amphibians of the San Francisco Bay Region. University of California Press, Berkeley, CA.

ADDITIONAL ACTIVITIES

Sounds Around:

Have everyone quietly listen to all of the sounds around them. Have each person name one sound that they heard and what they think was making it. Ask them if they heard a sound that would not have been heard here two hundred years ago? Ask them if they heard any sound that they thought might not be heard one hundred years from now in this spot?

Magic Ring:

Materials needed: Loops made from 18" lengths of yarn. (Hand lenses - optional) Bug boxes.

Have each person take a yarn ring and lay it on the ground near the trail. Caution them to find a spot without poison oak (and help them to do so if they need it). Explore this "mini-ecology" for different leaf shapes, seeds, decomposers, animals, etc. using all of the senses. How are all of these things connected? I.e.. producers, consumers, decomposers, including water and energy. How can we respect this environment and minimize our impact?

Acorn Aware-nuts:

Materials needed: Acorns, a small sheet or plain colored handkerchief.

Hand out an acorn to each person. Have everyone examine their acorn very carefully, especially noting any identifying features. Collect all of the acorns. Spread them out on a sheet and have everyone find their "own" acorn. Do the same thing with some screws or bolts for comparison with man-made objects. In nature, nothing is identical!

Keep on Tracking:

Have everyone look for animal tracks along the side of the trail and on the trail. When a track is found, try to determine what kind of animal made the track and which direction it was headed. Does it appear that the animal was using a well worn game trail? There is too much poison oak for us to follow game trails. Have people suggest where the trail might lead to in either direction.

The Fallen Log:

Locate a fallen log or branch along the trail. Observe the variety of life forms living around and on it. Have everyone trace the energy from the sun to the tree, the log, and the decomposers, and note their ability to get energy indirectly from the Sun.

Poet - tree:

Materials needed: several pencils and pieces of papers.

Station people along the trail at various distances from an oak tree. Have each person write down three words that describe the oak tree from their own particular point of view. Collect all of the words and have three people arrange all of the words into a poem. Have the group poem read to everyone.

Favorite Food Finding:

Materials needed: small cards with a different wild food written on each (such as grass seeds, blackberries, acorns, wild strawberries, manzanita apples, yerba buena (for tea), miner's lettuce, soap root, bay tree nut, madrone berries, deer, woodrat, caterpillar).

Have each person name their favorite food, then the origin of the food. Hand out food finding cards and ask everyone to match the food listed on the card, and to look for something that eats that food somewhere along the trail. At the end, collect the cards and discuss the food webs that were found. *Note that all of the suggestions listed above may have been food sources for the California Indians.*

Are You an Animal?

Have each person say one way in which they are like an animal that they know well. Discuss qualities that all animals share, including ourselves, and qualities that may be uniquely human.

Where is Energy?

Materials needed: several pencils and pieces of paper.

Have each person find and write down the names of three things, one natural, one man made, and one that makes you feel good inside. Have each person decide how each of their things uses energy, and have everyone share their findings with the group.

Oak Silhouettes:

Have one person mime an oak tree silhouette that is visible to everyone. Have one person at a time which oak tree it is until the right one is chosen. The person who guesses correctly can be the next "oak mime".

Who's the Farmer Here?

While smelling the yerba buena or bay leaves, ask, "who's the farmer here?" Have everyone offer answers to the following questions: Who waters the plant? What happens during our long hot summers? Who plants the seeds? Who helps plants reproduce and gets a meal in return? Who tills the soil? Who eats the produce? Discuss comparisons between natural systems and farm culture.

Recipe for a Forest:

Materials needed: pencils and 3x5 cards or paper to write on.

Have each person sit on the trail about 15 feet apart. Have them write down a recipe for their ideal forest, listing all of the important ingredients (Rainbows, waterfalls, etc.). Have everyone share their recipes. Discuss whether their forest would survive year after year, and what additional ingredients would be needed. Suggest that they take their recipe home with them and draw their dream forest and share it with someone they love.

Food Chain (for children):

Explain the concept of a food chain. Have each person in the group assume the identity of an organism in a food chain for this forest. **Suggested possibilities:** start with a plant such as **grass,** then ask, what eats grass? Someone may say **deer,** and that's your second link, so what eats deer? **A mountain lion!** And what eats the mountain lion? What if it just dies? Who eats its body? **A vulture**? A and who eats the vulture? A fungus or **soil bacteria,** that's a chain of 5, if you need more - add the four basic essentials at the beginning, sun, air, water, soil. **Other possibilities:** 1) oak tree, oak tree moth larvae (inchworm), spider, jay, hawk, fungus and soil bacteria (decomposers). 2) Oak tree, squirrel, coyote, vulture, decomposers. When everyone's role has been decided, tell them that every time you say food chain during the hike, they are to get together in the order of their food chain as quickly as they can.

