Taming the Flames: Understanding Wildfires

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Grade Level	6
Duration	3-4 class periods

National Standards	AZ Standards	Arizona Social Science Standards
GEOGRAPHY **Element 1: The World in Spatial Terms** 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information. **Element 3: Physical Systems** 7. The physical processes that shape the patterns of Earth's surface **Element 5: Environment and Society** 14. How human actions modify the physical environment.	**ELA** **Reading** **Key Ideas and Details** 6.RI.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. Integration of Knowledge and Ideas 6.RI.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **Writing** **Production and Distribution of Writing** 6.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **SCIENCE** **Life Science Standards** 6.L2U3.11 Use evidence to construct an argument regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems. **MATHEMATICS** **Ratio and Proportional Relationships** 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	**GEOGRAPHY** **Examining human population and movement helps individuals understand past, present, and future conditions on Earth's surface.** 6.G3.2 Analyze the influence of location, use of natural resources, catastrophic environmental events, and technological developments on human settlement and migration. **Global interconnections and spatial patterns are a necessary part of geographic reasoning.** 6.G4.2 Describe how natural and human-made catastrophic events and economic activities in one place affect people living in nearby and distant places.

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 GEOGRAPHIC ALLIANCE

Arizona English Language Proficiency Standards

Grade 6-8
Basic
Listening and Reading
Standard 1
B-2: recount specific details and information in a variety of texts.
Standard 2 By the end of each language proficiency level, an English learner can determine the meaning of words and phrases in oral presentations and literary and informational text.
B-1: determine the meaning of frequently occurring academic and content-specific words and phrases.
Speaking and Writing
Standard 4
B-2: supply a reason that supports the opinion and is based on some textual evidence.
B-3 use grade appropriate words and phrases.
Listening, Speaking, Reading, and Writing
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: paraphrase observations/information notes with labeled illustrations, diagrams, or other graphics, as appropriate.
B-3: cite sources used in research.
B-4: restate the main idea using evidence from text or presentations.
Standard 9
By the end of each language proficiency level, an English learner can: create clear and coherent grade-appropriate speech and text.
B-1: introduce and present facts about an informational topic and provide a conclusion when writing and speaking.

Overview

Wildfires in Arizona are increasing in frequency in recent years due to various human and natural causes. Forests are closed for recreation, trees turn black, ecosystems are changed, and smoke pollutes the skies. Yet, fire is a vital part of a forest ecosystem. As wildfires increasingly surround citizens in the state, how do we respond? What can be done to prevent them?

Purpose

In this lesson, students will map out where fires have occurred in Arizona in recent years and use information from research to create a public service announcement to teach younger students how to prevent wildfires.

Key Vocabulary

resource - a useful material found in the environment
environment - all of the surroundings and conditions that affect living things, such as water, soil, land and air
dependent- needing someone or something else to surive
fuel- any living or non-living matter that can start a fire
prescribed fire- a planned fire started by forest managers as a remedy or treatment
wildland fire- a fire that occurs in the wildland nature
prevent- to stop something from happening
promote- to make people aware of; to make happen

Materials

- *Gallery Walk Reaction Log*
- Gallery pictures, printed or digital to display (select 5 out of the many choices)
- Vocabulary Cards
- Vocabulary Graphic Organizer and Answer Key
- Orange Colored Pencils
- Southwestern United States: Topography and Rivers map https://geoalliance.asu.edu/sites/default/files/maps/SouthwestTopo_BW.pdf
- Recent Fires in Arizona Data (2016-2021) worksheet and Answer Key
- AZ Landscape map 8.5” X 11” https://geoalliance.asu.edu/sites/default/files/maps/AZLandscape_color.pdf Also, tape or pin the

- Arizona Landscape Map 4x4 Tile Map https://geoalliance.asu.edu/sites/default/files/maps/AZ_Landscape-Tile-4x4%20.pdf
- A set of sticky dots or colored push pins (about 10 for each group)
- Student Electronic Devices and Internet Access
- Ratios and Percentages of Major Arizona Wildfires - 2016 to 2021 worksheet and Answer Key
- The Role of Fire reading
- Example *of a PSA* handout
- Rubric: Wildfire Prevention Infographic
- PSA Storyboard: Wildfire Prevention

Objectives

The student will be able to:

1. Locate places using latitude and longitude to analyze relationships of human and nature caused catastrophes.
2. Use ratio and rate reasoning to solve mathematical problems and problems in a real-world context.
3. Describe how wildland fires are affected by geographic features and people living nearby.
4. Use evidence to construct an argument regarding the impact of human activities on the environment.
5. Collaborate with peers to research, produce, and present a digital Public Service Announcement (PSA) on how to prevent forest fires.

