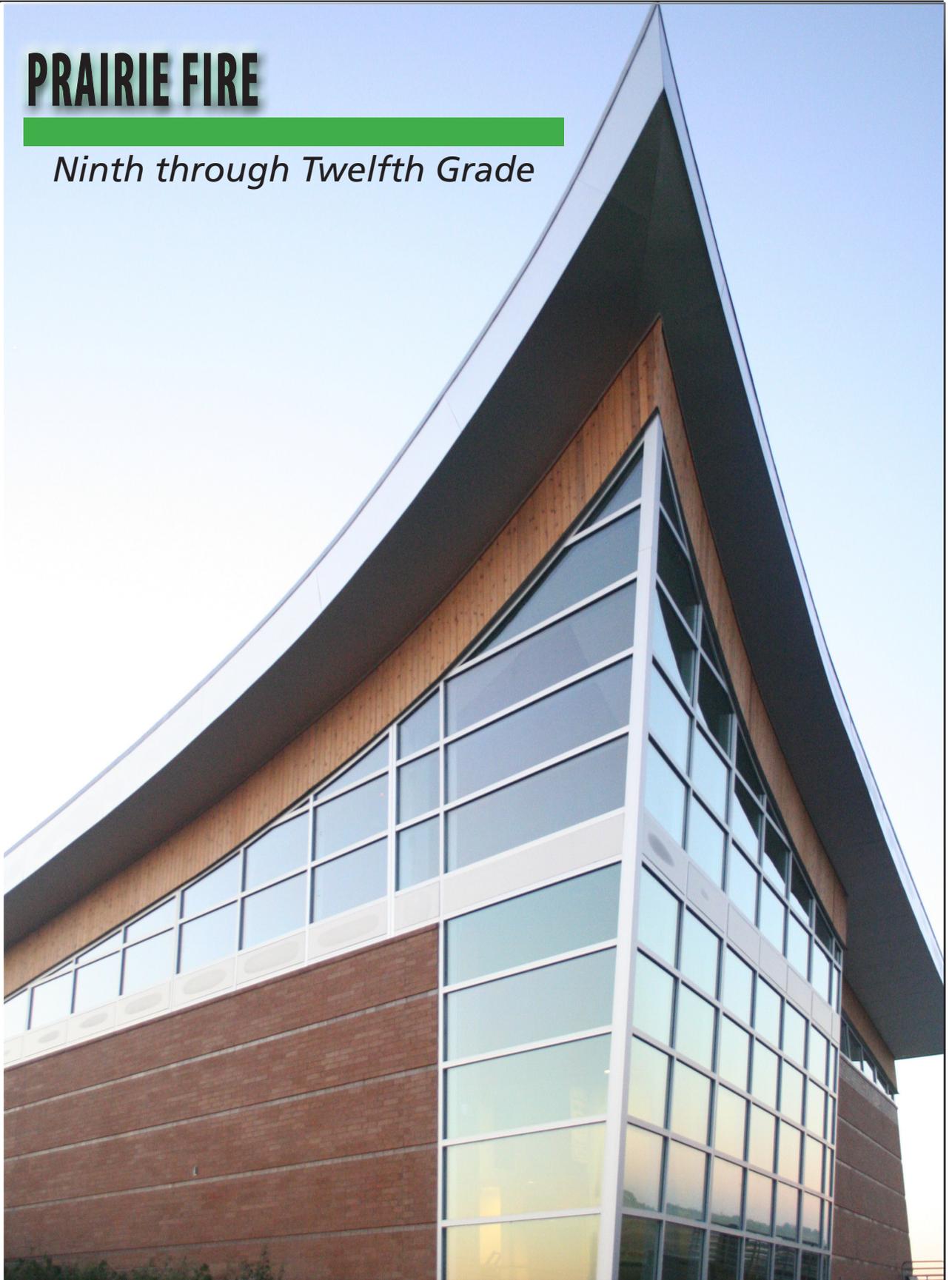


Free Land was the Cry!