Cinquain (pronounced sin-cane) Poetry:

Materials needed: a pencil and a sheet of paper

A cinquain is a five line poem that succeeds in allowing for the combination of facts and feelings. The form is as follows:
First line: one word, giving title
Second line: two words, describing title
Third line: three words, expressing an action
Fourth line: four words, expressing a feeling
Fifth line: five words, a synonym of the title
(A synonym is another word that has - for the poet - the same meaning as the original.)
Take out a pencil and a piece of paper. Have the children, as a group, come up with a title (hopefully something they've seen on the hike so far). When they have agreed, or you have chosen from the ideas they have come up with, then lead them to come up with the second line, the third line, and so on. They may want to write more than one poem. Allow this if there is time and interest. Plan to read your poem(s) to each other and to the other groups at the end of the hike.

20 Questions:

Materials needed: 2 pencils and 2 pieces of paper or 3x5 cards

Divide your group in half. Have one group choose something special that they have seen on their hike. Have them discuss it thoroughly and quietly so that they know all about this thing. (This could be something like a turret spider or an oak tree.) Write the name of the thing down on their piece of paper. Have the two groups get together and take turns trying to guess what is on the other group's piece of paper. The only clue they may have is that it is something natural that they have seen on their hike, and they may ask as many as 20 questions which are answerable by "yes", "no", or "I don't know". When they guess the answer give them a small cheer (we have to keep the noise down here). If they just can't get it, give them a huge clue - spell it out, but only as a last resort.

Controlled Burns:
It has been known since the earliest European settlers witnessed and wrote accounts of it, that the California Indians would set fires to open up more countryside, providing better grazing for the animals they hunted as well as increasing the area in which they could gather seeds and other plant foods. In experiments, foresters burned a dense chaparral area. Previous to the burn, the deer population had been estimated at 30 per square mile. After the first burning, the population of the deer in the study area rose to 98 per square mile. The population rose to 131 per square mile in the second year, and dropped to a fairly stable 84 per square mile by the fifth and sixth years. Testimony from the Indians showed that they were well aware that the burns increased the deer supply.

Oak Trees/Acorns: At least seven species of oaks (Quercus) are known to have been used by Indians in various areas. The **coast live oak (*Quercus agrifolia*)** is believed to have been the preferred species. Among the deciduous oaks, the **valley oak (*Quercus lobata*)** was preferred. All species of oaks in California contain **tannin, or tannic acid**, which is bitter and makes the acorns unpalatable in their untreated state. There were two methods used to remove or neutralize the tannin and render the acorns "sweet". One was the bury the acorns in mud along the edge of a stream for several months and up to a year, in which time the bitter element was neutralized. The more **common method** consisted of removing the acorn hull, grinding the interior meat into a flour in a stone mortar or on a flat grinding slab known as a metate, and then pouring warm water repeatedly over the flour to **leach out the tannin**. A shallow concave pit was dug into the earth, lines with grass or conifer needles, and the acorn meal was put into the pit. Water was heated in a basket using hot stones. The hot water was then poured gently over the meal. Several such applications of warm water percolating through the meal were sufficient to remove the bitterness. The leached meal was mixed with water in a watertight basket and boiled by the use of hot stones into a gruel. The cooked mush was then edible. Some leached acorn meal could be flattened into a cake and baked on a slab next to a fire, but most tribes preferred the mush. They could improve the taste by the addition of spices or other flavoring. Large quantities were collected in the fall which is the bearing season for the oaks, and stored for winter use in granaries. In 1849, a village along the Feather River was observed to have collected nearly 50 bushels of acorns for a population of about 300. Another estimate is that about 500 pounds was a year's supply for a family. Acorns are very high in fat, and a diet of them must be supplemented with protein (typically fish and deer). Every species of oak does not bear with equal abundance every year. The **California Black Oak (Q. kelloggii)** and the **Interior Live Oak (Q. wizlizenii)** are the most reliable, bearing well every other year. **The Valley Oak (Q. lobata)**, the **Blue Oak (Q. douglasii)**, and the **Golden Cup Oak (Q. chrysolepis)** may bear well only every three years. If the acorn crop was light or failed altogether, the Indians would resort to other storable food resources, such as the Buckeye. Famines were not reported, so it is assumed that there were abundant food sources to fall back on until the preferred foods were back in production. The acorns in storage were often accompanied by leaves from the Bay Laurel to repel insects. Some Indians also preferred the acorns of the **Tanbark Oak or Tan Oak (*Lithocarpus densifolia*, not of the Quercus genus)**. These acorns have thicker shells making them less susceptible to rot, and to insect invasion. The Tanbark acorns have a lower protein content and higher in tannic acid than those of Quercus. Different tribes would use different plants and fungi to flavor the acorn mush. Some added a bit of earth clay which would absorb any bitter tannic acid remaining, and experts believe may have added needed minerals to the diet.

Buckeye: (Aesculus californica) These trees produce an abundance of round meaty seeds two inches in diameter. A stand of buckeyes might produce over 4 tons per acre per year. The seeds contain a bitter, poisonous alkaloid (aesculin) and have little fat or protein. They were not considered a staple food, but were a fall back crop when the acorns failed. The poison can be removed by either leaching or baking in an earth oven. The leaching process takes a long time. The seeds are quite watery (100 pounds of seeds produces about 32 pounds of meal). The taste was not as well liked as that of acorns.

