

Fires and Fire Suppression

Teachers: This lesson contains three classroom activities with discussion questions related to the AFG video clips about Fires and Fire Suppression. These parts may be used individually or together, depending on the needs of your class.

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site (www.pbs.org/americanfieldguide/teachers).

Grade level: 6-8

Background Information

Wildfires have occurred since the earth began. Many ecosystems are dependant on fires to maintain diversity, and a number of species are dependant on fire to reproduce. Naturally occurring fires are started by lightning storms and are part of the normal life cycle for forests and prairies. Native Americans recognized the value of fires on Prairies and would burn large areas to promote the growth of grasses that would attract wildlife such as bison.

However, in many places, wildfires create a hazard for human populations in terms of life, property and economic resources such as timber. During the 20th century, the US forest service practiced a type of fire management called fire suppression. In this practice, all forest fires, whether natural or manmade, were extinguished as rapidly as possible. The result has been a reduction of diversity as opportunistic plants have had their opportunities limited and the density of vegetation in the underbrush of forests. Because of this build-up, more recent fires have burned with more intensity since there is more fuel. High intensity fires can kill the entire local ecosystem, which can take years to begin to recover. In more normal conditions, low intensity fires generally burn out the underbrush, leaving most trees standing and create more habitats for organisms. The forest service has recognized this trend and is now turning toward a new method of management called prescribed natural burns that allow natural areas to burn if conditions are favorable.

In this lesson, students will examine their assumptions about forest fires. They will learn about the conflicts involved with the forest service's new strategy, and they will study one case where a prescribed natural burn had a significant impact on a later, uncontrolled wildfire.

Related National Standards

Content Standard C: As a result of their activities in grades 5-8, all students should develop understanding of

- Populations and ecosystems
 - The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

- Diversity and adaptations of organisms
 - Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Content Standard E: As a result of their activities in grades 5-8, all students should develop understanding of

- Science and Technology
 - Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance.

Content Standard F: As a result of their activities in grades 5-8, all students should develop understanding of

- Natural Hazards
 - Human activities also can induce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal. Such activities can accelerate many natural changes.

Extension Websites from PBS

- Kakadu – Beware! Lightning
http://www.pbs.org/edens/kakadu/classroom_lightning.html
 In this activity, students learn about lightning and its relationship to forest fires.
- Wild Places – Growing Prairie
<http://www.pbs.org/saf/1106/teaching/teaching.htm>
 This is an activity that allows students to experiment with the growth of plants under different levels of canopy.
- PBS TeacherSource – Science and Technology: Ecology
http://www.pbs.org/teachersource/science_tech/high_ecology.shtm
 This site contains a variety of other activities related to ecology for high school students
- PBS TeacherSource – Science and Technology: Ecology
http://www.pbs.org/teachersource/science_tech/middle_ecology.shtm
 This site contains a variety of other activities related to ecology for middle school students

Activity 1: Only You Can Stop Forest Fires**Time Allotted:**

20 minutes

Materials:

No special materials necessary

Objectives:

- Students will examine basic assumptions of modern society about forest fires.
- Students will be introduced to the concept of fire management in ecosystems.
- Students will learn about fire's role in maintaining diversity in an ecosystem.

Teaching Instructions:

1. Have students take out a piece of paper and write a short essay about the following question:
 - Smokey the Bear says 'Only you Can Stop Forest Fires'. Why should people avoid forest fires and should we stop all forest fires if possible?
2. Discuss student's answers.

**Watch the AFG Video Segment "Lake Wales Ridge State Forest"**

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site (www.pbs.org/americanfieldguide/teachers).

If you plan to go on to other activities in this lesson, go straight to the following discussion questions. If you do not plan to do other activities in this lesson, then have students re-write their answer to the essay question above before discussing the following questions.

Discussion Questions for Video Segment

- Is it ever all right to allow fires to burn on their own?
- What role does fire play in the ecosystem described?
- What do you think would happen to an ecosystem that used to depend on fire if fire was totally suppressed by humans?

Activity 2: A Heated Debate**Time Allotted:**

20-30 minutes

Materials:

No special materials needed

Objectives:

- Students will learn how human management of an ecosystem can create hazards for man and nature.
- Students will learn how different fire management strategies can impact an ecosystem.
- Students will use role-playing to prepare and present arguments.
- Students will attempt to weigh the different needs of citizens in a community to reach an agreement.