PRAIRIE FIRE

Ninth through Twelfth Grade



Homestead

National Park Service
U.S. Department of the Interior

Homestead National Monument
of America, Nebraska



ACKNOWLEDGEMENTS

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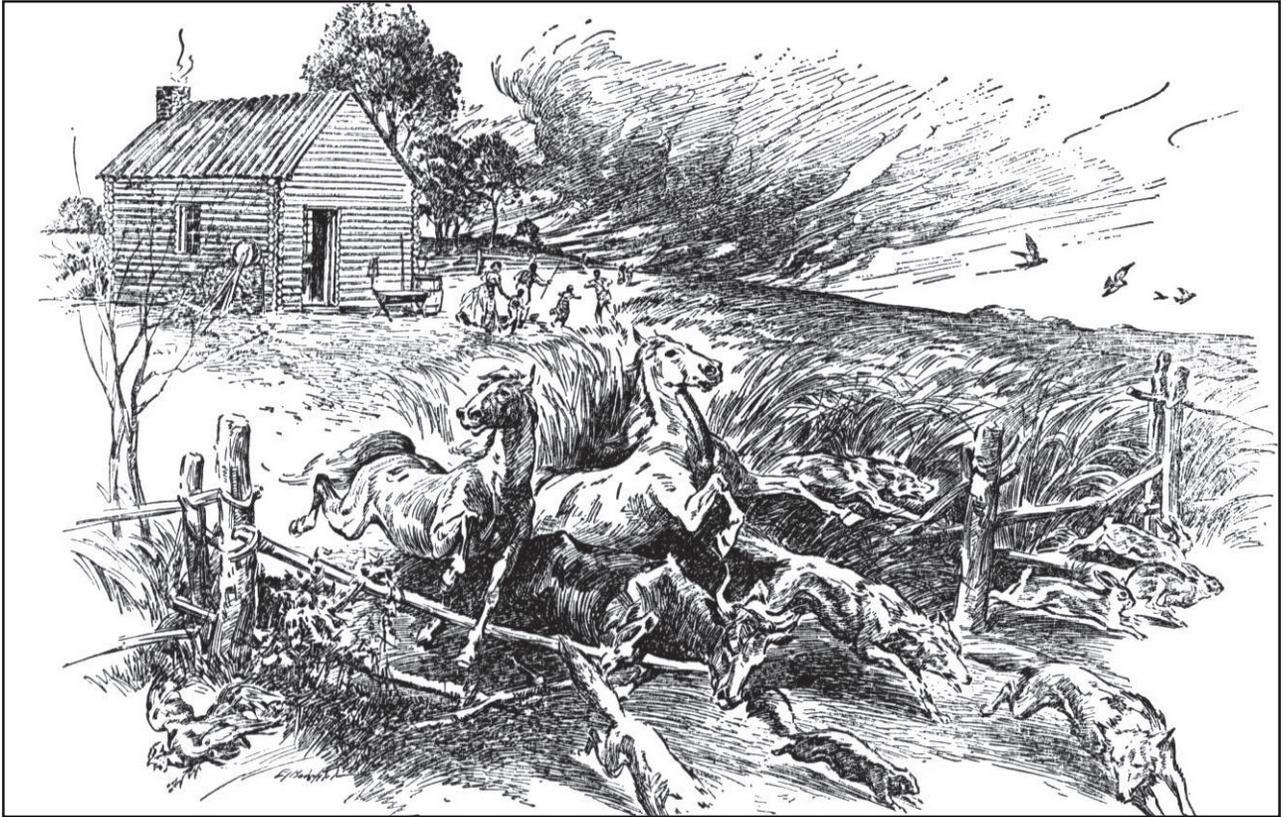
TABLE OF CONTENTS

This unit has Pre-Visit Activities for teachers to use to prepare students for a visit to Homestead National Monument of America, a Ranger-Led Experience which will occur during your visit, and Post-Visit Activities for teachers to use to expand students' knowledge of the impact the Homestead Act of 1862 had on America.

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Some of the ideas in this lesson may have been adapted from earlier, unacknowledged sources without our knowledge. If the reader believes this to be the case, please let us know, and appropriate corrections will be made. Thank you.

PROGRAM DESCRIPTION



For homesteaders, prairie fires were a hazard that threatened their crops, their homes, and their lives. Methods of fire prevention and fire safety—such as fire breaks—were used in efforts to control and stop burns.

However, fires play a regenerative role for plants on the tallgrass prairie. Controlled burns are now used in prairie restoration projects. Native plants—such as grasses, with deep and established root systems—can handle



fire better than invasive or exotic plants.