Pine Nuts: Pinyon, Digger **Pine**, Sugar Pine, Yellow Pine, **Knobcone Pine (*Pinus attenuata*)** The seeds raw or roasted are quite edible. The knobcone cones must be heated in a fire to release their seeds. Split roots and needles of many varieties were used to weave baskets. Pine pitch (sap) was collected and could be heated and used for a glue as well as to seal (waterproof) baskets.

California Bay Laurel: The nuts were roasted and eaten. The leaves may have had some medicinal use. They were known to be boiled and used by the Yuki (to the north) for rheumatism.

Bedstraw: The roots could be used for a red or purple dye.

Buttercup: The seeds are edible and may have been mixed into a mush made of grass seeds.

Clematis: For cordage (string made from fibers), for shampoo, and possibly medicinally.

Coffee Berry: The berries are edible. The bark may have been used medicinally.

Cucumber, Wild: The roasted seeds may have been used for kidney trouble. The fruit is not edible.

Maidenhair Fern: Stems may have been used in basketry.

Grasses: Generally for edible seeds. Some may have been used for weaving baskets, mats, or cordage.

Hazelnut: The nut is very edible. The wood can be split very finely for weaving.

Iris: The fibers along the leaf edge were prized for cordage.

Miner's Lettuce: The succulent leaves may have been eaten raw or cooked.

Poison Oak: Face tattooing was very common among Indians of California. The plant juice was used to draw the design onto the face. Then soot was pricked in to make the design permanent. The result was blue-green in color and unfading.

Rose: The roots made a lovely pink tea used for colds. The leaves or petals may also have been used for medicinal teas.

Soap Root: The bulb was crushed and used to kill fish in a stream or pond (illegal today). The inner bulb was used as a soap or shampoo. The leaves were used by some California Indians as a green dye in tattooing. The leaves are edible raw or cooked. The bulbs were baked and eaten like potatoes. When cooked slowly, they lost their soapiness and were very nutritious. As the bulbs roasted, a thick substance was exuded which was used as glue for attaching feathers to hunting arrows. The glue could also be used to construct a brush from the tough outer fibers of the bulb.

Yerba Buena: Leaves dried for aromatic tea.

Yerba Santa: Leaves used for a medicinal tea, a poultice, and may have been smoked like tobacco.

Other medicinal plants: It is likely that the Indians in this area used many other plants for medicinal purposes. They did have over 4000 years to learn which plants would kill, which would heal, and which would nourish. We have only sketchy information, mostly from tribes in other parts of the state which outlived those on the Peninsula.

Land animals: Deer, elk, bear, rabbit, woodrat (***Neotoma fuscipes***), squirrel (***Sciurus* sp.**) were all eaten, as well as numerous birds both residents and migratory. Snakes, lizards, carrion eaters, and scavengers such as vulture and coyote were not eaten. These taboo may have had religious significance or simply been a matter of taste. The grizzly bear (Ursus arctos) had about the same diet as the Indians and was therefore often encountered while the people were out hunting or collecting food. Grizzlies are quite dangerous and were generally avoided. The smaller black bear, more common in Central California, was easier for a group of men to hunt. These animals were not only hunted for their meat. Fur, skins, and feathers were used for blankets, clothing, and ornamentation. Bones were used for whistles, rattles, jewelry, knives, scrapers, and chisels. Sinew was used to attach arrowheads to their shaft. Stomachs and intestines were used to store meat and fat. Teeth might become jewelry. Brains were used in the tanning process. Even deer toenails were used to make rattles. Nothing was wasted.

Fish: (trout, whitefish, perch) It is hard to say what fish these Indians may have caught in local streams. Most of the creeks in this area today are seasonal. It is possible that they made occasion trips to the bay or the ocean to visit relatives and take advantage in the change of diet.

Insects: (grasshoppers, caterpillars) Several species of grasshoppers and crickets were eaten as well as the caterpillars of several moths and the larvae of bees, wasps, ants, and beetles. Some fly larvae and pupae were also utilized. Added to soup or roasted in an earth oven. A hole would be dug in the middle of a meadow. People would surround the meadow and slowly walk toward the center, beating the grass with sticks as they went. Grasshoppers driven into the hole were collected, soaked in salt water, and roasted. Native California bees do not make and store much honey, but the Indians would collect what they could find, and the larvae were esteemed as a delicacy. Aside from the honey, there were few sweet things in their diet (manzanita berries being one). Another sweet delicacy was the honeydew of aphids which crystallizes on the leaves of certain plants and can be collected. The plants would be cut at the base, laid on a woven mat, and beaten with a stick to dislodge the crystals.

Spices and salt: The Indian diet was probably fairly bland judging by our taste. Relatively few plants served as condiments. Nearly all California Indians used salt in one form or another. The four most common sources of salt in California are: 1) grass; 2) seaweed; 3) saline waters (from marshes, lakes, springs, or the ocean); 4) dry mineral deposits. If the Indians on the Peninsula had these, they most likely traded for them.

