

Arizona Ablaze: Assessing the Impact of Wildfires

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Grade Level High School
Duration 3 class periods

National Standards

GEOGRAPHY

Element 2: Places and Regions

4. The physical and human characteristics of places

Element 3: Physical Systems

7. The physical processes that shape the patterns of Earth's surface

8. The characteristics and distribution of ecosystems and biomes on Earth's surface

Element 5: Environment and Society

14. How human actions modify the physical environment

15. How physical systems affect human systems

16. The changes that occur in the meaning, use, distribution, and importance of resources

Element 6: The Uses of Geography

17. How to apply geography to interpret the past

18. How to apply geography to interpret the present and plan for the future

AZ Standards

ELA

Reading

Key Ideas and Details

9-10.RI.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

Writing

Production and Distribution of Writing

9-10.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

SCIENCE

Life Science

Essential HS.L2U3.18 Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.

Arizona Social Science Standards

GEOGRAPHY

Human-environment interactions are essential aspects of human life in all societies.

HS.G2.1 Analyze interactions within and between human and physical systems.
 HS.G2.2 Evaluate how political and economic decisions throughout time have influenced cultural and environmental characteristics of various places and regions.
 HS.G2.4 Evaluate the use and sustainability of natural resources.

SIOP Elements

Preparation

Adapting content
 Linking to background
Linking to past learning
 Strategies used

Scaffolding

Modeling
 Guided practice
 Independent practice
Comprehensible input

Grouping Option

Whole class
Small groups
Partners
 Independent

Integrating Processes

Reading
 Writing
Speaking
 Listening

Application

Hands on
 Meaningful
 Linked to objectives
Promotes engagement

Assessment

Individual
 Group
Written
 Oral

Arizona English Language Proficiency Standards

Grade 9-12

Basic

Listening and Reading

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Standard 1 By the end of each language proficiency level, an English learner can construct meaning from oral presentations and literary and informational text through grade appropriate listening, reading, and viewing.

B-1: determine the central idea or theme and explain how they are supported by using text evidence.

B-2: recount a text including specific details and information.

B-5: utilize visual information to understand the text.

Speaking and Writing

Standard 3 By the end of each language proficiency level, an English learner can speak and write about grade appropriate complex literary and informational texts and topics.

B-3 compose informational text that include relevant details, concepts, and examples to develop a topic while using appropriate conventions.

B-4: integrate graphics or multimedia when useful.

B-5: use examples of precise language and domain-specific vocabulary within informative texts.

Listening, Speaking, Reading, and Writing

Standard 6 By the end of each language proficiency level, an English learner can participate in grade-appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions.

B-1: participate in discussions about familiar topics and texts.

B-2: participate in written exchanges about grade-appropriate topics and texts.

B-5: review information expressed by others and add relevant information and evidence to collaborative oral and written discussions.

B-7: summarize the key points expressed.

Standard 7 By the end of each language proficiency level, an English learner can conduct research and evaluate and communicate findings to answer questions or solve problems.

B-1: gather information from multiple provided resources to answer questions.

B-2: summarize the main idea using evidence from text or presentations.

B-3: paraphrase observations, information notes with labeled illustrations, diagrams, or other graphics, as appropriate.

Overview

Fire is a natural part of a forest's growth and repair cycle; consider it a necessary agent of change. However, when fires burn unexpectedly and out of control, they can have a devastating effect on the local ecosystem for years to come. Wildfires in Arizona have been increasing in frequency and size in recent years. It is important to understand the impact they are having on the biodiversity of the area.

Purpose

In this lesson, the students will describe the events of a modern wildfire and predict the effects of wildfires on a local ecosystem. This lesson includes strategies for teaching diverse learners.

Key Vocabulary

fuel: all living and dead plant material that can be ignited by a fire.

crown fire: burning only on the top layers of the tree; the most intense and difficult kind of wildfire to contain.

prescribed fire: a planned fire intentionally started by park managers.

wildfire: an unplanned fire caused by nature, human action, or an escaped prescribed fire.

Materials

- Forest Layers Diagram
- Wildland Fires Background Reading
- Wildland Fires Vocabulary Cards and Test
- Wallow Fire Visual Overview
- Wallow Fire Document Set (Article, FAQ, Progression Map, Visuals)
- Wildfire Impact Rubric
- The Impact of Wildfires Paragraph Frame and Answer Key

Objectives

The student will be able to:

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1. Describe the social and environmental effects of wildfire.
2. Predict the impact of wildfire on the organisms in the local ecosystem.

Procedures

Prerequisite Knowledge: Students should know the levels of organization in an ecosystem. Students should know how to interpret a food web diagram.

SESSION ONE

Engage:

- a. Inform students they will be “transported” to a specific ecosystem not too far from their school. The only limitation is that students are not allowed to see the ecosystem. Instead, they must rely on their other senses to determine where they are.
- b. Direct students to put their heads down and to cover their eyes. Remind students to pay close attention to what they hear, smell, and feel.
- c. Start the sensory experience by including as many of the following as possible: light a pine scented candle, turn a fan on to a low setting, play an audio clip such as <https://www.youtube.com/watch?v=OdlJ2x3nxzQ> (the idea is to evoke a pine forest with birds, breezes, etc.) (**Application: Promotes engagement**).
- d. Transition from a healthy forest to one encountering a wildfire by slowly removing the previous sense cues. In their place, add as many of the following as possible: light a campfire scented candle, turn on a space heater, play a crackling fire audio clip such as <https://www.youtube.com/watch?v=EgqpcFj8G-s>
- e. Remove all sensory cues and instruct students to “return” to the classroom. Allow students time to compare their observations in pairs or small groups (**Grouping Options: Partners & Small groups**).
- f. Ask students which ecosystem they visited. Prompt students to justify their answer with specific observations (**Integrating Processes: Speaking**).

