

UC Santa Barbara

Educational Materials

Title

Wetland Plant Adaptations Lesson

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Storke Wetland: Plant Adaptations

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-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

[Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

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.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

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.]

Lesson Plan: Plant Adaptations

Objective: Students will learn about the basic differences between aquatic and terrestrial plants and how they adapt to the environment in which they live.

Preparation: Cut out a wetland plant, and upland plant and cut to show cross section of stem and roots.

Materials Needed: Cross section of a couple wetland plant (tules), up-land plant (coyote brush), six hand lenses, one salt grass and pickleweed specimen, and a knife and clippers.

Introduction

Ask kids what all plants need to grow: Air, water, nutrients, sunlight

Can they get too much of these things? Yes, in those cases they then need to adapt to their environment. What do desert plants have to adapt to? (Little or no water, abundant sunshine) What do wetland plants need to adapt to? (Too much water and in this case salt)

If all plant's roots need air to live and grow, and wetland plant's roots are completely underwater, how have wetland plants adapted? They have air pockets in roots and hollow sponge like stems to transport air from above.

Show the cross section of the wetland plant, pointing out the adaptations it has made, and the differences between the upland plant and the wetland plant: it has big air pockets in roots to store air, hollow tall stems to stay above water level and transport air easily, also spreads by rhizomes (underground stems) because flooded water makes seed dispersal and germination difficult.

Tell kids a little about the history of Storke Wetlands: Historically was part of the Goleta Slough, which covered a huge area where the entire university and airport is. It also connected to the ocean which made the soil here highly salty.

What happens when we eat salty chips? We get thirsty

What effect does salt have on the growth of plants? Dehydration, as salt draws water out of cells a process called osmosis. So plants need to develop a way to stay hydrated and retain water.

What is osmosis? When there is too much salt in our body, we react by taking water out of our cells to dilute the salt which in turn makes us dehydrated. It is the same with plants, they lose lots of water in these salty conditions and must find a way to stay hydrated and move the salts out of their cells.

How do different salt marsh species adapted to this? Salt grass excretes salt through its leaves (so it tastes salty) Pickleweed has developed a way to isolate the salts in the top tips of the plant, and also has succulent fleshy stems to hold lots of water.