GLOSSARY

alleotrophic - the characteristic of some trees of exuding a chemical through their leaves and root system which inhibits the growth of other plants in their immediate vicinity, thus reducing competition for nutrients, moisture, and light.

amphibian - a class of vertebrate animals that usually have gills and live in or near water early in their lives and develop lungs later, included are frogs, salamanders, newts, toads.

arthropods - invertebrate animals characterized by segmented bodies and jointed legs, included are spiders, insects, crustaceans, and myriapods.

bacteria - one-celled microorganisms with no chlorophyll, multiply by simple cell division, visible only with a microscope, includes three main forms - spherical (cocci), rod-shaped (bacilli), and spiral (spirilla), some cause diseases such as pneumonia, tuberculosis, and syphilis, other are necessary for fermentation, nitrogen fixation, decomposition, etc.

burl - a woody knot or overgrowth on a tree.

chaparral - an ecological community characterized by evergreen shrubs such as manzanita, chamise, coyote brush, and scrub oaks which prefer dry, nutrient poor soil, plants are closely situated and often become an impenetrable thicket.

clearcut - a logging technique wherein all of the dominant species of tree in a given area are harvested for lumber, assuming that new growth will arise from the stumps or that seedlings planted in the area will quickly grow to replace the old growth. The lack of protective canopy often makes it difficult for new trees to get a good start, and lack of groundcover encourages erosion which strips away topsoil.

community - refers to any set of plants and animals that live together and depend on each other, i.e. the chaparral community includes, but is not limited to, chamise, poison oak, manzanita, ceanothus, yerba santa, hummingbirds, bumblebees, ants, lizards, snakes, deer, coyote, bush bunnies, and bunch grasses.

consumer - refers to an animal that survives by consuming plants and/or other animals.

cultivate - refers to a set of tasks necessary to the purposeful growth of a particular plant in a particular place includes, tilling, planting, weeding, thinning, watering etc. or any subset of these tasks.

deciduous - refers to a plant that loses its leaves during the winter or during times of drought.

decompose - to break down into its component parts or elements.

decomposer - an animal or other agent that assists in the decomposition of something else. Mold on bread, moss on rocks, banana slugs on leaves.

diversity - having a large number of different characteristics within a population, or a large number of different organisms within a community.

duff - the build-up of dead and decaying leaves or needles under an evergreen tree.

edible - being safe to eat.

environment - the place in which an organism is living.

erosion - the wearing away of soil or rocks by water or wind.

evergreen - refers to a tree that never loses all of its leaves at once, such as firs, live oaks, and redwoods.

forest - an environment where the dominant plant species is/are trees.

fungus (fungi, pl.) - an organism of the group that includes mushrooms, toadstools, molds, and mildew. They are classified as acotyledonous or cryptogamous plant with no green color.

gall - an unusual growth on the leaf, branch, or root of a plant usually caused by a tiny wasp which simultaneously lays an egg and injects a hormone into the tissue of the plant which causes the unusual growth. The gall provides food and shelter for the wasp larva, and usually does no permanent damage to the plant. The galls in oak species are very high in tannic acid.

germinate - to sprout, to begin growth from a seed into a plant.

grove - a group of trees mainly of one particular species growing close enough together to provide a complete or nearly complete canopy without undergrowth, a small wood.

habitat - the place in which an animal or plant lives, its immediate surroundings, its home.

hermaphroditic - bisexual, have the sexual characteristics and organs of both sexes in one organism, many mollusks have this characteristic.

inorganic - not part of a living organism or from a living organism, chemicals not containing carbon.

invertebrate - an animal without a backbone, includes worms, mollusks, arthropods, and other so-called lower forms.

lichen - one of a group of cellular cryptogamic plants without stems or leaves and consisting of algae and fungi growing in close association.

logging - the occupation of cutting down trees, cutting them into logs, and transporting them to a sawmill.

medicinal - having the property of healing or relieving a disease.

microclimate - a unique climatic condition involving a small area, differing significantly from conditions in surrounding terrain.

microorganism - a microscopic, or very small plant or animal such as bacteria, viruses, and protozoa.

mold - a downy, furry growth on the surface of organic matter caused by fungi.

mollusk - an animal in the phylum Mollusca, characterized by soft, unsegmented bodies, gills, a foot, and a mantle, includes snails, slugs, oysters, clams, octopi, squid, etc.

monotypic (species) - being the only species in a genus

moss - a small green, bryophytic plant growing on rocks, trees, moist ground, etc.

native - innate, belonging to a locality, as found in nature, not refined or altered by man.

niche - an organisms particular place in its community, suited to its particular skills and needs.

opportunistic - the character of a plant or animal that can adapt to a particular set of conditions or has the capacity to change the circumstances to meet its own needs, such as the establishment of chaparral plants in an area that has been logged, and is now open and dry.

organic - a chemical in or from a living thing, includes all carbon based molecules.

organism - an individual living thing.

parasitic - an organism that lives in or on another organism, taking all of its sustenance from the other without making compensation.

photosynthesis - the process in which plants use green chlorophll and water to turn light and carbon dioxide into sugar and oxygen.

predator - an animal that lives by hunting and eating other animals.

prey - an animal that is hunted and eaten by other animals.

producer - organisms that make their own food, plants are all producers.

ravine - a long, narrow, deep gully or hollow in the earth's surface, often formed by water erosion.

recycle - to put something back into use, dead wood in recycled by decomposers into soil and its nutrients used again by plants and animals in its community, paper is ground up and made into new paper that can be used again.

