John Muir Study Guide
Science Lesson Plan
Grade Four
Unique Ecosystems

John Muir traveled throughout the world, and every place he visited he saw plants and animal species that could naturally be found nowhere else. One of his favorite ecosystems was that of the Giant Sequoia tree which grows only in southern Sierra mountains of California where the soil and climate are ideal for this species of tree. Muir recognized that the combination of weather, climate, soil, and available water are important factors in determining whether a particular plant or animal species can survive in an area.

In each place John Muir visited he learned about the plants and animals that live in the region, and how they have adapted to their environment.

Objective:

Students will be able to explain how in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

California Science Standard Grade Four, Life Sciences:

3a.   Students know ecosystems can be characterized by their living and nonliving components.

3b.   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.

Materials:

John Muir on Unique Ecosystems Reading Handout (also provided below)
Nature books
Internet access
Science and geography textbooks
World map

Preparation:

Share with the students this story about John Muir's travels in search of the rare Monkey Puzzle tree:

It was John Muir's ambition for much of his life to visit the forests of South America. One species of tree that was of particular interest to him was the *Araucaria imbricata* or monkey puzzle tree, an extremely rare species of tree that only grows high in the forests of the western slopes of the Andes Mountains in Chile. The tree had been given the name "Monkey Puzzle", as Muir explained in his journal, because "its prickly needles render ascent impossible to the monkey."

In November of 1911 he traveled by horseback into the high mountains of Chile with a small party of native guides, and there found to his delight the tree that he had been searching so long to find. Despite his age of 74 years, he climbed to the top of a 1,000 foot high ridge so he could walk among the trees for which he had been searching. He described the sight of this rare species of tree as "A glorious and novel sight, beyond all I had hoped for." He spent the day studying and sketching the trees and making notes about the ecosystem of which it is a part.

Activity:

Divide the class into groups of 2 or 3 students. Assign one of the following animals or plants to each group: Giraffe, llama, koala bear, panda, gila monster, arctic fox, penguin, grizzly bear, caribou (reindeer), Siberian tiger, lowland gorilla, coral, and lemur; and saguaro cactus, bamboo, Sequoia trees, Sitka spruce, deodar, and baobab trees.

Using the Internet or library for information, have the students research the ecosystem of which each animal or plant is natively a part. Ask the students to describe the nonliving features of the ecosystem in which each animal or plant lives (soil, water, climate, altitude, and geographical location), and make a list of 4 plant and 4 other animal species that also live in that ecosystem. Ask the students why they think the animal or plant can be found only in this one particular area. Suggest they think about sources of food and water and protection from predators. Ask the students if they think changes in the ecosystem, such as a change in climate or the loss

of a food source, would make it difficult for the animal or plant to continue to survive in its environment.

Have each group give an oral report to the class about the ecosystem of which their plant or animal is a part. Have the students show the class the place where their animal's ecosystem can be found on a world map .

John Muir Study Guide
http://www.sierraclub.org/john_muir_exhibit/lessons/science/