Scientists continue to study the effects of fire on different plant types (such as forbs and woody plants) and animal species, but it is generally believed that fire contributes to increased biodiversity in the tallgrass prairie ecosystem.

The meaning of “prairie fire” in America has changed and evolved throughout history. By studying this phenomenon, students learn about science, culture, and their ongoing intersections on the prairie.



CURRICULUM OBJECTIVES

- Students can cite examples to describe how, historically and culturally, understandings of “prairie fire” have varied.
- Students can utilize several methods of researching information, including the study of books, on-line sources, and personal interviews.
- Students can compile an accurate bibliography of sources.
- Students can use evidence to support an argument about what “prairie fire” means in the current historical and cultural moment.
- Students can form and test hypotheses and draw conclusions about the effects of fire and scarification on the germination of prairie plant seeds.
- Students can communicate this process, as well as their findings, in the form of a standard lab report.

NATIONAL STANDARDS

NL-ENG.K-12.3 EVALUATION STRATEGIES

Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features. (e.g., sound-letter correspondence, sentence structure, context, graphics).

NL-ENG.K-12.7 EVALUATING DATA

Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

NS.9-12.1 SCIENCE AS INQUIRY

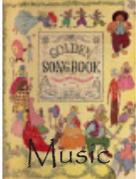
As a result of activities in grades 9-12, all students should develop

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry.

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

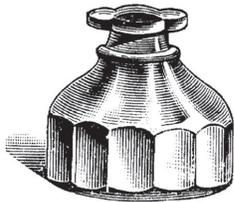
As a result of activities in grades 9-12, all students should develop understanding of

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives.

SPECIAL ICONS		Science 	Math 	Social Studies 		Language Arts 
	Indicates a reproducible handout is included	Indicates an additional science activity	Indicates an additional math lesson	Indicates an additional social studies lesson	Indicates an additional music or art activity	Indicates an additional language arts lesson

Pre-Visit Activity #1 (suggested)

Enrichment Activities



Prairie Fire In America

Have students extend their exploration of this topic by inquiring into the current connotations and denotations of “prairie fire.” Students can conduct basic research about the term by searching for texts in the library, searching online sources, and asking personal sources (like family members or friends) for their thoughts, stories, or definitions of the term.

Students should compile an annotated bibliography of at least ten sources, noting the different fields their sources come from (science, politics, history, etc.). In writing, or through a class discussion, ask students to use what they have learned to support an argument about what “prairie fire” means now in America.

FINDING OUT ABOUT FIRE

The Cultural Evolution of Prairie Fire

Divide students into small groups. Have each small group read a different selection from:

Beemer, Rod. (2006). *Earth Ablaze. The Deadliest Woman in the West: Mother Nature on the Prairies and Plains.* (pp. 131-176). Caldwell, ID: Caxton Press.

Find this selection online at: <http://bit.ly/cuwrFQ>

Dick, Everett Newfon. (1937) *Nature Frowns on Mankind. The Sod-House Frontier, 1854-1890: a Social History of the Northern Plains from the Creation of Kansas & Nebraska to the Admission of the Dakotas.* (pp. 216-220). Lincoln, NE: University of Nebraska Press.

Kidwell, Clara Sue. (1993) *Systems of Knowledge. America in 1492: The World of the Indian Peoples Before the Arrival of Columbus.* (pp. 395-396) New York, NY: Vintage Books.

Least Heat Moon, William. (1991). *Between Pommel and Cantle. PrairyErth (a deep map).* (pp. 71-75) Boston, MA: Houghton Mifflin.

Least Heat Moon, William. (1991). *About the Red Buffalo. PrairyErth (a deep map).* (pp. 76-80) Boston, MA: Houghton Mifflin.

The group should then formulate a summary of the reading to share with the rest of the class that answers these questions:

- Where their author is “coming from”—where and who they are in terms of culture and history.
- How their author understands the concept of prairie fire.

After each group reports back to the class, ask students to discuss what these understandings of prairie fire have in common, and where they differ.

- Why do different sources display different views of prairie fire?
- How has “prairie fire” changed and evolved in its meaning?