runoff - excess rainwater that cannot be absorbed once the ground has become saturated, or that is coming down so fast that the ground cannot absorb it all.

scat - feces of animals, often left along their trails to let other animals know that they have been there.

scavenger - an animal that eats refuse, dead leaves, scat, dead remains of other animals and plants.

seasonal - something that happens only at a certain time of year, such as streams that flow only during and for a short time after the rainy season, them dry up for the remainder of the year.

sexual dimorphism - in plants, when a particular species has distinct male and female flowers on the same plant or (as is the case with coyote brush) has distinct plants, one with female flowers, the other with male flowers.

soil compaction - a condition caused by repeated compression of the soil, as a well worn trail, or a skid road where heavy logs have been dragged over a period of time. When this occurs, it is difficult for plants to get established and for rain to be absorbed.

succession - one thing following another in a natural order, in ecological communities the order of succession is grassland to chaparral (or scrub) to mixed woodland to redwood forest (or mature forest, depending on conditions and climate).

symbiosis – An ecological relationship between organisms of two different species that live together in direct contact.

transitional - a term used to describe something that is temporary, such as the chaparral community growing in the compacted soil of an old logging site, eventually the chaparral will be replaced by oaks and then redwoods which are the natural dominant species in the area.

unpalatable - not very tasty, bad tasting.

SUGGESTED BACK PACK ITEMS

ALWAYS CARRY:
A TRAIL EMERGENCY CARD, WITH INFORMATION ABOUT WHAT YOU NEED TO DO IN AN EMERGENCY ON THE TRAIL, CHANGE FOR THE PAY PHONE.

SUGGESTED ITEMS

(YOU DON'T NEED TO CARRY ALL OF THESE ITEMS; FIND OUT WHICH ONES ARE NEEDED FOR THE ACTIVITIES THAT YOU HAVE PLANNED.)

1. **a small pocket knife**
2. a small trowel
3. a small flashlight
4. a small ruler and tape measure
5. a hand lens
6. **bug boxes**
7. **a small squirt bottle full of water**
8. compass
9. **soap root**
10. **oak gall**
11. acorns from different varieties of oak trees
12. a piece of plexiglass to watch a banana slug crawl
13. **facial tissues**
14. yarn for magic circles
15. color samples/ paint chips for color detectives
16. **pieces of paper**
17. 3x5 cards
18. **pencils**
19. soil thermometer
20. light meter
21. pennies
22. **plain colored handkerchief or scarf**
23. talking stone or stick - a special object to pass around, only the person holding it can speak
24. picture of poison oak in different phases
25. small calculator
26. binoculars
27. field guides (only carry what you think you will use, these are heavy) - ferns, insects & spiders, birds, plants of the redwood coast, fungi (especially useful in wet season), wildflowers, animals tracks.
28. any interesting rock, bone, fossil, or feather samples that you have collected elsewhere and feel would contribute to the group's understanding of this trail and its environs.

11. Trends in Teaching

- Next Generation Science Standards & Our Program
- Thematic Interpretation & NGSS
- NGSS Guidelines by Grade & Implementing on the Trail

NGSS: How it relates to Our Program

It is a very exciting time in education and we, as docents, can help! The trends are towards interdisciplinary, experiential learning approached in a collaborative way. This is being guided, in science, by the Next Generation Science Standards. The NGSS has been developed with the cooperation of states, experts, stakeholders and industry.

The main ideas for this context of learning is to have the students:

1. Ask questions
2. Define problems
3. Investigate and analyze data
4. Construct explanations
5. Design solutions

NGSS aims for students to work together and develop critical thinking skills and inquiry based problem solving. We are all familiar with the D school at Stanford, and that is the trend, for more 'design thinking'.

How does this relate to our hikes with K/1? With NGSS, the overarching idea or theme is called: Crosscutting Concepts, which bring in many disciplines to better understand a core idea. For instance, the theme of the hike might be 'adaptation' and this theme can be explored using the techniques below. Many docents are already using these techniques to engage the children.

First – we can have the children observe and describe something (leaf, rock, stem, bush, tree, cones, environments, animals, teeth, skulls, sun exposure, etc.) encouraging them to use their senses to observe the shape, size, color, texture, etc.

Second – have them compare what they have described with another object in the same class – i.e. two leaves: Maple leaf and Redwood leaf.

Lastly – have them contrast… what are the similarities, what are the differences.

This is to encourage the children to think critically and approach things with curiosity and a desire to explore and to establish a 'thinking pattern' or 'thinking map' to keep the children wondering why. The style of yesteryear, memorization, lecturing, rote, didactic, is being replaced with a spirit of inquiry and inquisitiveness to be rejoiced!

Lisa Putnam, Fall 2016

Themes that Embrace the Next Generation Science Standards

In designing your hikes, consider these themes that align with the new science standards emphasized in schools.

Patterns of Change
Living organisms and systems continually change in response to environmental circumstances, time, cycles, interactions, etc.

Habitat and Environment
Each living think has a role, or niche, in a specific physical environment called its *habitat*. There it lives with specific other organisms as a member of a community.

