



ELSEE
Environmental Laboratory for
Sustainability and Ecological Education

Lesson 9: California Ecosystem and Geography

California Education Standards:

Kindergarten, Earth Sciences

3. Earth is composed of land air, and water. As a basis for understanding this concept:
 - b. *Students know* changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.
 - c. *Students know* how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).

Grade One, Life Sciences

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:
 - a. *Students know* different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
 - c. *Students know* animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.

Grade Two, Life Sciences

2. Plants and animals have predictable life cycles. As a basis for understanding this concept:
 - c. *Students know* many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.

Grade Three, Life Sciences

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:

- b. *Students know* examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- c. *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.
- d. *Students know* when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.

Grade Four, Life Sciences

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:

- a. *Students know* ecosystems can be characterized by their living and nonliving components.
- b. *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.

Grade Six, Ecology

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

- c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.
- d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
- e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil compositions.

Grade 8, Chemistry of Living Systems (Life Sciences)

6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:

- c. *Students know* that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.

Objectives:

Students understand the characteristics of the California ecosystem. Students understand the different plant communities in California, and are able to recognize them through their unique characteristics. Students should know the different influences (soil, elevation, aspect, etc.) that determine what kinds of plants are suitable to what kinds of environment.

Vocabulary:

Oak Woodland/Grassland – plant community located in the coastal areas and the interior valleys of the Pacific Coast Ranges

Riparian – plant community located towards the inland of California

Desert – areas of low rainfall and high and low elevation

Redwood – plant community located along the Pacific Coast Ranges in North America

Mixed Evergreen Woodland – plant community located along the Pacific Coast Ranges in North America

Chaparral – plant community located inland in California

Coastal Sage Scrub – plant community located on the coast of California

Lesson:



When people hear about California, they think about the Golden Gate Bridge, Hollywood, and perhaps the center of technological innovation. However, another unique characteristic of California is its diverse ecology of both plants and animals. Because of California's geography and climate, it has the ability to produce the best quality fruit and vegetables in the entire nation. California plant ecology is divided into seven main communities: oak woodland/grassland, redwood, chaparral, riparian, mixed evergreen woodland, coastal sage scrub, and desert.

Oak Woodland/ Grassland

This plant community is spread out throughout the lower elevations of California, mainly near the coastal areas and the interior valleys of the Pacific Coast Ranges. The dominant trees are oaks, which generally grow in cooler temperatures. Some examples are Coast Live Oak, Canyon Live Oak, Central Valley, and Blue Oak.

Redwood

This plant community is located along the Pacific Coast Ranges. Redwood trees can live well over 1000 years. This species of tree includes the tallest trees in the world, reaching to about 350 feet tall. Besides height, other unique characteristics of the redwood include its horizontal to slightly drooping branches and its bright red-brown color. Redwoods reproduce both sexually by

seed and asexually by sprouting of buds.

Chaparral

Chaparral is California's most extensive, native plant community. Semi-arid and shrub-dominated, it is characterized by its Mediterranean forests, woodlands, and scrub. This plant community is very diverse, including grasslands, oak savannas, woodlands, and chaparral. Of all the plant communities, chaparral has the most animal species living in it.

Riparian

This plant community is located more inland along streams where rich soils and high humidity produce a natural greenhouse effect. Common riparian communities include big-leaf maple trees and California bay laurel trees.

Mixed Evergreen Woodland

This plant community is located along the Pacific Coast Ranges and is dominated by conifers. Some of the popular plant species include Sugar Pine, Ponderosa Pine, White Fir, and Canyon Live Oak.

Coastal Sage Scrub

This plant community is located in coastal California and is characterized by low-growing aromatic, and drought-deciduous shrubs adapted to climate similar to that of Mediterranean. Some common plants include black sage, white sage, California buckwheat, coast brittle-bush, golden yarrow, and Lemonade berry.

Desert

The three main deserts in California are the Great Basin desert, the Colorado Desert, and the Mojave Desert. Some characteristics of the desert ecology include low rainfall, high (Mojave Desert) and low elevation (Colorado Desert). Common animals in desert include coyote, spotted bat, kangaroo rat, desert tortoise, and desert kit fox.

California Geography



The second largest state in the United States, California is very geographically diverse. From the highlands of the Sierra Nevada Mountains to the fertile farmlands of the Central Valley, California is home to both the highest and lowest points in the 48 mainland states. California is divided into many geographic provinces. Some notable ones include Cascade Range, Coast Ranges, Central Valley, Sierra Nevada, Mojave Desert, Peninsular Ranges, and Colorado Desert. These landscapes provide unique characteristics of varying plant community because of soil, distance from ocean, elevation above sea level, rain fall, and aspect.

Materials:

Maps of the natural regions of California, enough for each student

Activity:

Give each student a map of the natural regions of California. Go to different areas of the garden to see the different species of plants that make up these individual ecosystems of California. As we travel around our state in the map, with our fingers pointing to desert or grasslands or oak woodland, students will take us to that plant community in the garden. Then, we will go inside and look at the big map projected on the wall and talk about the uniqueness of each ecosystem and how all of these systems relate to each other.

The remaining time will be spent propagating for our garden project. Some will be transplanting; some taking cuttings, some planting asparagus and strawberries; some sowing seeds or transplanting seedlings.

Sources and Links:

<http://ceres.ca.gov/ceres/calweb/coastal/trees/riparian.html>

<http://www.pssac.org/castatesoil.htm>

<http://www.laspilitas.com/nature-of-california/ecology>