Activity 7-4. Puzzling It Out

Grade level:
X Middle

What’s the Point?

Discovering how the inhabitants of ecosystems interact is a little like assembling a complicated jigsaw puzzle. In this activity, students use what they have learned about fire, plants, animals, and succession to assemble jigsaw puzzles about some of the plant and animal communities in Missouri River Country: prairie (this activity doesn’t distinguish the different types of prairie), ponderosa pine forests, lodgepole pine forests, and whitebark pine forests. Students need to use information about many species—either from their previous study or from reading the clues on the puzzle pieces—to complete the puzzles correctly.

This is a quiet activity that can be done alone or in small groups. FireWorks contains four puzzle sets. If you want to set up only 1 station for the activity, put out only 1 set; if you want to set up multiple stations, put them in separate places so the pieces from different sets don’t get mixed up. This project can be assigned as seat work to fit in with other classroom activities, or set up at activity stations that one or a few students visit at a time.

Teacher’s Map:

Objective: Given photographs and text as clues, students can identify components of 4 different ecosystems and see how they interact.

Subjects: Science, Reading, Social Studies

Duration: 20 minutes

Links to Standards¹:

National Science Teachers’ Association—Grades 5-8:
C4) Recognize ability to obtain and use resources, grow, reproduce… are essential for life
C6) Understand nature of populations and classification
C7) Recognize nature of energy and food webs
F3) Recognize 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
2.2A) Understand biotic communities and adaptations
2.2C) Understand interactions among organisms and populations
2.2D) Understand how energy and matter flow in environment

Vocabulary: cavity nester, crown fire, fire scar, fungus, succession, surface fire

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

<table>
<thead>
<tr>
<th>In this trunk…</th>
<th>… where?</th>
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<tbody>
<tr>
<td><em>Puzzling It Out</em> Kit (4 manila envelopes, each with a complete puzzle set of 44 pieces)</td>
<td>Teacher/C</td>
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Procedure

1. **Explain:** Each team uses one envelope of puzzle pieces to assemble four puzzles simultaneously, all on the same template. One of these puzzles describes the prairies of the Great Plains, another describes ponderosa pine forests, another lodgepole pine forests, and another whitebark pine forests. Each puzzle contains
   • a picture of the main kind of plant life—prairie or pine tree—in the center
   • across the top, typical fires and change in that kind of ecosystem over time
   • across the bottom, photos and information about other plants and animals that live in that ecosystem and how they interact with one another
2. **Since the puzzles are all cut from the same pattern, they can’t be assembled correctly based on shape alone; many pieces are interchangeable. To assemble them correctly, students need to use what they already know and use new clues in the captions on the puzzle pieces.**
3. **OPTIONAL:** Review these key concepts that students will need to know:
   • Prairies are dominated by grasses but also have a lot of variety, including trees and shrubs
   • Ponderosa pines grow best at low elevations, on dry sites. In the past, most fires here were surface fires and did not kill the large trees. Trees could grow very old and very big.
   • Lodgepole pines grow well at middle elevations. They do not get very old or very large. Fires are not frequent, but they often crown and kill most of the trees.
   • Whitebark pines grow best at high elevations, on dry sites. In the past, some fires were surface fires and some were crown fires. Some burned in surface fuels most of the time, then—when the wind got strong and flames reached a cluster of trees with lots of ladder fuels—reached into the crowns. (*FireWorks for Missouri River Country* does not contain much information on whitebark pine communities, so this puzzle may be especially challenging and could be left out of the exercise.)
3. **When students have completed puzzles, check them against the puzzle-master illustrations included in the *Puzzling It Out* Kit and shown (reduced in size, with text omitted) in fig. 26.**

**Evaluation:** Name one kind of mammal, bird, or insect that lives in each ecosystem.

**Closure:** Repack the puzzles in the correct envelopes, 44 pieces per envelope. If the pieces get scrambled, just turn them over and place all those with matching colors and symbols (for example, red X or black O) in the same envelope.
**Extensions**

1. Make a flip book\(^2\) illustrating succession in one of the ecosystems included in this curriculum or in another ecosystem.

2. Read and report to the class about information in *Made for Each Other* (about whitebark pine ecosystems) or *Graced by Pines* (about ponderosa pine forests), both in the *FireWorks Library*.

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\(^2\) Thanks for *Fire in Florida’s Ecosystems* Educator’s Guide for this activity.
Correctly completed jigsaw puzzles for Activity 7-4. Size is reduced so text has been left out. A—Puzzle depicting ponderosa pine/Douglas-fir forest. B—Puzzle depicting lodgepole pine/subalpine fir forest. C—Puzzle depicting whitebark pine/subalpine fir forest. D—Puzzle depicting prairies of Missouri River Country.