Exploring Local Ecology

Santa Barbara Botanic Garden, 2010.

This CD provides a photographic introduction to Oak Woodland, Riparian Woodland, and Chaparral Habitats of the Santa Barbara region. Background notes for teachers are provided in a separate booklet. This program is provided for use by teachers.

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Exploring Local Ecology
What is ECOLOGY?
ECOLOGY is the study of the interactions between organisms and their environment.
What is an ECOSYSTEM?
An **ECOSYSTEM** is a community of organisms together with its physical and chemical environment.
What is an ADAPTATION?
An ADAPTATION is an inherited trait that increases an organism’s chances of reproducing and surviving in a particular environment.
Hummingbirds have long thin bills and tongues. These adaptations allow them to obtain nectar from long tubular flowers.
What are FOOD CHAINS?

What are FOOD WEBS?
A **FOOD CHAIN** is a diagram that shows how energy in food molecules flows from one organism to the next.

A **FOOD WEB** is a more complicated diagram that shows the many energy pathways in a real ecosystem.
Seeds -> Mice -> Owl
Why are **PLANTS** important in ecosystems?
PLANTS are able to make their own food through the process of Photosynthesis. As a result of this process, carbohydrates are produced and oxygen is released.

Because of this, plants are called PRIMARY PRODUCERS.

Plants form the base of almost all food chains. Other living things depend on plants for their existence.
What is an HERBIVORE?
An **HERBIVORE** is a consumer that eats plants.

Herbivores are also called “Primary Consumers.”
Mule Deer are herbivores. They browse on many types of plants.
What is a CARNIVORE?
A CARNIVORE is a consumer that eats animals.
Great Horned Owls are carnivores. They eat mice and other small animals.
What is an OMNIVORE?
An **OMNIVORE** is a consumer that eats both plants and animals.
Coyotes are omnivores. They eat rodents, berries, and many other foods.
What are **DECOMPOSERS**?
DECOMPOSERS break down the remains of dead organisms from which they obtain energy.
There are many types of decomposers, including fungi and bacteria
Why Learn About Local Ecology?

So that we can:

• know & appreciate our surroundings

• have first-hand experiences in nature

• learn about fascinating interrelationships of plants, animals and other living things

• understand the need to conserve local species & habitats for future generations
The Ecology of Santa Barbara County is very complex. Look for patchy or mosaic patterns on the landscape.
OAK WOODLAND
The Oak Woodland Environment

• temperatures warmer in summer, cooler in winter
• soils either deep and fertile or rocky and well-drained
• usually on north-facing slopes or in valleys and canyons
• tall trees up to 75 feet
• deep roots reach underground water
• much leaf litter
California has diverse oak habitats and many different species of oaks.
Coast Live Oak

This evergreen oak tree is common around Santa Barbara.
Valley Oak
This deciduous oak grows in inland valleys.
California Black Oak
A deciduous oak with beautiful fall color.
Coast Live Oak and Toyon
Shade-loving plants grow under oaks.
Hummingbird Sage and Fairy Lanterns
More shade-loving plants
Baby Blue Eyes and Farewell to Spring
Poison Oak
Special woodland flora
Checker Lily and Humboldt Lily
Vines climb among the trees.
Clematis has white flowers and feathery fruits.
Ferns of the oak woodlands
Squirrels & Chipmunks feed on acorns and other plant foods?
Hoary Bat
This nocturnal animal feeds on insects.
Red Shouldered Hawk and Scrub Jay

birds of riparian and oak woodlands
Cicada
an insect of the oak woodland
Acorn Woodpeckers store acorns in granary trees.
Mule Deer

herbivores of grasslands and woodlands
Nocturnal Hunters
Great Horned Owl and Barn Owl
Mushrooms are reproductive structures. They produce spores.
Fantastic Fungi
important decomposers of oak woodlands
California’s Magnificent Mushrooms
many different species grow in local woodlands
Oak Galls

Salivary secretions of gall wasps cause oaks to form galls. Galls provide food and shelter for gall wasp larvae.
Lichens grow on rocks, soil and tree bark. They cannot live in areas with polluted air.
Lichens are composite organisms made up of Symbiotic Associations of Fungi and Algae.
Mistletoe