Relationships
Living things interact with, are modified by, and depend on other living things

Structure and Function
In living organisms, the design of a structure is generally shaped by its function and *visa versa,*

Adaptation
Living things are adapted to, modified by, and interact with the environment

Diversity and Unity
Living things are very diverse, yet similar in many ways

Interconnectedness
In living systems, everything is connected to everything else

Energy and Matter
Energy and matter are neither created nor destroyed, only transformed

- Matter is recycled, energy is not. Energy flows in one direction.
- Energy quality decreases whenever it is transferred, or transformed

NGSS Guidelines by Grade & Alignment to our Content

The State of California has adopted rigorous content standards in science. The Friends of Huddart & Wunderlich Parks programs support California Public Schools Life Science Curriculum Standards and New Generation Science Standards (NGSS).

The goal of the Huddart Park Nature Hike program is to facilitate children making concrete associations between science in the classroom and what lies beyond the school. Our focus is to connect and illustrate the concepts explored in the classroom and link them to the out of doors.

Our docents guide children through the process of observing and characterizing what they see on the trails. Children are lead through an inquiry-based problem solving process. Examples are included for the docents as suggestions for how they can incorporate the concepts into their engagements. The suggestions are in *italics*.

GRADE KINDERGARTEN

Use observations to describe patterns of what plants and animals, including humans, need to survive. (LS1.C: Organization for Matter and Energy Flow in Organisms; ESS3.A: Natural Resources; ESS2.E: Plants and Animals Change their Environment)

As a basis for understand these concepts:

1. Students know living things need water, air, and resources from the land
2. Students know plants live in places that have the things they need to survive
3. Students know plants and animals can change their environment.

Ask the children to:

- *Identify what all living things need to live; e.g., air, water, food, light*
- *Describe the ecosystem where the plants are living, e.g., forest, chaparral*
- *Describe how plants can change their location; e.g., seed dispersal via wind, animals, people, water*

GRADE 1

Plants and animals meet their needs in different ways (LS1.A: Structure & Function; LS1.B: Growth and Development of Organisms; ESS1.B: Seasonal Patterns)

As a basis for understanding this concept:

1. Students know both plants and most animals need water and light, food in some form
2. Students know animals eat plants or other animals for food
3. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight
4. Students know how to infer what animals eat from the shapes of their teeth; e.g., beaks, sharp teeth, eats meat, flat teeth for chewing
5. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

Ask the children to:

- *Use all five senses to observe & describe what they see*
- *Describe what a particular leaf/flower/tree/animal looks like; e.g., compare to other leaves, Compare to the size of the hand, shape, feels like, smells like, where it lives*
- *Use the terms herbivore, carnivore, and omnivore & know their difference, categorized by main type of food they eat, predator or prey*
- *Look for signs that animals live in the area; e.g., chewed leaves, banana slug slime*
- *Look for prints and scat on the trail*
- *Observe woodrat shelters in trees & on the ground*
- *Discuss what plants need*
- *Look for plants which are competing for sunlight*
- *Compare full sun to shady environments; e.g., ecosystems*
- *Look for special plant adaptations- thorns, poisons, and bitter taste*
- *Compare seed cones and what they do*
- *Compare trunks of redwoods and madrones*
- *Feel the coolness of the madrones*

GRADE 2:

Plants and animals have predictable life cycles. Interdependent relationships in ecosystems. (LS2.A Interdependent Relationships in Ecosystems; LS4.D Biodiversity and Humans)

As a basis for understanding this concept:

- Students know that organisms reproduce offspring of their own kind and that the offspring often resemble their parents and one another.
- Many young plants and animals look similar to their parents. (but note differences, also)
  Ask the children to:
  - *Identify animals which produce off springs that look similar to their parents; e.g., does and fawns*
  - *Buckeyes and buckeye seedlings leaf patterns*
  - *Describe differences in a mature and young redwood*
- Students know that many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment
  Observe differences:
  - *Oaks, e.g., influenced by climate, size & number of acorns produced, smaller trees eaten by deer*
  - *Variation of size; e.g., depending on availability of food sources for animals, competition from neighbors for plants, and water; e.g., drought, fewer deer.*
  - *Sunlight*
- Students know there is a variation among individuals of one kind within a population
  Observe and compare:
  - *Individual differences among the students and adults in the group*
  - *Different size deer seen on the trails – some age, gender related differences*
  - *Different growth patterns in the same trees depending on environment*
  - *What is growing under the redwoods; e.g., presence of thick layers of duff make it difficult for seeds to germinate & so reproduce via shoots (Seeds do germinate after fire clears the duff.)*
- Students know flowers and fruits are associated with production in plants
  Identify:
  - *Flowers or fruit or seeds on wildflowers, grasses, some trees in various locations*
- Students know there are seasonal variations in leaves on deciduous trees & shrubs

<u>GRADE 3:</u>

Adaptations in physical structure or behavior may improve an organism's chance for survival. (LS4.C: Adaptation; LS4.B: Natural Selection; LS2.C: Ecosystem Dynamics, Functioning and Resilience)

As a basis for understanding this concept:

1. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
   Evidence of adaptation:
   - *Camouflage value of banana slug's color allows the slug to blend in with fallen bay, coffee berry leaves, slime distasteful to many predators*
   - *6-12 inch bark on redwoods protects from fire damage*
   - *Deer have big ears, good hearing, eyes on the side, & flat molars to chew plants*
   - *Coyote – large ears, canine teeth, binocular vision are tools for a predator*
   - *Many leaves in the chaparral are small, hairy or sticky to prevent water loss*
2. Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forest, grasslands, and wetlands.
   Discuss:
   - *Variation in different ecosystems at Huddart; e.g., woodland, redwood, chaparral*
   - *Deer, ground squirrels, pocket gophers, snakes, predatory birds*
   - *Banana slugs and ferns live in forest environments*
3. Students know living things cause changes in the environment in which they live; some of these changes are detrimental to the organism or other organisms, and some are beneficial.
   A*sk what are the positive and negative impacts of:*
   - *Changing trail area made by humans and deer*
   - *Clearing areas of plants, shrubs, & tree; e.g., loss of nesting areas, too much sun*
   - *Reusing a nest built by one species by another*
   - *Tannins in redwood tree; e.g., inhibit growth of many plants*
   - *Banana slugs and fungi clearing debris*
   - *Woodrats' nests provide cover; e.g., other creature share or occupy nests*
   - *Oak moths striping oak trees; e.g., impacts acorns production, forcing out acorn woodpeckers and leaving few leaves for next generations of moths*
   - *Scrub jays distribute acorn; e.g., oak trees sprout in new areas, less crowding*
4. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.
   Describe what happens:
   - *Drought; e.g., some animals come to lower elevation seeking food and water*
   - *Seasonal variation; e.g., dry to wet to dry; trees loose leaves & new leaves grow in spring*

- *Banana slugs need to seek out damp, cool spots during dry months*
- *Birds migration to locations where there is more food*

5. Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.
    - *Ferns have lived on earth for more than 180 million years*
    - *Lizards are modern relatives of dinosaurs*
    - *Scientists believe birds evolved from dinosaurs*

GRADE 4:

All organisms need energy and matter to live and grow. (ESS3.A: Natural Resources; LS1.A: Structure and Function)

As a basis for understanding this concept:

1. Students know plants are the primary source of matter and energy entering most food chains.
   D*iscuss:*
    - *Acorns are consumed by birds, humans, squirrels, coyotes, bob cats, and deer*
    - *Roots and seeds consumed by pocket gophers and ants*
    - *Leaves consumed by caterpillars*
    - *Nectar from flowers consumed by insects and hummingbirds*
2. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
   Discuss:
    - *Relationship between four types of consumers; e.g.,* herbivores, carnivores, omnivores, and detritivores
    - *Ask children to visualize a food chain & describe one*
    - *What is at the bottom of the food chain (primary producers = plants),*
    - *Who eats the producers; e.g., primary consumers, insects*
    - *Who eats primary consumers; e.g.*
    - *Identify secondary consumers; e.g., snakes*
    - *Who is at the top of the food chain; e.g., hawks, mountain lions*
    - *Identify who would compete for nuts & berries (birds, humans, some mammals)*
3. Students know decomposers, including many fungi, insects, and micro-organisms, recycle matter from dead plants and animals.
   A*sk what is happening:*

- *Who might like the decaying log – insects*
- *What happens to all the dead debris (detritus); e.g., recycled*
- *Banana slugs recycle leaf debris*
- *Describe how a fungus gets it food; e.g., 'eat' by releasing enzymes outside of their bodies that break down nutrients, from either living or dead matter, into smaller pieces that they can then absorb.*

Living organisms depend on one another and on their environment for their survival.

As a basis for understanding this concept:

1. Students know ecosystems can be characterized by their living and nonliving components.
   Ask what are:
   - *Differences when viewing meadow, chaparral, woodlands*
   - *Biotic and abiotic characteristics; e.g., **biotic** factors include anything that is living, i.e.,plants, animals, fungi, bacteria; **abiotic** factors are sunlight, gasses, water, & soil*
2. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
   Ask:
   - *What are some of the variations in plant and animal communities across the various ecosystems*
   - *What might not be seen in a hot, sunny area vs a wet, cold location.*
   - *What do plants/animals need to survive?*
   - *What might animals/plants do to improve their chance of survival?*
   - *What is the impact of wind? (knocking down, drying up)*
3. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.
   Describe:
   - *Seed dispersal; e.g., wind, water, ants, burrs stick to coats of animals*
   - *Pollination; e.g., bees, humming birds*
   - *Animals eat berries and excrete them; e.g., toyon berries, huckleberries, elderberries*
   - *Shelter; e.g., tree cavities (birds), branches (woodrat), downed trees (fawns), undergrowth (quail)*
4. Students know that most microorganisms do not cause disease and that many are beneficial.

