

John Muir Day Study Guide  
Science Lesson Plan  
Grades 9 - 12  
**Forest Management**

For much of his life, John Muir struggled to save and protect the Giant Sequoia trees of the southern Sierra. On April 15, 2000, President Clinton set aside some of the few remaining unprotected Sequoia groves by proclaiming a new Sequoia National Monument, thereby seemingly fulfilling Muir's dream. However, for decades natural fires have been suppressed and now there is an abundance of highly flammable material that has accumulated on the forest floor. Conflict has arisen over how the newly protected Sequoia groves and the surrounding forests should be managed to prevent catastrophic fires in the area.

**Objective:**

Students will be able to:

- analyze physical and biological changes in the Sequoia forest ecosystem resulting from human activity, especially logging and fire management practices.
- evaluate opposing views and the merits of each position on the controversy of how logging and fire management should be conducted in the Giant Sequoia ecosystem.

**California Science Standard Grades 9 - 12, Life Sciences (Ecology):**

6b. Students know how to analyze change in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.

**California Science Standard Grades 9 - 12, Investigation and Experimentation**

1m. Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include ...land and water use decisions in California.

**California History - Social Science Standards: Grade 11: United States History and Geography: Continuity and Change in the Twentieth Century**

11.11 Students analyze the major social problems and domestic policy issues in contemporary American society.

11.11.5. Trace the impact of, need for, and controversies associated with environmental conservation, expansion of the national park system, and the development of environmental protection laws, with particular attention to the interaction between environmental protection advocates and property rights advocates.

**Materials:**

John Muir on Forest Fires Reading Handout (also provided below)

DVD Player or VCR and television or access to YouTube:

View "Sequoia -- Ancient Race of Giants "on YouTube: [Part 1](#) | [Part 2](#)

DVD or VHS Video, "Sequoia: An Ancient Race of Giants" (20 min., 10/5/00)

available free for teachers from:

Sierra Club

John Muir Education Committee

P.O. Box 3543

Visalia, CA 93278

[sequoiavideo@fusemail.com](mailto:sequoiavideo@fusemail.com)

Please specify whether you prefer the DVD or VHS videocassette version and provide a verifiable proof of your status as a full-time or part-time teacher (e.g., school letterhead, school address, school e-mail address, photocopy of school ID card, copy of pay-stub (delete SS number) etc.).

**Preparation:**

Read the following excerpt by John Muir, from Chapter 9 of his book, Our National Parks:

"In the forest between the Middle and East forks of the Kaweah, I met a great fire, and as fire is the master scourge and controller of the distribution of trees, I stopped to watch it and learn what I could of its

works and ways with the giants [Giant Sequoia]. It came racing up the steep chaparral-covered slopes of the East Fork cañon with passionate enthusiasm in a broad cataract of flames, now bending down low to feed on the green bushes, devouring acres of them at a breath, now towering high in the air as if looking abroad to choose a way, then stooping to feed again, the lurid flapping surges and the smoke and terrible rushing and roaring hiding all that is gentle and orderly in the work. But as soon as the deep forest was reached the ungovernable flood became calm like a torrent entering a lake, creeping and spreading beneath the trees where the ground was level or sloped gently, slowly nibbling the cake of compressed needles and scales with flames an inch high, rising here and there to a foot or two on dry twigs and clumps of small bushes and brome grass. Only at considerable intervals were fierce bonfires lighted, where heavy branches broken off by snow had accumulated, or around some venerable giant whose head had been stricken off by lightning."

"Fire attacks the large trees only at the ground, consuming the fallen leaves and humus at their feet, doing them but little harm unless considerable quantities of fallen limbs happen to be piled about them, their thick mail of spongy, unpitchy, almost unburnable bark affording strong protection."

Note for the students that in Muir's time, frequent, low-intensity fires only killed an occasional large tree, mostly burning underbrush and small trees. Accordingly, forest fires were not catastrophic, as he observed first-hand. After a century of trying to control forest fires, today there is a greater amount of underbrush, and when a forest fire occurs, it can be catastrophic. But the latest research in fire ecology shows that young stands, whether created by logging or by stand-replacement fires, are more flammable than forests full of big old trees. Moreover, we have learned that Sequoia seedlings need bare mineral soil in order to take root; if there are too many

needles and duff on the forest floor, only a few seedlings will sprout.

