

# UC Santa Barbara

## Educational Materials

### Title

Redwood Ecology Lesson

### Permalink

<https://escholarship.org/uc/item/9wr642mf>

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### Publication Date

2011-04-01

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# SBBG: Exploring the Redwood Forest

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## Next Generation Science Standards

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

## EEI Concepts and Principles

### Principle II

#### People Influence Natural Systems

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Concept A. Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept B. Students need to know that methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept C. Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

Concept D. Students need to know that the legal, economic, and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

## **Lesson Plan: Redwood Forest**

**Objective:** Students will learn about the life cycle of a conifer, be able to distinguish evergreen vs. deciduous, and explore the redwood habitat, observing the forest canopy and understory. Students will learn about the loss of Coast Redwood habitat in California and why it is important to conserve and restore.

**Materials:** KIN Journals, Coast Redwoods Fun Facts page, California Map of Coast Redwood Distribution, samples of Redwood cones and seeds

**Introduction:** As the students enter the Redwood habitat, have them take note of any changes in temperature, light, and humidity that they notice.  
(KIN Journal, pg. 98)

**Procedure:** Discuss the life cycle of a coniferous plant. Define evergreen and deciduous and distinguish the differences. (KIN Journal pg. 98) (Note: There are deciduous Western Sycamores growing among the Redwoods.) Share some of the information from the Coast Redwoods Fun Facts page.

**Conclusion:** Emphasize the importance of conservation and restoration by demonstrating (with the map) the drastic loss of old growth Redwood forests in California and the “Not so fun facts” on the facts page.

## **Coast Redwoods: Fun Facts**

- Scientific name: *Sequoia sempervirens*
- Coast Redwoods occur in temperate rainforest environments of California characterized by heavy winter rains and dense summer fog.
- Coast Redwoods are **evergreen** conifers.
- A **conifer** is a cone bearing plant. Cones are where the conifers make and shelter their seeds. Conifers evolved long before flowering plants.
- Coast Redwoods have an average lifespan of 500-700 years, but can live over 2,000 years.
- The world’s tallest tree, named Hyperion, is a Coast Redwood that stands over 379 feet tall (That’s taller than the statue of liberty, by over 70 ft!)
- Coast Redwood cones are only an inch long, and contain 14-24 seeds. It would take around 100,000 seeds to equal a pound.

- During the foggy summer months, Coast Redwoods “create” their own rain from fog drip as moisture from the air condenses on their leaves and falls to the ground adding moisture to the forest floor.
- Many species of plants and animals live their entire lives in the **canopy**, including species of worms, salamanders, ferns and huckleberries.

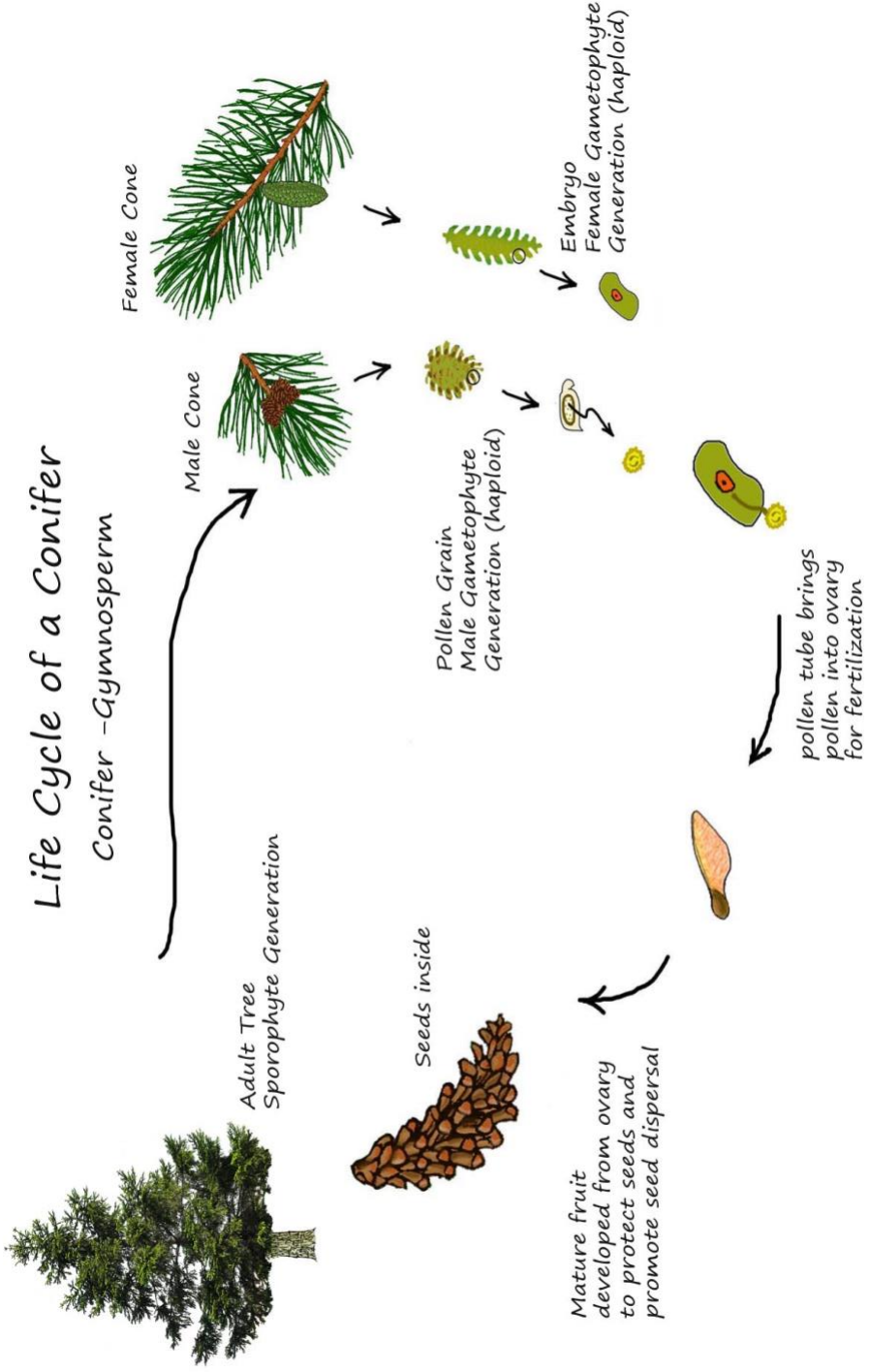
### **Not so fun facts**

- Of the original 2 million acres of ancient Coast Redwood forests, about 95% have been chopped down, only about 5%, or around 106,000 acres of old growth redwood forests remain.
- Unsustainable logging practices are still occurring to this day.
- There is an urgent need to protect and restore old-growth ecosystems in order to save the threatened species that rely upon them.

<http://www.savetheredwoods.org/education/coastredwood.shtml>

<http://www.redwoods.info/showrecord.asp?id=3950>

# Life Cycle of a Conifer Conifer -Gymnosperm



Female Cone

Male Cone

Adult Tree Sporophyte Generation

Seeds inside

Mature fruit developed from ovary to protect seeds and promote seed dispersal

pollen tube brings pollen into ovary for fertilization

Embryo Female Gametophyte Generation (haploid)

Pollen Grain Male Gametophyte Generation (haploid)