Explore:

- a. Inform students that the focus of the lesson is wildfires and their effect on society and the environment.
- b. Distribute one copy of the Forest Layers Diagram to each student.
- c. Ask students to divide the forest into logical layers. Do not tell students where they layers

- a. are supposed to go or how many there should be (**Application: Promotes engagement**).
- d. Allow students time to compare their “completed” diagrams in pairs or small groups (**Grouping Options: Partners & Small groups**).
- e. Ask students to justify their layers as best as they can (**Integrating Processes: Speaking**).

Explain:

- a. Distribute one copy of the Wildland Fires Background Reading to each student.
- b. Assist students with numbering the paragraphs and identifying at least one of the key vocabulary words (**Scaffolding: Modeling**).
- c. Direct students to continue using mark-the-text strategies to highlight important information. Students may consider circling key vocabulary and highlighting the ten most important facts. Consider distributing the vocabulary cards to diverse learners at this time (**Integrating Processes: Reading; Scaffolding: Comprehensible input**).
- d. Ask students to make any necessary edits to their Forest Layers Diagram based on the information provided in the background reading (**Application: Promotes engagement**).

SESSION TWO

Explore:

- a. Review the wildland fire vocabulary from the previous day.
- b. Inform students that they will now be focusing on one specific wildfire from Arizona’s recent history.
- c. Present the Wallow Fire Visual Overview to students. Direct students to make observations and inferences as each image is presented (**Application: Promotes engagement**).
- d. Ask students to summarize what they know about the Wallow Fire based only on those visuals (**Integrating Processes: Speaking**).

Explain:

- a. Divide students into teams of 4. Each student will be responsible for analyzing a different document related to the Wallow Fire (**Grouping Options: Small Groups**).
- b. Distribute one Wallow Fire Document Set to each group. The four documents pose different challenges; consider having diverse learners work with the FAQ or Visuals while exceptional learners work with the Progression Map.
- c. Give students time to analyze their document individually (**Integrating Processes: Reading**).

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- d. Model one appropriate format for a classifying map using non-academic categories (types of vehicles, etc.). Direct students to create one graphic organizer for the team using the following three categories: environmental, social, economic (**Scaffolding: Modeling**). Students can do this electronically using a program like Popplet <http://popplet.com/> or on paper.
- e. Direct teams to fill in the graphic organizer using information from all four documents in the Wallow Fire Document Set. A complete graphic organizer should have at least four pieces of information for each category (**Application: Promotes Engagement**).
- f. Ask students to summarize what they now know about the Wallow Fire based on these new documents (**Integrating Processes: Speaking**).

SESSION THREE

Elaborate:

- a. Inform students that they will now focus on only the environmental impacts of wildfires in Arizona.
- b. Ask students to review the levels of organization in an ecosystem and identify sample organisms for the forest ecosystem affected by the Wallow Fire (**Preparation: Linking to past learning**).
- c. Direct students to select two specific organisms from the forest ecosystem.
- d. Prompt students to write a paragraph explaining the impact wildfires have on those two organisms. Possible areas of focus include population size, distribution, life expectancy, resource availability, etc... Consider using the paragraph frame for diverse learners (**Assessment: Individual & Written**).

Evaluate:

- a. Assess student paragraphs using the Wildfire Impact Rubric.
- b. Assess student vocabulary comprehension with the Wildland Fire Vocabulary Quiz.

Assessment

Science, Geography and ELA

Student paragraphs explaining the impact wildfires have on organisms can be scored with the Wildfire Impact Rubric. A score of 4 or higher in each category will be considered mastery.

The Wildland Fire Vocabulary Quiz can measure language acquisition. A score of 80% or higher will be considered mastery.

The graphic organizer can be graded for accuracy and completeness. Mastery will be considered having 3 or more correct pieces of information under each category.

If the paragraph frame is used for diverse learners it can be graded for correct answers. A score of 80% or higher will be considered mastery.

Extensions

Have students compare data from the Wallow Fire (featured in this lesson) to other significant wildfires in Arizona.

Sources

Wildland Fires Background Reading
<https://www.nps.gov/fire/wildland-fire/what-we-do/wildfires-prescribed-fires-and-fuels.cfm>

Wallow Fire Images (no longer an active website)
http://www.wmicentral.com/multimedia/wallow-fire-in-photos-a-photo-gallery/collection_6287fc62-8e28-11e0-931b-001cc4c002e0.html

Wallow Fire Article
<http://archive.azcentral.com/news/articles/20110614-arizona-fires-wallow-fire-largest-arizona-fire.html>

Wallow Fire FAQ
<http://archive.azcentral.com/news/articles/20110605-arizona-wallow-fire-QA-05-ON.html>

Wallow Fire Progression Map
<http://inciweb.nwcg.gov/photos/AZASF/2011-05-31-00:57-wallow/picts/pict-20110628-100953-0.pn>