



Fire: Friend or Foe

Background Information for Teachers

Throughout history humans have had a love/hate relationship with fire. The ability to purposely light fire enabled people to stay warm, cook food and have light at night. But people weren't always able to control fire — sometimes fire got out of control and wreaked havoc with the surrounding environment. Or did it? Forest fires seem to bring down the curtain, but sometimes they really are the opening act in nature's play. Fire presents opportunities for new life to begin; nearly every ecosystem in North America depends on fire. Our challenge is to try to understand its place in nature and reconcile our relationship to the mighty force that both gives and takes away life.

Some Native Americans referred to fire as "Grandfather Fire" because it was a force they couldn't always control, but one they must always protect. Fire was sometimes used as a hunting tool by many Native Americans. They often used fire to encourage growth of plants that were eaten by animals they hunted. For example, controlled burns kept the grasslands fertile so buffalo would be attracted to the area. In western Washington, Native Americans used fire to keep conifers from invading prairies (scattered areas of grass and oaks growing on coarse, gravelly soils). These fires encouraged the growth of camas, valued as a root crop, and maintained open grazing conditions favored by deer. Fire also was used to drive animals into places where Native Americans could hunt them more easily. Early white settlers imitated the native people's use of fire.

Fire has many natural benefits, as well as being useful to people. As areas are burned, grasslands are created instead of forests. Some trees, such as the lodgepole pine, giant sequoia, longleaf pine, ponderosa pine and Douglas fir, need sunlight to grow and are therefore helped by ground fires which clear out dense forest growth. The lodgepole pine needs the heat from a fire to open its cones and release its seeds. As forests burn, fire releases minerals from wood and grasses, breaking them down and returning them to the soil so plant roots can absorb them and grow more rapidly. The result is new growth that provides food for many animals.

Some animals use fire to their advantage. For example, the firehawk flies to a fire, picks up a smoldering branch or twig and drops it onto unburned grass. It then waits for a feast as mice, chipmunks and snakes run out of the way of the new fire. The Kirtland's warbler lives only in recently burned jack pine forests. The Steller's jay and pronghorn antelope look for food in both burned and unburned areas.

Skills

Discussion, cooperative learning, critical thinking

If **More Ideas** section is used:
Graphing, computer technology, persuasive writing

Subject Areas

Science, physical education

If **More Ideas** section is used:
Math, language arts

Materials

Paper

Drawing supplies

Scissors

Safety pins

Play Forest Fire Tag: Review with students the fire triangle (components necessary for fire): **heat, oxygen and fuel.**

Either outside or in the gym, play a tag game to simulate the pros and cons of fire. Prior to leaving the classroom, designate four students as fire, two others as firefighters. Have remaining students count off by threes. The “one’s” represent lodgepole pine seeds, “two’s” are houses and “three’s” are oxygen. Students are to make pictorial name tags to pin on the fronts of their clothes. As examples, firefighters might draw hoses or shovels, and fire could be illustrated as flames.

When outside or in the gym, designate boundaries for two circles: an inner circle and an outer circle. The fire and firefighter students stand in the center of the inner circle, and the remaining students form the outer circle. At your signal the fire students try to tag students in the outer circle, and the firefighter students try to tag the fire students. Fire students can enter the outer circle, but not the firefighters. Fire must leave the game when tagged by firefighters. When the lodgepole pine seeds are tagged by fire they become trees and “freeze” with their arms outstretched. When the houses are tagged they become ashes and sit down where they were tagged. When oxygen students are tagged they become fire and join the other fires in trying to tag houses and pine seeds. When all the houses and pine seeds have turned to ashes and trees, the fires must return to the inner circle (because all the “fuel” is gone). The game is over when there are no students left to tag.

Help students process their learning by asking questions about the game, such as: How was this game like a real fire? How was it different? In a real fire, what are some positive effects that happen? What are some negative effects? (see Background Information for more ideas) Alternatively, divide students into groups and have each group draft answers to the questions and present their thoughts.

More Ideas

1. Have students use a word processor to create fire stories from various perspectives: that of a Native American in the times before pioneer settlement, a Douglas fir tree in the coastal forest “waiting” for an opening in the canopy to give it a chance to grow, a firefighter, a wilderness ranger, a deer, a homeowner, or any perspective of their choice. Stories could be illustrated and bound as a class book.
2. Invite guest speakers to talk to the class about fire management. Guests might be firefighters with the Washington State Department

Huge forest fires are phenomenal forces; they have been known to create their own weather. As heat and moisture rise in the air, towering cumulus clouds form. They can cause lightning and start other fires. As oxygen is sucked into the fire, winds are created which fan the fire to burn brighter and faster.

Opinions on fire constantly change as people seek to control its use and spread. Whether naturally occurring or human-caused, fire needs three things to burn: fuel, oxygen and heat. In the early part of this century controlled fires were used to rid the forests of dry, dead tinder. After World War II, new technology and techniques were used to control forest fires. Smokey the Bear reminded people that only they could prevent forest fires. Today, we know that people can't prevent all forest fires, and many people believe that we shouldn't even attempt to control wild fires. Still, some land managers promote the return of controlled burns, with the argument that if controlled burns are permitted they reduce the chance of larger, more destructive fires. They also open up an area to sunlight and help to control insects and tree diseases. On the other hand, repeated use of fire may endanger watersheds through erosion and could harm soils, reduce the natural beauty of an area, create air pollution and decrease the timber supply.

The National Park Service, the U.S.D.A. Forest Service, the Washington State Department of Natural Resources and private landowners are exploring their fire and land protection policies. As scientists continue to study fire's effects on ecosystems, forest managers will continue to revise fire policies. It will be interesting to see what those changes will bring.

Learning Outcome

Students will understand the natural role of fire and learn that the effects of forest fires can be both positive and negative.

Learning Procedure

Is Fire Positive or Negative? Instruct students to work in groups of four to generate two lists: one list for positive effects of fire, a second list for negative effects of fire. (The idea is to encourage students to think of fire as a positive as well as negative force. Most students tend to think of forest fires as having only negative impacts.) As a class, compile the lists on the board. Using the background information as a reference, conduct a class discussion of the pros and cons of fire.

of Natural Resources, land managers with the U.S.D.A. Forest Service, or private forest managers.

3. Instruct students to write "letters to the editor" stating their opinions, based on facts, about the positive and/or negative roles of fire.
4. Use the chart below to graph the number of forested acres burned each year in Washington. Discuss possible reasons for variations in numbers of acres burned/year.

| Year | Number Acres Burned |
|------|---------------------|
| 1990 | 11,000 |
| 1989 | 8,500 |
| 1988 | 27,000 |
| 1987 | 9,500 |
| 1986 | 2,500 |
| 1985 | 42,000 |
| 1984 | 4,000 |
| 1983 | 2,000 |
| 1982 | 4,000 |
| 1981 | 4,000 |
| 1980 | 2,000 |
| 1979 | 15,000 |
| 1978 | 4,000 |
| 1977 | 7,500 |
| 1976 | 9,000 |
| 1975 | 2,000 |
| 1974 | 6,000 |
| 1973 | 10,000 |
| 1972 | 2,500 |
| 1971 | 1,000 |
| 1970 | 61,000 |

Assessment: What Did We Learn?

Students can demonstrate what they've learned by creating posters to illustrate pros and cons of forest fire. (They can use lists generated in *Is Fire Positive or Negative?*)