Teaching Strategies

1. Tell the class that they are going to imagine that they are members of a community near a national forest. The national forest is proposing using 'prescribed natural burning' as a forest management strategy. Different factions of the community have differing opinions about this. The students are to represent the different factions and will present the arguments.
2. Each student should be given an identity. They will either be 'rural homeowner in wooded lot near national forest', 'forest service manager', or 'taxpaying citizens in towns or cities'. You will want the identities to be evenly divided.

**Watch the AFG Video Segment: "Fighting Fire with Fire"**

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site (www.pbs.org/americanfieldguide/teachers).

3. Have students meet with other students who are playing the same role. Remind them that they represent a community near a national forest where the forest service wants to conduct prescribed natural burns. They should discuss what they learned from the video and they should brainstorm other arguments that people in their position might have.
4. Organize students for a jigsaw activity. Have one representative from each faction meet in small groups of three (e.g. the groups of three should contain a rural homeowner, a forest service manager, and a taxpayer citizen). They should each explain their position and they should debate what should be done.
5. Regroup with the whole class and ask groups to share points that came up and ask if anyone came up with any good solutions.

Activity 3: The Hash Rock Fire - The impact of prescription burns on an ecosystem

Time allotted:

One 45-minute class period

Materials:

- Computer lab/ stations for students working in pairs OR
- Copies of the Hash Rock Fire Map from the Ochoco National Forest, Prineville Oregon, one per pair of students (attached)
- Student handouts (attached)

Objectives:

- Students will read and interpret a GIS map to determine extent and intensity of fire damage
- Students will brainstorm natural and man-made controls on forest fires.
- Students will develop an understanding of how man's management of the ecosystem has led to more dangerous conditions within the ecosystem, for both man and nature.

Teaching Instructions:

In this activity, students will examine a map of a major forest fire that occurred in the Ochoco National forest. Embedded within the burn area is a small area that had been burned several years previously as a prescribed natural fire. In this case, it appears that the prescribed natural burn had a significant impact in lowering the intensity of the larger 'Hash Rock Fire' thus lending credence to the Forest Services new management strategy.

1. Divide the class into groups of two or three.
2. Give each group a map (attached).
3. Students should answer the questions in the student handout while looking at the map.
4. Review student answers to the questions.

**Watch the AFG Video Segment: "Prescribed Natural Fires"**

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site www.pbs.org/americanfieldguide/teachers).

5. Discuss the questions in the student handout again in light of information presented in the video.
6. If you did the first activity in this lesson plan, have students answer the essay question again: Smokey the Bear says 'Only you Can Stop Forest Fires'. Why should people avoid forest fires and should we stop all forest fires if possible?

Assessment Idea:

Ask students to assess their own answers to their map interpretation while watching the video. Have them write notes and update answers as they learn more during or after the video.

Hash Rock Fire

Student Instructions

Background Information:

The forest service describes the Hash Rock fire in the Ochoco National Forest as follows:

"Late in the afternoon of August 23rd, 2000 an isolated dry lightning storm (lightning with no rain) rolled over the Western section of the Ochoco National Forest. Some 12 fires were ignited in all. Most all were caught under an acre in size. One was caught at 20. One fire began in the bottom of the rugged Mill Creek Drainage and quickly spread to the Mill Creek Wilderness where heavy fuel loading and steep terrain carried the fire for the better part of a week. The fire would eventually threaten several private residences and Highway 26. Cooler fall weather and an aggressive burnout operation by firefighters stopped the fire's spread at 18,500 acres in late August. Occasional flare-ups and more moderate burning activity were observed and monitored on the fire through mid October."

