Colorado Wildfire - Teacher Guide

Setting the Stage

The number, severity, size, and seasonal duration of wildfires is increasing. Until 2020, the 2012 and 2013 fire seasons were the most destructive in Colorado's history. The 2012 High Park Fire, west of Fort Collins, was the most destructive wildfire in the state when it occurred. But just a few days later, the Waldo Canyon Fire near Colorado Springs surpassed it. The 2013 fire season turned out to be even worse, with the Black Forest Fire ranked as the most destructive wildfire before 2020. In 2020, the Cameron Peak became the largest wildfire in state history.

Wildfire burns through the Black Forest area near Colorado Springs, 2013. Photo Credit: https://vimeo.com/84393594

Lesson Overview

In this lesson, students will investigate wildfires in Colorado by analyzing wildfire data and information to create a local news story to educate community members about wildfire risk.

- *Part 1 – Engage (20 minutes) Introduction to Wildfire Concepts and Case Study*
  As a class, watch a short documentary about wildfires in Colorado and have a brief whole group discussion about the video.
- *Part 2 – Explore (50 minutes) Wildfire Data Analysis Jigsaw*
  In small groups, analyze wildfire information and data to build understanding of the causes, impacts, locations, and frequency of wildfires.
- *Part 3 – Explain (65 minutes) Community Wildfire Risk and Response*
  In small groups, create a local news story for your (or another) community to share information about wildfire causes and impacts, and how people prepare for, respond to, and rebound from wildfires.

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Instructional Overview	
Grade Level	Middle School
Instructional Time	135 Minutes
Unit Driving Question	How can we make our community more resilient to wildfire?
Lesson Driving Question	How have wildfires changed in Colorado over time?
Building Toward	NGSS: MS-ESS3-2 CDE: MS3.ESS-GLE9
Three Dimensions	Science and Engineering Practices: ● Analyzing and Interpreting Data ● Obtaining, Evaluating, and Communicating Information Disciplinary Core Ideas: ● ESS3.B: Natural Hazards Crosscutting Concepts: ● Patterns ● Cause and effect
What Students Will Do	● Analyze wildfire data to identify patterns of wildfire history and risk in Colorado. ● Communicate information about the causes and effects of wildfires in your community. Explain what community members should do to be safe in the event of a wildfire.
Materials	❏ Wildfire Student Worksheet ❏ Wildfire Student Worksheet Key ❏ Lesson Slides ❏ Individual student computer devices or classroom computer with projector, and internet ❏ Materials for Part 3, depending on the format each group chooses (e.g., poster paper, audio/video recording, internet, etc.)
Material Preparation	❏ Print student worksheets ❏ For Part 2 stations: If internet is available, use student worksheets with embedded activity links with student personal devices or two to four shared devices with activity links bookmarked at each station. If internet is unavailable, print slides 7-19 of the lesson slides to put at tables around the room.
Vocabulary	Natural hazards are naturally occurring phenomena such as floods, wildfires, extreme heat, or drought, which may disrupt or damage a community. Wildfire is a widespread and destructive fire in a wilderness or rural area. Fuel load is the total amount of combustible (burnable) material in a defined

	space. Ignition is the starting of a fire. Anthropogenic means the influence of human beings on nature. WUI is an acronym for the Wildland-Urban Interface, the area where forests and human development overlap. Emissions are products, such as gases, that are released into the atmosphere (e.g., smoke from a fire).
Instructional Strategies	• Jigsaw (used in Part 2): A cooperative learning strategy in which each group is responsible for learning one "piece of the puzzle" and then sharing that information with other groups to complete the whole picture. Use Part 3 for students to present the information they learned at their stations to their classmates. Teachers can choose to use this strategy if time is limited, and stations can be differentiated for different student abilities and levels of teacher assistance. • Mind mapping (optional; used in Part 2 wrap-up): A creative way to "map out" students' thoughts and ideas. Similar to a concept map, multiple formats can be used to develop students' trains of thought and make connections between main ideas or concepts.

Part 1 (Engage) Introduction to Wildfire Concepts & Case Study (10 minutes)

How is wildfire risk changing in Colorado?

Begin the lesson with a warm-up KWL Chart (Know, Want to Know, Learned) on the first page of the student worksheet. Use Think, Pair, Share for students to share out what they already know and what they want to learn.

