



The Friends of Huddart and Wunderlich Parks

HIKES • HISTORY • HORSES

CA Life Science and NGSS Standards in Huddart Park Nature Hikes

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.

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: STANDARD 2

Plants and animals meet their needs in different ways

1

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*

2



GRADE 2: STANDARD 2:II

Plants and animals have predictable life cycles.

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

GRADE 3: STANDARD III.

Adaptations in physical structure or behavior may improve an organism's chance for survival.

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.

Ask 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* 4
 - *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: STANDARDS 2 AND 3

All organisms need energy and matter to live and grow.

As a basis for understanding this concept:

1. Students know plants are the primary source of matter and energy entering most food chains.

Discuss:

- *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. 5

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.

Ask 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 its 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.*

GRADE 4: STANDARDS 2 AND 3 III

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.

Discuss:

- *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: STANDARD 2:

Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials.

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., **phloem** 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*