<http://www.geocities.com/rainforest/jungle/5057/hasthumbz.html>

Procedure:

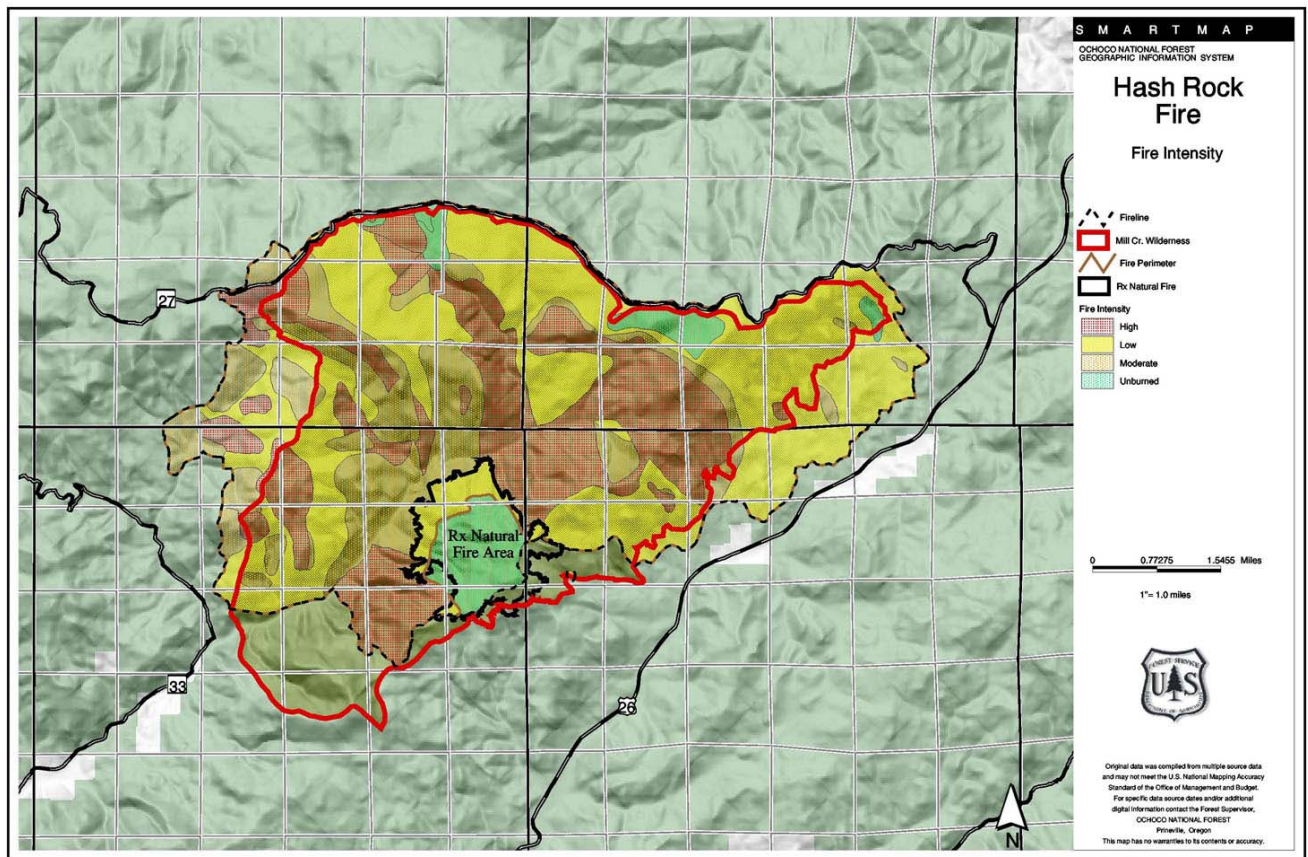
With your partner, go to <http://www.fs.fed.us/r6/ochoco/firenews/intens2.jpg> or look at the map provided by your teacher.

Answer the following questions:

1. Describe the pattern of burning and burn intensity that you see.
2. By looking at the map, what factors might stop the spread of the burn?
3. What other factors do you think might help stop burning?
4. On the map is a small area labeled Rx Natural Fire Area. How does the burn intensity appear to be affected in this area?
5. This Rx Natural Fire Area indicates an area that was allowed to burn when conditions allowed for easier control a few years earlier. How can a prescription burn affect the burn intensity of an uncontrolled fire?
6. In natural, unmanaged conditions, this area in the Ochoco National Forest would burn every 15-25 years. Under fire suppression management, it hadn't burned in 90 years.
 - o How do you think that might affect the ecosystem?
 - o How might it have affected the intensity of this burn?

Watch the video that your teacher shows describing the Hash Rock Fire and then revisit the questions above.

Hash Rock Fire Map



Map provided by Ochoco N.F.