



Lesson 1: Fire-Resilient Landscapes

Guiding Question: How can we support healthier and more fire-safe forests?

Goals:

- To build confidence in making observations and sharing ideas about fire in class.
- To highlight regional and ecological differences in Butte County forests.
- To learn what a healthy forest looks like and how people can support forest health.

Objectives:

Students will be able to:

- 1) Name and describe the Lassen County forest zone they live in.
- 2) Describe characteristics of a healthy and unhealthy forest.
- 3) Explain at least two actions people can take to improve forest health.

Materials and Preparation:

- Read *Forward to Educators* section about the Wildfire in North Eastern California program and recommended resources.
- Prepare to project the PowerPoint slideshow for *Lesson 1: Fire-Resilient Landscapes*.
- Lassen County landscaping plant guide for each student.
- Optional- Butcher paper to make a Ground Rules poster.

Subjects: Science, Speaking and Listening, Reading, Art

Duration: 60 minutes

Setting: Classroom

Vocabulary:
Elevation, Fire Hazard Severity, Topography, Resilient, Prescribed Fire

Standards:		
NGSS	Crosscutting Concepts	Patterns Scale, Proportion, and Quantity Structure and Function Stability and Change
	Science and Engineering Practices	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information
	Disciplinary Core Ideas	LS2.A: Interdependent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience

		LS4.C: Adaptation ESS3 (A-C): Earth and Human Activity
Environmental Principals and Concepts		Principle 1: People Depend on Natural Systems Principle 2: People Influence Natural Systems Principle 3: Natural Systems Change in Ways that People Benefit From and Can Influence Principle 5: Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors

Lesson Overview:

Fire is commonly viewed as dangerous, destructive, and uncontrollable. While fire can be those things, this is not the whole picture. This lesson frames fire as a natural process that is part of every landscape. Fire exclusion is not a sustainable strategy for living with fire, and nationally we are experiencing the consequences of a century of fire suppression. Fire suppression has led to dense, overcrowded forests. Overcrowded forests, combined with drought, extreme weather, and expanding human development in the wildland, contributes to Lassen County’s history with and vulnerability to catastrophic wildfire. The lesson builds to examine how fire affects the landscape you live in, and differentiates between low-intensity, prescribed fire, and unplanned, high-intensity wildfire. The lesson’s focus is on fire impacts to forest health and ecosystems, rather than human impact.

Following the presentation slides, students use the Landscaping Plant Guide, created by the Lassen Fire Safe Council, to learn about resiliency within our County. The activity could be expanded as an outdoor nature journaling opportunity or completed in the classroom.

Lassen County Background Information:

Abbreviated from the 2023 Work Plan Update [LASSEN COUNTY CWPP Work Plan](#)
Lassen County, located in northeastern California, is characterized by diverse topography and a complex fire history that has shaped its landscapes. Here is an overview of the background of Lassen County topography and fire history:

Topography of Lassen County:

- Lassen County encompasses a variety of landscapes, including mountain ranges, forests, valleys, and high desert terrain.
- The county is home to two prominent mountain ranges: the southern end of the Cascades, including Lassen Peak in Lassen Volcanic National Park, and the Warner Mountains along the eastern border.
- Elevations in Lassen County range from the high peaks of the Cascades to the lower valleys and plains, creating a gradient of ecosystems and vegetation zones.

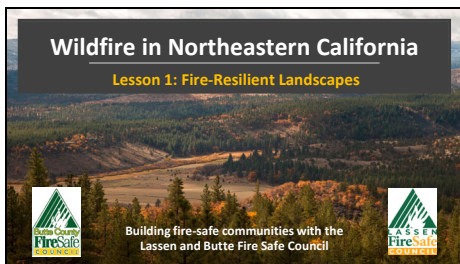
- The topography of Lassen County influences local weather patterns, fire behavior, and the distribution of vegetation types across the region.

Fire History in Lassen County:

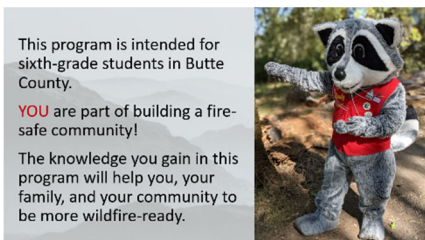
- Wildfires have been a natural component of the landscape in Lassen County for centuries, with both natural and human-caused fires shaping the ecosystems.
- Indigenous peoples, such as the Maidu and Washoe tribes, used controlled burning practices to manage vegetation and promote desired plant species.
- European settlement and fire suppression policies in the 20th century disrupted natural fire regimes, leading to an accumulation of fuel and an increased risk of catastrophic wildfires.
- Lassen County has experienced significant wildfires, including the Moonlight Fire in 2007 and the Chips Fire in 2012, which burned thousands of acres of forested land.
- Fire management strategies in Lassen County now emphasize the importance of prescribed burning, fuel reduction, and community preparedness to mitigate the risk of large, destructive wildfires.

