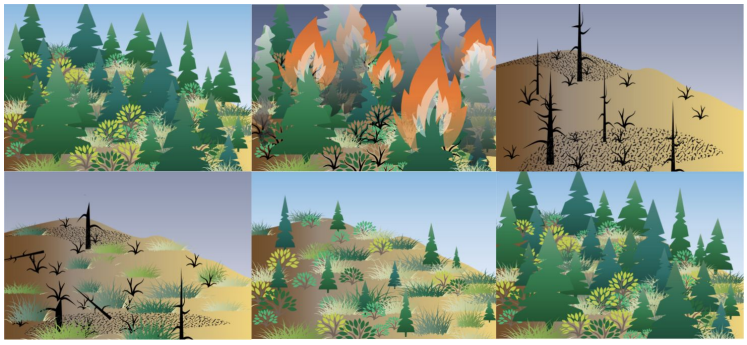
The Future of Forests

From Fire Comes Life - Teacher Guide

Setting the Stage



Burn scars in tree rings and charcoal preserved in lake sediments allow scientists to reconstruct fire histories around the world. Based on these and other findings, scientists have determined that wildfires are a natural phenomenon and help to maintain healthy ecosystems by creating nutrient-rich soils, opening forest canopies, and clearing out invasive species (e.g., weeds, insects, and diseases). In this way, wildfires provide an opportunity for fire-adapted vegetation to regenerate in a nutrient-rich, sunny environment. Scientists studying patterns of recovery across fire-affected landscapes have identified a series of steps by which life comes back after wildfires and other disturbances, a process called secondary succession.

Lesson Overview

In this lesson, students create a storyboard and play a modified game of Rock-Paper-Scissors to communicate the process of secondary succession.

- *Part 1 – (15 minutes) Wildfires Occur Naturally*
  Students are introduced to the ecological benefits of wildfires through a Google Slides presentation and discussion.
- *Part 2 – (20 minutes) From Fire Comes Life*
  Students create a storyboard to explain the process of secondary succession.
- *Part 3 – (15 minutes) Succession Game: Rock-Paper-Scissors*
  Students play a modified game of rock-paper-scissors to reinforce the process of secondary succession.
- *Part 4 – (10 minutes) Update Summary Table*
  Students reflect on what they learned from the lesson and how it relates to the unit driving question.

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Instructional Overview	
Grade Level	Middle/High School
Instructional Time	60 minutes *(total time needed)*
Unit Driving Question	How do landscapes recover after a wildfire?
Lesson Driving Question	How do wildfires affect landscapes?
Building Toward	Middle School: MS-LS2-4, MS-ESS3-3 High School: HS-LS2-7
Three Dimensions	**Science and Engineering Practices:** ● Obtaining, Evaluating, and Communicating Information **Disciplinary Core Ideas:** *Middle School:* ● LS2.C: Ecosystem Dynamics, Functioning, and Resilience ● ESS3.C: Human Impacts on Earth Systems *High School:* ● LS2.C Ecosystems Dynamics, Functioning, and Resilience **Crosscutting Concepts:** ● Stability and Change
What Students Will Do	● Communicate the process by which landscapes change (secondary succession) after a disturbance.
Materials	❏ From Fires Comes Life PPT ❏ From Fire Comes Life Student Worksheet (1 per student) ❏ Answer Key ❏ Video: Why natural wildfires are necessary ❏ Computer/Ipad (1 per student pair) ❏ Initial Ideas Public Record ❏ Summary Table Optional ❏ BiomanBio Succession Game
Material Preparation	❏ Cue and test web links ❏ Print student worksheets ❏ Review speaker notes in the From Fires Comes Life PPT ❏ Review Answer Key ❏ Display summary table and initial ideas public record

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Vocabulary	Serotinous Cones - cones that only open and release seeds only when a fire sweeps through and melts the resin (adhesive) keeping the cone closed. Secondary Succession - Series of steps by which life comes back after a disturbance (e.g., fire, tornado, volcanic eruption, flood, etc.) Pioneer Species - First living things (plant or animal) to return following a disturbance (e.g., grasses, flowers) Intermediate Species - Living things that may take years to return following a disturbance (e.g., shrubs, fast growing pines) Climax Community - Stable group of plants and animals that is the end result of the succession process

Part 1 - Wildfires Occur Naturally (15 minutes)

Refer to Part 1 slides including in the From Fire Comes Life PPT. See PPT presenter notes for additional information.

1. Students complete their warm-up, "How do we know that fires have occurred in the past?" and share their ideas with the class.
    a. Reference the From Fire Comes Life PPT to introduce the usefulness of tree rings and lake sediments reconstructing wildfire histories.
2. Watch the "Why natural wildfires are necessary" video and facilitate a discussion about the ecological benefits of wildfire.
3. Check for student understanding by giving students an opportunity to individually answer the three "Quick Check" questions on their student worksheet.
    a. Review "Quick Check" questions as a whole class. See Answer Key as needed.

Part 2 - From Fire Comes Life (20 minutes)

Refer to Part 2 slides including in the From Fire Comes Life PPT. See PPT presenter notes for additional information.

1. Use the From Fire Comes Life PPT to introduce students to the process of secondary succession.
    a. Students follow along with PPT by defining and drawing pictures to represent vocabulary words (pioneer species, intermediate species, climate community).
2. Students summarize the process of secondary succession by creating a storyboard in which they must describe a series of images and effectively use the secondary succession vocabulary words. See Answer Key as needed.

Optional: BiomanBio Succession Game
A fire has destroyed all life on an island, there is nothing left but soil. Your job is to make secondary succession happen and help the island recover to its pre-fire state! Reference the BiomanBio slide at the end of the From Fire Comes Life PPT for further instructions.

Link to game:
https://biomanbio.com/HTML5GamesandLabs/EcoGames/succession_interactive.html

Part 3 - Succession Game: Rock-Paper-Scissors (15 minutes)

Refer to Part 3 slides including in the From Fire Comes Life PPT. See PPT presenter notes for additional information.

1. Reinforce the process of secondary succession by having students play, the Succession Game. Refer to the Succession Game Instructions document and the From Fire Comes Life PPT (slides #13-15) to introduce students to the game (a modified version of rock-paper-scissors).

Teacher Tip(s):

- Ideally this game is played outside as space is required so that students can move around.
- Pause the game at different points to have students notice what the structure of the landscape community looks like.
- When nearly all of the students are trees, call out “wildfire” and tell them that the disturbance has cleared the area down to bare soil...the game begins again, with all students as bare ground.

“The Succession Game” was developed by the Idaho Fish and Game department.

Part 4 - Update Summary Table (10 minutes)

Refer to Part 4 slides including in the From Fire Comes Life PPT. See PPT presenter notes for additional information.

1. Students work in groups to reflect on their learning and how it relates back to the unit driving question, “How do landscapes recover after a wildfire?”

2. Facilitate a discussion in which students come to a consensus about what they learned and how it helps them understand the unit driving question. Ideas/concepts agreed upon by the class should be included in the whole class summary table (see Answer Key).
    a. Students record new summary table entries onto their own summary tables.