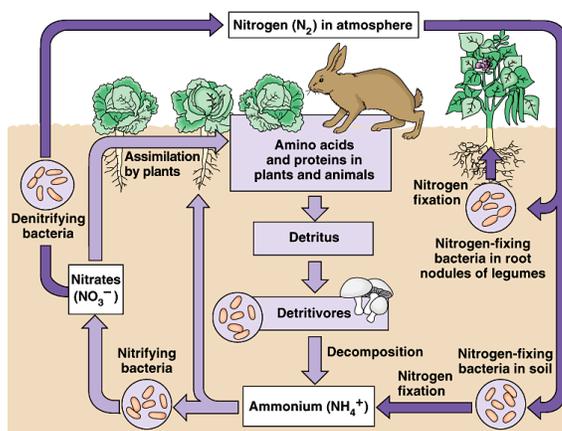
BAPTISM BY FIRE

Pre-Visit Activity #2 (suggested)

Seeds from Scarification to Germination

Review what students know about the nitrogen cycle, and about how grasses evolved to survive—and thrive—in an environment that contains occurrences of fire.

Develop, or guide students in developing, an experiment to test how fire (in terms of heat and scarification) impacts the germination of various prairie plant seeds. Students can help identify materials needed, steps in the experiment, and a timeline.

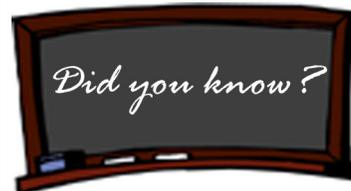


For example: Obtain one or more varieties of seeds (such as prairie sunflower, *Helianthus petiolaris*, or prairie clover, *Lespedeza bicolor*, or big bluestem, *Andropogon gerardi*) from a local source or from an online catalog (such as prairenursery.com or bigbluestemprairie.com).



Along with a control group, create groups of seeds to subject to different variables, such as scarification (use sandpaper to rub off the waxy seed coating) and heat (“toast” the seeds in a pan over a Bunsen burner flame). Then follow the appropriate steps for germinating the seeds (place in damp paper towels in a refrigerated space) and monitor daily, recording the time and rate of germination for each category. Finish the project by

having students write a standard lab report of hypothesis, methods, observations and data, and conclusion.



Prior to Euro-American settlement, fires swept through the tallgrass prairie every 5-10 years. In the absence of fire, prairie plants lose their competitive advantage over woody and exotic plants. The woody and exotic species then take over, shading out the native species. In 1970, park staff at Homestead National Monument of America began using prescribed fires to manage the prairie. The prairie is divided into five management units and burned on a seven-year cycle. Every year, two units are randomly chosen for treatment, with the stipulation that once a unit has been burned twice in the seven-year period, it is removed from consideration for the duration of that period. Seasonality of fires is also randomized. The seventh year is a “rest year.” The goals of the fire management program are control of exotic species, such as smooth brome, management of shrub species to no more than 15% of the prairie by area, and removal of plant debris that, if left in place, creates the potential for a large, devastating fire.

RANGER-LED EXPERIENCE

Prairie Plants and Animals

Homestead National Monument of America’s prairie is teeming with life no matter what season your group visits. Based on the season of your visit to Homestead, choose several common prairie plant species that students should be able to identify. A PowerPoint that reviews the plant life found at Homestead National Monument of America can be found under the For Teachers section at: www.nps.gov/home or in the Additional Resources section.

Review the chosen species in class. Students should take notes, either in a designated regular notebook or in “nature journals” of their own construction.



Materials

To make nature journals, provide students materials (different kinds of paper; tools such as scissors, stapler, hole punch, and glue; binding materials such as thread, twine, and ribbon; and drawing materials) with which to construct a 10-12 page nature journal to use in their study of plants and fire. The design can be of their choosing, or you could provide special instructions for design and binding techniques. The cover should

include their name and should indicate the purpose of the journal.

Guide students in constructing tables in which they will tally the results of their count of the chosen species.

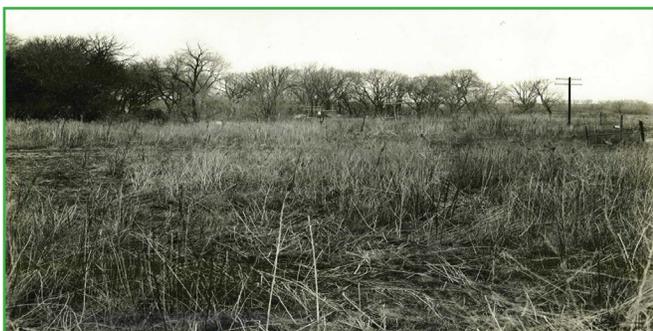
In consultation with a park ranger, conduct species counts in areas of Homestead National Monument of America or another facility.