Procedures

Prior to starting the lesson, the teacher will need to choose 5 images for the gallery walk and display these around the room or show them digitally. Number each picture before the students begin.

Prerequisite Knowledge: It may be helpful for students to be familiar with biomes and the different types of vegetation that we have in Arizona, but this is not required.

Students should also know how to use latitude and longitude coordinates to find locations on a map, and know the meaning of ratio and percentage and have some experience calcuating these.

SESSION ONE

Engage

1. Distribute the worksheet Gallery Walk Reaction Log. Read the directions together as a class. **(Preparation: Strategies)**
2. Instruct students to quietly walk around the room viewing each image, either in groups or individually. After viewing each document, they need to record their thoughts and reaction on the Gallery Walk Reaction Log. Note: This could be glued into an interactive science notebook.
3. Invite students to first share with a partner their thoughts, then discuss as a whole class their reactions to the images. Discussion Questions: *Why did you react the way you did? How did the pictures make you feel? What questions do you have?* **(Preparation: Linking to background)**
4. Pass out the Vocabulary Graphic Organizer and one vocabulary card to eight different students. Ask each student with a card to read the word and definition off their card, then place on the wall for a Word Wall. **(Scaffolding: Comprehensible input)**
5. Have the students work with partners or in small groups to complete the vocabulary graphic organizer. Note: If students have a notebook, they can paste this paper in it. **(Grouping Option: Small Group)**

Explore

6. Explain to the class that in this lesson they will be learning about and mapping out where wildfires have occurred in Arizona in recent years. Later they will create their own public service announcement that they can use to teach younger students about wildfires, what causes them, and how we can prevent them.
7. Distribute the Southwestern United States: Topography and Rivers map https://geoalliance.asu.edu/sites/default/files/maps/SouthwestTopo_BW.pdf and orange-colored pencils. Have students work individually to shade on the map with the orange-colored pencil where they predict the most fires have occurred in Arizona. After two minutes, instruct students to share with a partner where they shaded and why.
8. Divide students into groups as you see fit. Distribute the Recent Fires in Arizona Data (2016-2021) worksheet to all students and one copy per group of the AZ Landscape map https://geoalliance.asu.edu/sites/default/files/maps/AZLandscape_color.pdf Also, tape or pin the Arizona Landscape Map 4x4 Tile Map https://geoalliance.asu.edu/sites/default/files/maps/AZ_Landscape-Tile-4x4%20.pdf in a place where all students can reach and see it. **(Grouping Option: Small Group)**
9. Model for students how to plot a location using the latitude and longitude coordinates *for the last fire listed, the Wallow Fire. Say: The Wallow Fire, which occurred in 2011, is the largest fire Arizona has had in recent times and was caused by two campers whose campfire got out of control. The fire was nearly 538,000 acres in size. Many other fires occur in Arizona that may*

be human caused or lightning caused. In this lesson, we are going to explore just a few of these fires. Note: This may be an opportunity to relate how big an acre is. A good example is comparing an acre to a football field. **(Scaffolding: Modeling)**

10. Assign a set of fires (5-6 per group) from the list. Using the coordinates shown on the handout, students will use the sticky dots or pins to mark on their maps the proper coordinates where each fire occurred. Then, each group will mark on the 4X4 map their findings and the groups will mark it on their own. **(Assessment: Group)**
11. Discuss the resulting map. Ask: *What is surprising about the location of the fires shown on the map? Is this what you expected? Why or why not?* **(Integrating Processes: Speaking)**
12. End the session with a Quick Write on the back of their reaction log. Write this question on the board to be answered: *What do you still want to know about fires after today?* Collect the students' worksheets for grading.

