22. Fire ecology puzzlers

Lesson overview: This activity uses a set of jigsaw puzzles (printed on laminated paper) to review species interactions and the role of fire in 3 forest ecosystems of the northern Rocky Mountains and the North Cascades. These are forests dominated by ponderosa pine/Douglas-fir, lodgepole pine/subalpine fir, and whitebark pine/subalpine fir. The activity can be done in 2 ways, if not more: as a classroom “grab-bag” competition among student teams, or as a quiet activity to be done singly or in small groups at stations.

Lesson Goal: Students can distinguish characteristics of 3 forest ecosystems and integrate information on fire behavior, fire history, and species’ adaptations to fire in each ecosystem.

Objective: Given a set of puzzle pieces with photographs and text as clues...

- Students can recognize some of the species and fire behavior patterns associated with 3 different forest ecosystems.
- Students can assemble jigsaw puzzles that represent the fire ecology of the 3 ecosystems.

<table>
<thead>
<tr>
<th>Standards:</th>
<th>CCSS</th>
<th>NGSS</th>
<th>EEEGL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Informational Texts</td>
<td>1, 2, 4, 7, 10</td>
<td>LS1.B</td>
<td>A, B, C, E, F, G</td>
</tr>
<tr>
<td>Speaking/Listening</td>
<td>1, 2, 4, 6</td>
<td>LS2.A, LS2.C</td>
<td>A, C</td>
</tr>
<tr>
<td>Language</td>
<td>1, 2, 3, 4, 6</td>
<td>LS4.C</td>
<td></td>
</tr>
<tr>
<td>Reading: Science/Tech</td>
<td>1, 2, 3, 4, 6</td>
<td>ESS2.D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ESS3.A</td>
<td></td>
</tr>
</tbody>
</table>

Subjects: Science, Reading
Duration: 30 minutes
Group size: Whole class, working singly, in small groups, or as in large teams
Setting: Classroom
Teacher Background:

Discovering how the inhabitants of an ecosystem interact is a little like assembling a complicated jigsaw puzzle. In this activity, students use what they have learned about fire, organisms, and succession to assemble jigsaw puzzles that describe 3 forest communities in the northern Rocky Mountains and the North Cascades.

The activity is based on a set of 3 simple jigsaw puzzles (see the graphic below). Each puzzle represents 1 of the 3 forest ecosystems and is comprised of 11 pieces that are cut out from laminated printouts. A complete puzzle set thus contains 33 pieces. The 3 puzzles would be easy to assemble, except all three are cut from the same template, so pieces for the different ecosystems have the same shape. For example, each puzzle has a piece showing a bird that lives in that ecosystem and is adapted to the kind of fire that historically occurred there. To get each bird piece into the correct puzzle, students must either recognize the species and its habitat or figure that out from text “clues” written on the pieces.

Your trunk may contain up to 4 puzzle sets. Each set of 33 pieces is stored in a separate envelope, and the pieces of that set are labeled on the back with a unique letter or number. If you want to mix up pieces from different sets, you can sort them out later by using the labels on the back of the pieces.

Materials and Preparation:

- Locate the “Puzzling It Out” kit in the trunk. The kit contains up to 4 puzzle sets (33 pieces in each set, with each set stored in a separate envelope). The kit also contains keys for correcting the puzzles. You can also use the 3 graphics above to check students’ work, since you can see the photos even though the text is too small to read.

- Decide what approach to use for the activity:
o **To use the class “grab-bag” approach**, place the 33 pieces from one puzzle set on a table at the center of the room. Scramble the pieces, leaving them face-up. Arrange for an empty desktop or lab bench at each of 3 locations where student teams can assemble their puzzles. If you wish, have prizes on hand for the winning team(s). **To make this more challenging**, include pieces from more than one puzzle set!

o **To use the “station” approach**, place the 33 pieces from each puzzle set at a station where students can do the activity in groups of 1 to 3. Scramble the pieces, leaving them face-up. **If you want to make the activity more challenging**, scramble the pieces from 2 puzzle sets so students can’t use the process of elimination to assemble the puzzles correctly.

**Procedure:**

1. **Explain:** Discovering how the inhabitants of an ecosystem interact is a little like assembling a jigsaw puzzle. So today we’re going to draw on what we’ve learned about fire behavior, different organisms, fire history, and succession in order to assemble jigsaw puzzles that describe the 3 ecosystems we’ve been studying.

2. **Explain:**

<table>
<thead>
<tr>
<th>To do the activity as a class grab-bag:</th>
<th>To do the activity quietly at stations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form the class into 3 teams, one for each ecosystem (ponderosa pine, lodgepole pine, whitebark pine). If the resulting group size will be too unwieldy, have each team select 4-5 students to represent them. Position each team at a different location around the edge of the center table that has the puzzle pieces. Make sure each team is next to a clean desk or bench where they can assemble their puzzle.</td>
<td>Explain: Each station has a set of 33 puzzle pieces (or possibly more, of you put in extra pieces). Assemble them into 3 puzzles, one representing each of the forest ecosystems that we’ve been studying. You’ll see that the pieces from different ecosystems are interchangeable in shape, so you have to know the ecology and/or read the clues to assemble them correctly.</td>
</tr>
</tbody>
</table>
**Explain/suggest:** At a signal from me, ONE member of each team will come forward and select ONE puzzle piece. Suggest that they start by finding the oval-shaped piece that shows their ecosystem’s pine species. Each time I give a signal, a DIFFERENT student will come forward and select ONE MORE piece for the team’s puzzle. Put it together with the other pieces, and have other team members read the text carefully to make sure it belongs in YOUR puzzle. If the team decides that a piece doesn’t belong in their puzzle, you must wait for the next signal to exchange it for another piece.

**Explain:** When you’ve finished your puzzles, have another team check your work and check theirs. When you’re satisfied that the puzzles are correct, have the teacher check.

**Give the signals and try to control the traffic as the teams assemble their puzzles. The first team to complete their puzzle correctly wins.**

**After your work has been checked, scramble the puzzle pieces, leaving them face-up for the next students to use.**

**Assessment:** When students have completed their puzzles, check them against the graphics above or the keys in the “Puzzling It Out” kit.

**Evaluation:** All 3 puzzles must be assembled correctly for full credit.