Students should tally the results in their nature journals. Then, they should make notes about and sketches of the species that they see. They should also note the occurrence of species they do not recognize.

Afterwards, ask students to give ideas of what they think “biodiversity” is. Explain and/or review this concept. Then, ask students to describe the biodiversity they found in their various species counts. How many species did they identify? How many species did they find but not recognize? Which unit had the greatest biodiversity? Why might that be?

Review what students know or have learned about prairie fires or have a park ranger speak on how burning contributes to prairie restoration. Ask students: what are some ways that we know burning influences different kinds of plants? How do we know that burning contributes to prairie restoration?

Before Restoration in 1937



After Restoration in 2007



FIRE'S IMPACT ON BIODIVERSITY

Big bluestem

- Grows from 3-10 feet tall
- Also called "turkey foot"
- Deep, thick roots help form sod



Preserving Biodiversity

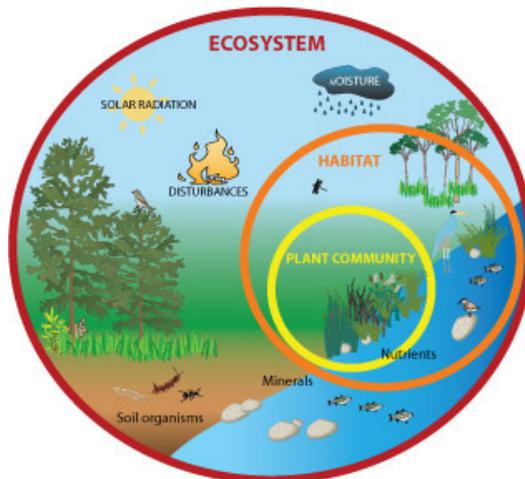
Have students review what students know or have learned about biodiversity either from in-class discussions or from their visit to Homestead National Monument of America.

Have students read (individually or as a class) the excerpt on prairie fire from Aldo Leopold's *A Sand County Almanac*. The link is:

<http://lb.vg/M3L67>

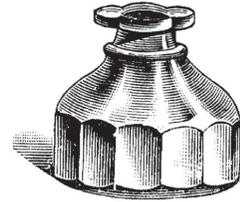
In writing, or as an entry in their nature journal, if that activity was done, have students respond to the reading by addressing these questions:

- What is biodiversity?
- Why do we value biodiversity on the prairie?
- What are some of the strategies and techniques we can use to preserve biodiversity?



Post-Visit Activity #1 (suggested)

Enrichment Activities



Research the advantages and disadvantages of having a prescribed burn in the fall vs in the spring.

Write a 500 word paper on which you would choose if you were the Natural Resource Manager at Homestead National Monument of America.

CHARACTER EDUCATION

CITIZENSHIP

Students who practice good citizenship are motivated by more than self-interest and greed. They are genuinely concerned for the needs of others. They recognize their duty to contribute to making life better at home, at school, in the neighborhood, and for the whole planet.

5 Minute Focus

Many natural ecosystems need fire to stay healthy. Timed prairie burns are conducted on a regular basis by trained fire specialists. The fire kills intrusive weeds and many larger woody plants, and allows light in for the native plants. Because of their root system, the prairie plants are not harmed and the fire actually encourages growth. The fire releases nutrients into the soil and creates a surface that warms quickly so the growth of plants gets a head start. Burns simulate what wild fires did for the tallgrass prairies. It was also used by American Indians who recognized its benefits.

Discuss beneficial fires and harmful fires. Stress that burns are well planned and organized by experts. What other components of nature have good and bad aspects?



ADDITIONAL RESOURCES

Resources

Beemer, Rod. (2006). Earth Ablaze. *The Deadliest Woman in the West: Mother Nature on the Prairies and Plains*. (pp. 131-176). Caldwell, ID: Caxton Press.

