

LESSON 4

Teacher Guide

Fire and California Forests (90 Minute Lesson Plan)



This lesson can be completed in the classroom, or at home using teleconferencing (such as Zoom, Skype, Google Meet, Facetime, etc.) and/or shared documents (such as Google Docs) during group activities such as discussions and group projects. Sections requiring use of one of these remote-access tools have been marked (). Before beginning this lesson, explain to your students how you would like them to participate in these group activities if your class will be completing the lesson at home.*

Please note that this lesson may be an emotional trigger for students who may have direct knowledge of or experience with a wildfire, house fire, or other fires. Please consider the experiences of the members of your class before deciding if this lesson is appropriate for your group.

Today's Topic: Fire and California Forests

NGSS 3–5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Introduction to Fire and California Forests (5 minutes)*

Have students watch the video, Fire and California Forests. Ask students to make note of how wildfires affect California forests. Then, ask students what causes wildfires and how wildfires affect forests.

Read and Respond

Humans and Wildfires (5 minutes)

Students should complete the short reading to learn about human involvement in wildfires and the different ways humans have caused an increase in wildfires.

Fire Management (5 minutes)

Students should complete the short reading to learn about how wildfires are managed, which includes fire suppression and prescribed burns.

Restoration After a Wildfire (5 minutes)

Students should complete the short reading to learn about restoration efforts that follow wildfires.

Student Response (5 minutes)*

As students complete the passages, have them join a group discussion about what they learned. These can be small groups or the whole class, depending on your class size and needs. If completing this lesson in the classroom, you could also have the students break into short discussions after each reading rather than waiting until all readings are complete.

Possible discussion questions:

Fires Keep Forests Healthy

- Why is it important to keep forests healthy?
- How can a fire help a forest?

Humans and Wildfires

- About how many wildfires are caused by humans?
- How does the number of acres burned by wildfires change each year?
- In which months do wildfires mainly occur?
- Looking at the graphs, what do you notice about the trends in wildfires?

Fire Management

- What does it mean to suppress a fire?
- Why is forest health important in managing wildfires?

Talk About Forests

Restoration After a Wildfire

- If a forest does not regrow quickly after a wildfire, what could the impacts be to the surrounding areas?
- How can a forest begin regrowing on its own?
- When might a forest need help to begin regrowing?

Research

Who Owns and Manages California's Forest? (10 minutes)

Direct students to appropriate websites or texts to determine current percentages of California forest ownership, or provide this data for students to use to complete this section.

One such resource is [Forest Research and Outreach](#) from the University of California. This page is static, but is a good starting point to find additional information about the percentages of ownership. Another resource is the [USDA](#).

Students should then complete the short reading on California's forest ownerships to learn more about how California's forests are owned by different groups of people with different needs.

Fighting Fire with Fire (20 minutes)

Have students watch the video ["The Story of Prescribed Fire - A Vital Part of Western Landscapes"](#) by the US Forest Service to learn more about prescribed fires.

As students watch the video, have them think about these questions:

- What is the purpose of prescribed fires?
- How has the landscape of the forest ecosystem changed after a fire?
- How did the forest service show that prescribed fires are beneficial to fighting wildfires?
- How are prescribed fires used to keep forests healthy?

Next, direct students to perform online research at the following websites to learn more about the importance of prescribed burns in managing forests.

- [Cal Fire](#)
- [American Forests: Restoring California Forests](#)
- [University of California: Forest Research and Outreach: Wildfires](#)
- [Stanford Woods Institute for the Environment](#)

Instruct students to take the ideas from the discussions and research to write a letter to their local and state government officials explaining why prescribed burns are important in protecting California forests and can help reduce the overall cost and damage from large, quick-spreading wildfires. Ask them to include information that mentions how prescribed burns can reduce the overall cost of firefighting as well as reduce the damage caused by large, catastrophic wildfires.

Fire and California Forests Word Scramble

Practice Vocabulary and Facts (5 minutes)

Have students complete the word scramble to help them practice identifying terminology and definitions for California forest-related terms.

1. The lowest layer of the forest is called the **FOREST FLOOR**.
2. Almost all major wildfires are due to **HUMAN CAUSES**.
3. Together, oxygen, heat, and fuel make up the **FIRE TRIANGLE**.
4. **SUPPRESSION** means to smother a wildfire.
5. Firefighters may perform a **BACKBURN** near the perimeter of a fire to prevent it from spreading.
6. Thinning the understory and forest floor provides a break in **LADDER FUELS**.
7. **PRESCRIBED BURNS** help manage a forest by removing the dead and decaying matter on the forest floor.

What Did You Learn?

Assessment Questions (5 minutes)

Have students complete the assessment, which allows students to apply what they have learned. Note: the correct answers are in bold.

1. Which statement explains why wildfires are generally harmful to the forest and human society?

- ✓ a. **Wildfires spread quickly and can destroy everything in their paths.**
- b. Wildfires remove dried matter on the forest floor and put nutrients back in the soil.
- c. Wildfires burn faster in forests with young trees and slower in forests with old trees.
- d. Wildfires remove the native trees, making room for invasive species to thrive.

2. Fill in the blanks. Wildfires can be reduced in severity by prescribed burns to clear the dead and dry matter and by thinning out the dead and diseased trees.

3. How can making a break in ladder fuels help preserve older trees during a wildfire?

A break in the ladder fuels will help slow down the wildfire from reaching the canopy and wolf tree layers in the forest because there will be a break in fuel between the lower and upper levels of the forest.

4. Which statement(s) about fire suppression are true? Select all that apply.

- ✓ a. **Suppression is used for slowing quickly moving fires.**
- ✓ b. **Suppression tools include creating fire breaks and dropping fire retardant.**
- c. Suppression tools are always used from helicopters or small airplanes.
- ✓ d. **Suppression removes one part of the fire triangle to put out the fire.**

5. The top cause of wildfires in California is:

- a. Lightning

- b. Drought
- ✓ c. **Humans**
- d. Climate

Apply to the Real World

Group Activity: Discussion (20 minutes)*

Have students complete the group activity to promote the sharing of opinions and working together.

Explain to students that they will be using what they have learned to restore an area near their school that has been burned by a wildfire.

Break students into small groups. Instruct students to discuss the prompt and write a response that includes the priority of the restoration and how they will approach the problem. Once groups have completed their discussions, bring the class back together and have each group present their ideas. Encourage students to consider each group's ideas and determine the best course of action for the restoration.

Discussion Prompt

Inform students that they are forming a group to organize a restoration in an area near their school that was burned by a wildfire. The school is donating shovels, buckets, and a \$50 gift certificate for a local garden shop. Ask students to discuss and determine one priority of their restoration and how they will approach the problem.