Procedure:

1. Go through presentation slides for *Lesson 1: Fire-Resilient Landscapes*. Notes are included in the speaker notes section of the presentation, as well as here. To save space in the lesson plans, reference links and photo credits are included in the PowerPoint speaker notes only.



The Lassen Fire Safe Council has worked in Lassen County since 2002 in wildfire hazard education, mitigation, and recovery. We are non-profit organization based in Susanville, CA that serves communities across Lassen County. A key part of our community education is working and learning with students and teachers! Thank you for taking the time to participate in this program and bring this important topic into your classroom time. We would like to thank Butte County Fire Safe Council for allowing us to utilize their training material.



In Lassen County, it is not a matter of IF a fire will occur, but WHEN a fire will occur.
 Pictured: Wildfire Ready Raccoon, the Butte County and Paradise Ridge Fire Safe Council mascot.
 Ready's mission is to prepare residents, especially kids and families, for wildfire. Ready helps the Fire Safe Councils spread the word about actions everyone can take to keep their family and communities safer from wildfire. Sixth graders can play a significant role in their family's preparedness!
 Have you seen Wildfire Ready Raccoon at a community event? Where?

Key Topics

Forest Health
Fire-Resilient Landscapes
The Ready-Set-Go Model
Defensible Space and Home Hardening
Go Bags and Pet/Animal Preparedness
Family Communication Plan
Emergency Response Evacuation Zones, Maps, and Communications

Wildfire Lessons



Prepare students for the program by giving an overview of the key topics, split into four lessons.

This first lesson will cover forest health and fire-resilient landscapes.

Have students brainstorm a list of class expectations for learning about and discussing wildfire. Preview “Forward to Educators” section for recommendations for tone setting and ground rules. Write rules up on the whiteboard and take a picture, record on a large piece of paper, or create a new slide and type directly into the presentation to capture student ideas. Have everyone give a thumbs up or other agreement signal to commit to the group rules, before continuing with the lessons.

Every lesson will have a Ready Raccoon guiding question that we will explore and discuss as a class.
Guiding Question: How can we support healthier and more fire-safe forests?

We don’t need to answer this question yet. We will gather evidence and learn more about the forest type we live in. People who live in and around forests have a great responsibility. To live more safely with wildfire, particularly in the wildland-urban interface (WUI), where human development meets or intermingles with wildland vegetation, we need to learn how to keep our property and the forest around us healthy and fire-safe. This lesson will explore larger strategies for forest health, as well as small-scale actions people can take around their homes to create a more fire-safe landscape.

Group share: What did you use the map for? Was it printed or digital?

Go through the next six slides with introductory questions to get students talking, sharing observations, interpreting graphics, and establish a sense of place within Butte County.

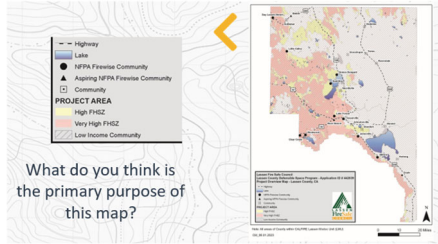
What types of information can maps tell us?

What features should be included on a useful map?

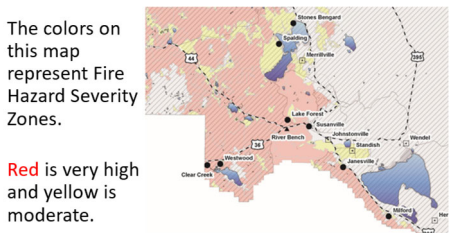
Pair share discussion then select volunteers to answer. Some useful features to include on a map: title, legend, scale, north arrow, and labels.



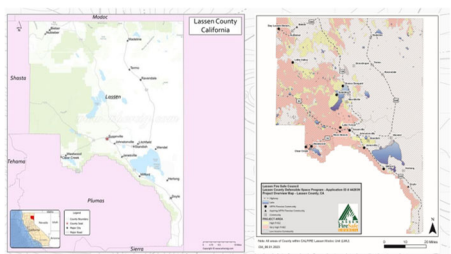
Review features on the Lassen County map to see if students got the major features. We can also see where the major cities/towns are, state roads, and other features like parks, lakes, and forests. We live in a beautiful and unique area with many land features and natural places to explore. Pictured: (Top) Doyle, Fort Sage, (Bottom Left) Termo-Grasshopper, (Bottom Right) Thompson Peak Honey Lake.