Explain to the students that the Sequoia National Forest has been heavily logged and roaded over the past 100 years. During this time, fire was suppressed in order to protect the forest resources. Scientists now believe that this kind of human intervention has negatively impacted the ecosystem. They now have determined that the excessive buildup of duff on the forest floor creates a significant amount of fuel which could result in disastrous fires. Since a significant part of the forest has been declared a national monument, there is a campaign to restore natural processes to the forest. Prescribed burning is seen as a remedy that would use small, controlled burns to simulate natural forest fires. Others argue that the forests should be cleared by logging.

Students will view the 20 minute video, "Sequoia: An Ancient Race of Giants," which contrasts the two techniques that have been advocated to manage the forest: controlled burning and logging.

Prior to the video:

- Ask students if they have ever visited a Giant Sequoia Grove, and if so, what were their impressions.
- Use a map to describe where the Giant Sequoias are found in relation to local communities.
- What would they expect to find in the forest? It should be pointed out that a healthy forest contains water, soil, and clean air, in addition to trees and wildlife.
- If the students have had biology, ask them to describe the components of a forest ecosystem.
- Ask students to list the many ways the forests are used. Be sure that recreation, as well as resource extraction, is included.
- Without answering the question, ask students to consider what role fire plays in a healthy forest ecosystem. At this time, the video should be played.

After viewing the videotape, pose the following questions to the students:

- Why is fire necessary to promote a healthy forest ecosystem?
- In what ways are Giant Sequoia Groves dependent on periodic fires?
- What kinds of problems have we created by excluding fire from our forests?
- Is it important to take care of the forest surrounding the Giant Sequoia Groves if we want to protect the giant trees?
- Can the Giant Sequoias survive if we do not protect the forests surrounding them? Why or why not?
- Ask students why they think people 100 years ago were anxious to cut the Giant Sequoias down, while today most people want them to be protected. Point out that society's values change over time, and resource depletion has become a concern.
- Ask what they think future generations will think of our actions today.
- Ask students to list the pros and cons of logging vs. controlled burning to manage the Sequoia National Monument.

To complete the unit, have students express their own personal opinions on the subject in a writing assignment following the class discussion. Ask them to include their opinions about the following topics:

- Do you think the Giant Sequoia Groves should be managed to protect the species? Give your reasons.
- Which method of management do you feel should be implemented - logging or controlled burning? Or some combination? Give your reasons.
- What uses would you like to see made of the forests where the Sequoias are found?
- What kinds of responsibilities do we have for people in the future as we decide today how to manage the Sequoia Groves and the forests that surround them?

### **Useful Websites:**

Bush's Inferno by Pepper Trail:  
[http://www.sentienttimes.com/03/oct\\_nov\\_03/print\\_inferno.html](http://www.sentienttimes.com/03/oct_nov_03/print_inferno.html)

Sierra Club Sequoia Task Force :  
<http://www.sierraclub.org/ca/sequoia/>

Sequoia Forest Keeper:  
<http://www.sequoiaforestkeeper.org>  
Heritage Forests Campaign:  
<http://www.ourforests.org>

Giant Sequoia National Monument Management Plan (U.S. Forest Service):  
[http://www.fs.fed.us/r5/giant\\_sequoia/](http://www.fs.fed.us/r5/giant_sequoia/)

### **Additional Reading:**

A GUIDE TO SEQUOIA GROVES OF CALIFORNIA by Dwight Willard; A comprehensive guide to all of the Giant Sequoia Groves in California.

JOHN MUIR, MY LIFE WITH NATURE by Joseph Cornell; An autobiography of John Muir written for children.

OUR NATIONAL PARKS by John Muir; Contains an excellent essay on the Giant Sequoia Groves as they were in the 1870s.

CHALLENGE OF THE BIG TREES by Dilsaver and Tweed; A History of Sequoia and Kings Canyon National Parks.

All of the items above as well as other Sequoia-related items such as posters and pamphlets can be obtained from:

Sequoia Natural History Association  
HCR89 Box 10  
Three Rivers, CA 93271  
559 565 3759  
FAX 559 565 3728  
Email: [a-seqnha@inreach.com](mailto:a-seqnha@inreach.com)  
Website: [sequoiahistory.org](http://sequoiahistory.org)