

Activity 7-2. Always Changing

Grade levels:

Middle

High

What's the Point?

Missouri River Country is a vast, complex land containing many different kinds of plant and animal communities. Most of the area is covered by one kind of prairie or another. These are usually classified in a general way as shortgrass, tallgrass, and mixed-grass prairie. In moist draws and river bottoms you will find woodlands and wetlands. In the west are hills and mountainsides covered by pine forest.

All of these plant communities change over time, and the animals that use them may change as well, in a process called *succession*. Plant communities are tremendous storehouses of carbon compounds with high-energy chemical bonds, so other organisms—fungi, insects, mammals, birds, people—have developed ways to tap that resource. People rely on plants and plant consumers (animals) for food, clothing, housing, medicines, and many other needs, including nourishment of the spirit.

Thus fungi and animals reuse and recycle the carbon accumulated the plants, but fire is the most dramatic recycler in Missouri River Country.

This *FireWorks* activity asks students to use information in *Story Time* (Activity 7-3) and in *Prairie, a Natural History* (in the Missouri River Box) to create and present a play showing 100 years of change in the plant communities of Missouri River Country.

ALTERNATIVE OR SUPPLEMENTAL ACTIVITY: You can cover the information in this activity in a more structured way and provide a service to younger students in your school as well: Assign a group of students to prepare *Story Time* (Activity 7-3) and present it to your class or a younger class.

Teacher's Map:

Objectives: Given reference materials on biology, ecology, and succession, students can prepare and produce a drama showing succession in Missouri River ecosystems

Subjects: Science, Reading, Writing, Speaking and Listening, Social Studies, Technology, Library Media, Arts, Workplace Competencies

Duration: 1-2 hours or more for student preparation, 20 minutes for presentation

Links to Standards¹:

National Science Teachers' Association—Grades 5-8:

- C4) Recognize that ability to obtain and use resources, grow, reproduce... are essential for life
- C7) Recognize nature of energy and food webs
- C8) Recognize that population size depends on resources
- F3) Recognize sources and challenges of natural and human-induced hazards

National Science Teachers' Association—Grades 9-12:

- C1) Understand basis for theory of evolution and natural selection
- C4) Recognize that energy flow underlies resource webs
- C6) Recognize behavior as a form of adaptation to environment
- F3) Recognize extent, sources and challenges of natural and human-induced hazards

North American Association for Environmental Education—Grades

5-8:

- 0A) Classify local ecosystems. Create food webs
- 0B) Describe habitat needs of species that are locally declining
- 1C) Locate and collect reliable information about environment
- 2.2A) Understand biotic communities and adaptations
- 2.2C) Understand interactions among organisms and populations

North American Association for Environmental Education—Grades

9-12:

- 0A) Identify several plants and animals common to local ecosystems. Describe concepts (succession, competition, parasitism)
- 0B) Investigate short- and long-term environmental changes
- 2.2A) Understand basic population dynamics and importance of biodiversity
- 2.2B) Understand basic ideas behind biological evolution
- 2.2C) Understand the living environment is comprised of interrelated, dynamic systems
- 2.2D) Use interaction of matter and energy to explain environmental characteristics

Vocabulary: plant community, ecosystem, succession

¹ See Appendix 4 in Smith and McMurray (2000) for links to Montana educational standards, grades 5-8, 9-12.

Materials

| <i>In this trunk...</i> | <i>...where?</i> | You must supply |
|---|------------------|--|
| Map of Missouri River Country | B (with posters) | |
| <i>Prairie, a Natural History</i> | MO River Box | Art supplies for masks or costumes |
| <i>FireWorks Notebook for the Missouri River Country</i> | Teacher/C | |
| Feltboard Background for <i>Dancing Prairie Fires in Missouri River Country</i> | | |
| Giant Looseleaf Notebooks: <i>Dancing Prairie Fires in Missouri River Country</i> (Parts 1 & 2) | | Copy of Class Page 13, <i>Assignment List</i> , used in Activity 7-1 |

Preparation

Use this activity right after Activity 7-1, in which students adopt an organism and explain its fire ecology to the class. In this activity, students will learn about the different kinds of plant communities that comprise Missouri River Country. Then they will prepare and produce a play in which they depict inhabitants of these communities using masks or costumes. In the play, a reporter or narrator interviews plants and animals about changes in their homeland, especially due to fire.

Use the *Assignment List* from Activity 7-1 for planning.

Display the map of Missouri River Country in the classroom.

Procedure

1. Explain: The map shows the enormous size of the Missouri River drainage, where water originates at the Continental Divide in the Rocky Mountains and runs or creeps or seeps downhill through the northern Great Plains toward the Mississippi. (This curriculum does not cover the ecology of the lower Missouri River drainage, which reaches through the tallgrass prairie and into the hardwood forests of the central states.) Our class will develop a play that shows how some of the plants and animals in this vast area relate to each other, how they change over time, and how they interact with fire. Students will work together, using their adopted organisms from Activity 7-1, to create this play.
2. Find one student who will be the "director" of the production. That student doesn't have to "just" be a reporter; he or she can retain the identity of the organism adopted earlier. (A mouse can interview a tree—why not?)
3. Provide the *Story Time* narrative—at the start of Part 1 of *Dancing Prairie Fires in Missouri River Country*—for students to consult.
4. Have students plan the play by discussing the relationships among their organisms what happens to them over time, how fire influences them, and what happens to them after fire. Then have them develop a script, write it if necessary, and rehearse.
5. Have students produce their play for other classes or a parent group.

Evaluation:

Middle School level: Describe two organisms that live in Missouri River Country. Compare the ways they obtain energy and the ways they respond to fire.

High School level: How well could a tree from high in the mountains cope with life in the prairies? What traits might make it difficult for the tree to survive or reproduce in its new habitat? Would its relationship with fire have to change? Now select an organism that lives in the prairies and describe how it might respond to life in the high mountains.

Closure: Explain that students have investigated the story of fire in ecosystems of the Missouri River country three kinds of forest, but hundreds of other kinds of ecosystems in North America are shaped by fire. Fire's story is different in each of these ecosystems, and the plants and animals in each have developed traits that enable them to survive fire or reproduce well after fire.

Extensions _____

1. Report to the class on fire ecology in a different ecosystem than the ones explored in *FireWorks for Missouri River Country* by searching online or by studying the *Fire Ecology Resource Management Education Unit* (in the Teacher Box). Interesting ecosystems to study might include the longleaf pine forests of the South, sagebrush steppe in the Great Basin, giant sequoias in California, jack pine forests in the Great Lakes states, and pine barrens in New Jersey and New York.

Learn about current research in whitebark pine ecosystems from the Internet site of the Whitebark Pine Ecosystem Foundation, a group dedicated to protecting this unique ecosystem: www.whitebarkfound.org