SESSION TWO

Explain

13. Explain that today we will do some research to learn more about the fires we have located on the map. Returning to their groups, have students research online how each fire was caused, noting "H" for human-caused or "L" for lightning-caused next to the name of the fire on their chart. **(Grouping Option: Small Group)**
    3 Websites for researching the cause of each fire: https://inciweb.nwcg.gov/?state=3
    https://www.predictiveservices.nifc.gov/intelligence/intelligence.htm
    https://en.wikipedia.org/wiki/List_of_Arizona_wildfires
14. Inform students that they will now combine their information into tally chart. Draw a T-chart on the board or on chart paper. On the left label "H-Human" and on the right label "L-Lightning." Each group will take turns adding their tallies to the corresponding columns based on their research. Students will record the same tallies at the bottom of their own Recent Fires in Arizona worksheet. **(Grouping Option: Whole Class)**
15. Distribute the Ratios and Percentages of Major Arizona Wildfires - 2016 to 2021 worksheet to each student. Calculate as a class the ratio and percentage of lightning-caused fires to human-caused fires. Then, each group will work together to calculate the ratio and percentage of human-caused to the total number of fires. Record their answers on the chart paper and have each student finish the *Ratios and Percentages* worksheet. *Collect students work for grading.* **(Scaffolding: Guided Practice, Modeling)**
16. Discuss the results and findings with the class. *What did you expect? What did you notice? Did these numbers surprise you? What does this data tell us about fires?*

Elaborate

17. Review the vocabulary words introduced yesterday using the Word Wall. Have students individually read The Role of Fire and answer the questions at the bottom of the reading. Collect students work for grading. This could also be given as homework. **(Integrating Processes: Reading)**
18. Conclude today's session with partners doing a Quick Chat. Write this question on the board to be answered: *How do you think geographical features and people living in a particular area affect how many fires we have in Arizona each year? Have groups share out their answers aloud with the class and record them on chart paper to use during the next session.* **(Preparation: Strategies)**

SESSION THREE

Prior to the Session, *decide if you will assign groups or if the students will choose their partners. The resulting PSA could be shared with an audience in various forms: a brief Piktochart/Infographic, a written speech with graphics, or a video. This lesson has students create an infographic and give a presentation to younger students.*

Note: *Further research may be necessary. This could carry over into another day depending on your students.*

Evaluate

19. Begin the session by giving the vocabulary test.
20. Introduce the final project, creating a Public Service Announcement (PSA), by displaying or projecting the Example of Wildfire PSA Infographics. Distribute and discuss the Rubric: Wildfire Prevention Infographics.
21. Distribute and explain the *PSA Storyboard: Wildfire Prevention* worksheet. Have students complete this worksheet before moving on to creating their PSA.
22. Arrange to have the students visit a younger class to present and teach their project, if time and resources permit. They could practice their presentation in front of their class first. Students will turn in their PSA for assessment and grading. **(Integrated Processes: Reading, Writing, Speaking)**

Assessment

Geography
The identification of the correct location using longitude and latitude on the Arizona Landscape map can be graded. Mastery will be considered a score of 80% or higher. **(Assessment: Written, Group)**

Mathematics
The Ratio and Percentages of Major Arizona Wildfires worksheet can be graded for completeness and correctness. Mastery will be considered a score of 80% or higher.

ELA and Geography
The Vocabulary Graphic Organizer can be graded. Mastery will be considered a score of 80% or higher.

The Role of Fire comprehension questions can be graded. Mastery will be considered a score of 75% or higher.

The Vocabulary Test can be used to measure language acquisition. Mastery will be considered a score of 80% or higher. **(Assessment: Written, Individual)**

The PSA can be scored using the Rubric: Wildfire Prevention Infographic. A score of at least 24 out of 30 pointsis considered mastery. **(Assessment: Written, Oral, Group)**

Extensions

Engineering and Science:
- Invite the local fire department to talk to the class. What is the most common cause of house fires in our area? (Usually, it is a kitchen grease fire.) Develop a plan, device, or campaign to help prevent these fires.
- By understanding the fire triangle and how fires are currently fought, what could we design for wildland firefighters to use that would more quickly stop the spread of a new wildfire? https://smokeybear.com/en/about-wildland-fire/fire-science/elements-of-fire

ELA:
- Write a persuassive essay or letter related to wildfire prevention.
- Create a fictional story of a fire fighter following fires throughout the state or of an animal fleeing the fires.

Economics/Mathematics:
- Research the cost of wildfires each year and connect this cost with the PSA.

Sources

Websites for researching the cause of each fire
https://en.wikipedia.org/wiki/List_of_Arizona_wildfires

Teacher Data About WildFires
https://www.nifc.gov/sites/default/files/document-media/Lightning-Human-Caused_2.pdf

https://storymaps.arcgis.com/stories/a27c5e17ab4c4160b6875f07d80ab8ac

Websites for PSA (requires a free account)
https://piktochart.com
https://info.flipgrid.com

Other Resources
https://www.paysonaz.gov/Departments/fire/firewise.html

https://www.fs.fed.us/nwacfire/home/terminology.html#P

The Wallow Fire
https://wildfiretoday.com/2011/06/09/wallow-fire-burns-through-greer-arizona/