This bright green plant is a parasite of oaks and other plants.
RIPARIAN WOODLAND
The Riparian Woodland Environment

- year around water from streams and/or high water table
- may be cooler in summer than in surrounding areas
- may freeze in winter due to cold air drainage
- tall trees, many of which are deciduous
- branches often overlap and create deep shade
- many plants with big leaves that trap as much light as possible for Photosynthesis
Riparian Woodlands follow streams through our dry country
Stream banks are lined with moisture-loving plants.
Western Sycamores
shady giants along the streams
Colorful Cottonwoods
Big-leaf Maple
another deciduous tree
Special stream-side plants
Orchids and Cattails
Yellow and Scarlet Monkeyflowers: beauty in damp places
Streams and Vernal Pools are critical for California’s wildlife.
The Santa Ynez River flows after winter rains.
The same river is often dry in summer and fall.
Riparian Food Pyramid
Microscopic Diatoms and Green Algae are important primary producers in streams
Leaves and twigs from riparian trees are important food for herbivores in streams
Azolla or Water Fern
a tiny floating fern of calm fresh waters

A Plant that Cleans Water

A team of Israeli botanists has discovered that the water fern, Azolla, can soak up large amounts of harmful heavy metals such as nickel, zinc, copper, cadmium, chromium, and uranium from polluted water. When these plants are harvested, dried and burned, some of the metals can be recovered and reused.
Many species of aquatic insects are important in stream food webs
Dragonflies & Damselflies are carnivorous insects with aquatic larvae and terrestrial adult forms.
Crayfish are Crustaceans
Western Pond Turtle
a reptile with an uncertain future
Many birds nest near streams and lakes. Different designs and building materials are used.
Mallard Ducks show sexual dimorphism
Egrets and Great Blue Herons feed on fish, frogs, gophers, and other animals.
The Osprey feeds on fish.
The Raccoon is an omnivore.
It eats fruits, nuts, insects, rodents, frogs, eggs, and crayfish.
CHAPARRAL
The Chaparral Environment

- drier than oak woodland
- often on south-facing slopes
- rocky, well-drained soil
- deep roots penetrate underground water sources
- dense impenetrable thickets of shrubs up to 8 feet high
- diversity of shrubs, many with stiff, small, evergreen leaves
- fire important in nutrient cycling and plant reproduction
Chaparral is known as the “Elfin Forest.” It includes many species of tough-leaved shrubs.
The deep roots of Chaparral shrubs obtain water from underground.
Chaparral Shrubs:
Manzanita and California Lilac
Chaparral Shrubs: Monkeyflower, Sage, and Yucca
A cycle of fire and re-growth
Fire-fighting over burning chaparral
Smoke from the huge Zaca Fire
Masses of flowers bloom among the charred shrubs during the spring following a fire in the chaparral.
After a fire in the chaparral shrubs re-sprout and wildflowers grow.
Wild Cucumber or “Manroot” sprouts quickly from a huge storage root after fire.
In following years more interesting shrubs mature. Sticky Snapdragon and Wooly Blue Curls
Ceanothus Silk Moth larvae feed on *Ceanothus* leaves.
Caterpillars of Monarch Butterflies eat Milkweed leaves and accumulate their poisons. Birds learn to avoid eating them.
Chaparral flowers attract Checkerspot Butterflies.
Tarantulas
Many species of lizards live in the chaparral: Whiptail and Alligator Lizards.
Western Fence Lizard or Blue Belly
The Horned Lizard: a tough reptile with protective armor.
Gopher Snake and Kingsnake
Watch out for Rattlesnakes!
The California Thrasher sings the song of the chaparral.
Turkey Vultures & Condor are scavengers.
“nature’s garbage men”
The Bobcat is a carnivore. California’s smaller wild cat
Mountain Lion

a big shy wild cat

a fierce predator
Local Ecology - things to think about

• A great diversity of species is found in local ecosystems.
• Complex relationships exist between species.
• All naturally occurring species are important in an ecosystem.
• Loss of even one species affects the food web.
• Invasive (foreign) species cause damage to ecosystems.
• Pollution and disturbance affect ecosystems.
• It is up to all of us to help in the conservation of our native plants, animals, and ecosystems.