Find this selection online at: <http://bit.ly/cuwrFQ>

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Kidwell, Clara Sue. (1993) Systems of Knowledge. *America in 1492: The World of the Indian Peoples Before the Arrival of Columbus*. (pp. 395-396) New York, NY: Vintage Books.

Kurtz, Carl. *A Practical Guide to Prairie Reconstruction*. University of Iowa Press, 2001. 31-32.

Least Heat Moon, William. (1991). Between Pommel and Cantle. *PrairyErth (a deep map)*. (pp. 71-75) Boston, MA: Houghton Mifflin.

Least Heat Moon, William. (1991). About the Red Buffalo. *PrairyErth (a deep map)*. (pp. 76-80) Boston, MA: Houghton Mifflin.

Madson, John, and Dycie Madson. *Where the Sky Began: Land of the Tallgrass Prairie*. Iowa City: U of Iowa P, 2004. 45-50.

Pidwirny, M. (2006) The Nitrogen Cycle. *Fundamentals of Physical Geography*, 2nd Edition. <http://www.physicalgeography.net/fundamentals/9s.html>

Sandburg, Carl. (1918) Grass. *Cornhuskers*. (pp. 126) New York, NY: Henry Holt and Co.



Fire Vocabulary

Backfire—A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Blow-up—A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a firestorm.

Brush fire—A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Candle or candling—A single tree, or a very small clump of trees, that is burning from the bottom up.

Campfire—As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Creeping fire—Fire burning with a low flame and spreading slowly.

Debris burning—A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Escaped fire—A fire that has exceeded or is expected to exceed initial attack capabilities or prescription.

Fingers of a fire—The long narrow extensions of a fire projecting from the main body.

Firestorm—Violent convection caused by a large, continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like fire whirls.

Fire whirl—Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

Flaming front—The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flanks of a fire—The parts of a fire's perimeter that are roughly parallel to the main direction of spread.



Fire Vocabulary

Flare-up—Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Head of a fire—The side of the fire having the fastest rate of spread.

Hotspot—A particularly active part of a fire.

Large fire—1) For statistical purposes, a fire burning more than a specific area of land, e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interactions between its own convection column and weather conditions above the surface.

Prescribed fire—Any fire ignited by management actions, under certain predetermined conditions, to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and Environmental Protection Agency requirements must be met prior to ignition.

Project fire—A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Running—A rapidly spreading surface fire with a well-defined head.

Slop-over—A fire edge that crosses over a control line or natural barrier intended to contain the fire.

Smoldering fire—A fire burning without flame and barely spreading.

Spot fire—A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Structure fire—Fire originating in and burning any part or all of any building, shelter, or other structure.

Test fire—A small fire ignited within the planned burn unit to determine the characteristics of the prescribed fire, such as fire behavior, detection performance, and control measures.

Torching—The ignition and flare-up of a tree, or small group of trees, usually from bottom to top.

Uncontrolled fire—Any fire which threatens to destroy life, property, or natural resources.

Underburn—A fire that consumes surface fuels but not trees or shrubs.

Wildland fire—Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Homestead National Monument

Identifying Prairie Plants

Big bluestem

- Grows from 3-10 feet tall
- Also called "turkey foot"
- Deep, thick roots help form sod



Little bluestem

- Grows to about 3 feet tall
- Also called "beard grass"
- State grass of Kansas and Nebraska



Indian grass

- Grows 3 to 7 feet tall
- Like bluestem, a perennial grass
- State grass of Oklahoma and South Carolina



Switchgrass

- Grows from 2-6 feet tall
- Being studied for use as a fuel source
- Helps provide cover for birds and animals



Milkweed

- Has smooth, flat leaves, purple/pink flowers, and a "milky" sap
- Provides food for the larvae of monarch butterflies



Prairie rose

- Pink petals with yellow stamens
- Blooms from about May through Sept.
- State flower of Iowa and North Dakota



Lespedeza

- Has purple flowers in the summer months
- Part of the pea and bean family
- Food for deer



Purple Coneflower

- Pink/purple petals with a red/orange "cone" center
- Part of the sunflower family



Compass plant

- Yellow flowers that look like sunflowers
- Name comes from pioneer belief that its leaves would point north-south direction



Sumac

- A woody plant: shrub or small tree
- Has crimson red berries
- Leaves turn red in the fall



Information and photos
courtesy of
*Homestead National
Monument of America*