D*iscuss:*

- *What is a microorganism; e.g., bacteria, fungi, etc. that can't be seen by human eye, about 1% of them cause disease in humans*
- *Where do some beneficial microorganisms live; e.g., all over our skin, in our stomachs, and, in many herbivores' stomachs where they help digest the plants they eat*

GRADE 5

Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. (LS2.A: Interdependent Relationships in Ecosystems; LS1.C Organization for Matter and Energy Flow in Organisms; PS3.D Energy in Chemical Processes)

As a basis for understanding this concept:

1. Students know how sugar, water, and minerals are transported in a vascular plant.
   Explain:
   - *Vascular systems in a tree trunk; e.g.,* ***phoelm*** *conducts sugars and other metabolic products downward from the leaves;* ***xylem*** *conducts water and dissolved nutrients upward from the root and also helps to form the woody element in the stem*
   - *Refrigerator tree; e.g., thin bark means xylem are close outside of the tree, the water is cold because it comes from deep under ground*
2. Students know plants use carbon dioxide and energy from sunlight to build molecules of sugar and release oxygen.
   Explain:
   - *How plants are solar-powered. Their leaves are little solar factories which use carbon dioxide & sun. They store their energy just like batteries do.*
3. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide and water (respiration.)
   Discuss:
   - *How water and oxygen enter into and exit leaves. I.e., oxygen and CO2 enter into leaves through stomata which are small holes typically on the underside of leaves through them for respiration & excess water is released in a process called transpiration*
   - *How animals such as rabbits eat grass for energy and breathe out CO2 and moisture*
   - *How redwoods generate moisture via respiration*

12. History of the Parks

- Huddart Park
- Wunderlich Park & The Folger Stable

History of Huddart Park

The first inhabitants of this area were California Indians, commonly referred to as the Ohlone, who lived in the bay area for 10,000-20,000 years. The Ohlone were hunter/gatherers. The Ohlone were master basket makers and used many of the plants in the forest for that craft. In 1769 the Portola party arrived on the peninsula as part of a Spanish expedition and began to establish missions shortly thereafter. Many natives converted and their way of life changed. Many Indians died of diseases introduced by the Europeans. By 1860 all the native settlements in San Mateo County had disappeared.

In August 1840, the Governor of Mexican California granted a parcel of land, later called Rancho Canada de Raymundo, to John Coppinger, an Irishman who had become a naturalized Mexican citizen. This 12,545-acre rancho contained the 973 acres, that are now Huddart Park.

In 1850, the California Gold Rush was booming, and the demand for lumber to build San Francisco resulted in extensive logging operations in the rancho area. Near the present borders of the park, five sawmills operated between 1853 and 1860. Richard's sawmill, built in 1853, operated just outside the present park boundary west of Skyline Boulevard. From this mill, Richard's Road led down the mountain. Wagons loaded with lumber and drawn by teams of oxen traveled down it towards Redwood City, where the lumber was barged to San Francisco. Today, Richard's Road Trail follows the route of this old road.

Near the park is the historic Woodside Store built in 1853 by Dr. Orville Tripp. Tripp's store was at the hub of activity during this early logging boom since about 15 sawmills were within five miles of its door.

James Huddart was a wealthy San Francisco lumberman and long-time resident of Woodside. He was raised in an orphanage with his sister and apparently spent a rather miserable youth. It was his desire to do something with his holdings in San Mateo County, particularly for the youth in the area. (The claim about Huddart being an orphan has recently been controverted. Research is ongoing).

Before his death in 1935, Huddart deeded 900 acres of his property to the County of San Francisco with the provision that it would be developed into a public park. Due to water rights problems along Squealer Gulch Creek, San Francisco held it only two years. When the State of California also had problems with the water rights, the property was willed to the County of San Mateo, who has owned and operated the land as a public park since 1944.

History material from:
"Huddart Park History" County of San Mateo, Parks Department, September 1, 2014, http://parks.smcgov.org/huddart-park-history

SHORT HISTORY OF THE FOLGER STABLE & WUNDERLICH PARK

- In 1841 John Coppinger was awarded a land grant for Canada De Raymundo 12,500 acres (most of Woodside) for assisting a group of dissidents called Californios headed by Juan Bautista Alvadrado against the Mexican government in Monterey. Over the next few years the parcels that make up our parks were sold to various characters, such as Charles Brown, who built the first sawmill on the peninsula at Woodside Rd & Portola Rd., and John Coffee Hays who was the first Sherriff of San Francisco.

- In 1872 Simon Jones bought 1500 acres at Wunderlich and named it Hazelwood Farm. He had an exporting business, grazed cattle and planted grapes for making raisins to export. He hired Chinese laborers to build rock walls in dry stack that are still on the property. Simon also built the Cold House, which is the only building still standing from that time.

- In 1902 James Folger II purchased property. James' father, James I, had come to San Francisco at the age of 14 to join the Gold Rush. To earn money to get to the gold mines, he started working for the Pioneer Steam Coffee and Spice Mills. He would eventually buy the company and turn it into the successful J.A. Folger & Co. Coffee company.

- James had the Stable built before the mansion. The architect was Arthur Brown who also designed San Francisco City Hall, San Francisco Opera House, Hoover Tower at Stanford and Coit Tower.

- In 1956 the stable area of the property was sold to Martin Wunderlich who wanted to develop it into homes and a golf course. The Town of Woodside refused the development plans.

- In 1974 Wunderlich donated 940 acres to the county.

- In 2002 Friends started raising money for restoration. Renovations started in 2008 and were completed in 2010.

- The Folger Historic District is listed on the National Registry of Historic Places and includes: Main Stable, Carriage House, blacksmith barn, dairy house and stone walls.

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