Use the short documentary about wildfire in our state, Colorado's Forests: Past, Present and Future to get students thinking about wildfires.

Part 2 (Explore) Wildfire Data Analysis Jigsaw (40 minutes)

Part 2 is designed as a jigsaw in which students work in small groups to complete the activities at six different stations and then share their findings in a class discussion. Consider giving the small groups expert names, like "fire science experts," "emergency managers," etc.. Alternatively, you may decide to run some stations as whole-class, teacher-led activities before assigning the remaining stations as a student-led, small-group jigsaw.

Use the student worksheet pages 2-7 for the jigsaw. Slides 7-19 have larger versions of the graphs and can be used to introduce the stations or for the class discussion.

Once students have completed the jigsaw, lead a 10-minute mind mapping session or consensus discussion session about your findings and learning from the jigsaw stations. Start the class mind map with “Wildfire” labeled in the center of a large Post-It, poster paper, or shared digital document.

Ask students to share their findings from the station to check and correct your responses, as needed, and add key information to the wildfire mind map.

Suggested discussion questions:

- What are the causes and impacts of wildfire?
- Is the severity of wildfire changing because of actions humans have taken?
- When do most wildfires occur in Colorado?
- Where do most wildfires occur in Colorado?
- Can wildfires occur in different forest types? Can wildfires occur in sagebrush or grasslands?
- How should people prepare for and respond to be safe in the event of a wildfire?

Collect student worksheets and/or have them digitally share their copy with you. Student worksheets will be used for Part 3 and it is important for students to have complete and correct responses to communicate information.

Part 3 (Explain) Community Wildfire Risk & Response (65 minutes)
How can communities manage their exposure to wildfire risk in Colorado?

For Part 3, students will work in new groups, or hazard expert teams after watching a few more videos as a class. Each hazard expert team should be made up of one student from each of the jigsaw groups, so that the team consists of students that collectively completed each of the Part 2 stations. The goal of this part is to have an expert from each station in order to communicate key wildfire information to your (or another) community that faces wildfire risk and/or has experienced a wildfire in the past.

Wildfire Expert Interview (5 min)
Watch the short film with Dr. Megan Cattau, wildfire expert with Earth Lab at the University of Colorado Boulder. The video is a good summary of the topics covered in the jigsaw.

Wildfire Expert video

Waldo Canyon Wildfire Case Study (10 min)
Watch these videos to learn how people and communities prepared for, responded to, and rebounded from the devastating Waldo Canyon Fire. *Teacher note: Use video or press coverage from a local wildfire in place of Waldo Canyon Fire information if available.*

- Evacuating the Waldo Canyon Fire (3:42)
- The Waldo Canyon fire: Remembering it five years later (1:51)
- The Waldo Canyon fire, five years later: Colorado Springs rebuilds (1:14)
- The Waldo Canyon fire, five years later: Restoring the fire ravaged land (2:16)

The 2012 Waldo Canyon Fire heading towards Colorado Springs.Photo Credit: https//commons.wikimedia.orga/wiki/File:Waldocanyon.jpg

The 2013 Black Canyon Fire surpassed the Waldo Canyon Fire, making it the most destructive wildfire so far in Colorado. Photo Credit: U.S. Army

Local Wildfire News Story (50 min)
Give students page 8-10 of the student worksheet with the prompt and an outline to create a local news story as their summative assessment.

Additional resources for students:

- The National Fire Protection Association (NFPA) leads the Firewise USA program. Their motto is “residents reducing wildfire risk.” Check out their wildfire preparedness tips and preparing homes for wildfire for more information as students develop their news stories.
- In Colorado, the Colorado State Forest Service (CSFS) and NFPA implement the Colorado Firewise USA program, which teaches people how to adapt to living with wildfire in Colorado and encourages neighbors to work together and take action now to prevent losses. Check out the CSFS’s Are You FireWise? guide for more information as students develop their news stories.

After students have completed the assignment, lead a class gallery walk, where teams share and learn from other groups’ News Stories.

Finish the lesson by returning to the KWL Chart on page 1 of the student worksheet, and have students complete the “What I Learned” section.

Find more HEART Force Curriculum here:
https://cires.colorado.edu/outreach/projects/HEARTForce