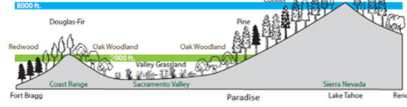
Representing Map Legends. Have you been to an area with a higher fire risk? Can you remember some differences in how it felt or looked compared to where you live?



CAL FIRE uses various types of data to map wildfire risk and categorizes areas into Fire Hazard Severity Zones. This represents not just the likelihood of a wildfire, but also how much harm it could cause to people and structures. These maps are created at a general scale and do not account for local actions that reduce wildfire risk.



What similarities do you notice between these two maps? What connection could you make between elevation and fire hazard severity? Other than elevation, can you think of other factors that could affect the fire hazard severity of an area?



What new information does this graphic represent?

This cross-section of California shows what plant communities are present, and at what elevation. Take a moment to review California's basic topography with a quick demonstration. Invite students to make a cup shape with one hand, like they are trying to hold water in their palm. Compare their hand shape to the high and low points on the graphic. Coastal Range (heel of hand), Sacramento Valley (palm), and Sierra Nevada Mountains (four fingers). Where do you live in relation to the model you made with your hand?

Based on the graphic, which plant communities are found in your area? What are some basic differences in plant structure you notice on the graphic? (Short and fine structured plants in the valley, leafy trees at or below 2,000 feet, and tall, needled trees at higher elevations.)

Topography: The physical features on Earth's surface or the technique of representing surface areas of land on maps.

Topography includes mountains, ridges, valleys, plateaus, or water features on the land.

Elevation, climate, light, water, soil, and temperature all contribute to where plants can survive and how plant communities are formed on a landscape.

Every landscape has its own history and relationship with fire, which is heavily influenced by humans.

What can we learn from our landscapes?



Ecosystem health, plant structure and arrangement, and the presence of certain species in a landscape gives us clues about that area's history and relationship with fire. Knowing how our landscapes have been shaped by fire in the past can help us to live more sustainably and safely with fire now and in the future.

What do you notice about this landscape? We have mixed conifers, pines, brush Photo: Bizz Johnson Trail

Forest Health

Supporting healthy and fire-resilient forests

Discussion of the word "resilient".

Resilient: Able to withstand or recover quickly from difficult conditions.

What does it mean to be fire-resilient? (As people? As forests?)

In the next two videos we will learn about what people can do to improve forest health and help forests be more resilient to wildfire.


Background: Artwork from Ali Meders-Knight, Mechoopda Tribal Citizen and educator, from the Butte County Forest Health Guidebook.



Video Length: 5:04 Visit an active fuels reduction project in Magalia to witness strategies the Butte County Fire Safe Council uses to support forest health.
<https://www.youtube.com/watch?v=LwyEjlkD8WI>

Video Review

1. What are signs of an unhealthy forest?
2. What are some strategies to improve or maintain forest health?



Class discussion

1. Overcrowded. Lots of brush, small trees, and ladder fuel. Sunlight cannot reach the forest floor.
2. Mechanical thinning, chipping, grazing with goats, and prescribed fire.



A side-by-side comparison of a dense, overcrowded forest and a thinned, healthy forest.
 Photos: Forestland in Magalia before and after Fire Safe project work.




Video Length: 5:30

Learn about the ecological benefits and uses of prescribed fire with CSU Chico professor and fire practitioner, Dr. Don Hankins, at a recently burned area on Doe Mill Ridge in Forest Ranch.
https://www.youtube.com/watch?v=NcU_bAJW7jI&t=3s

Video Review

1. What is the difference between a prescribed fire and a wildfire?
2. What are some benefits prescribed fire can bring to an ecosystem?



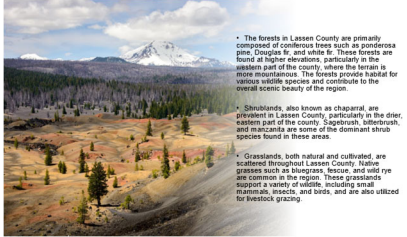
Class discussion

1. A prescribed fire is a low-intensity, intentional fire set to meet ecological objectives, reduce fuels, and improve wildfire safety. A wildfire is an unplanned, unwanted fire, with the potential to be high-intensity and ecologically damaging.
2. Prescribed fire benefits:
 - Reduces hazardous fuels under more controlled circumstances with less smoke than wildfires.
 - Minimizes the spread of pest insects and disease.
 - Removes unwanted plant species and improves habitat.
 - Recycles nutrients back to the soil.
 - Promotes the growth of trees, wildflowers, and other plants.

Photo: A prescribed fire in progress at the Big Chico Creek Ecological Reserve (BCCER) in Forest Ranch.
 Courtesy of BCCER.

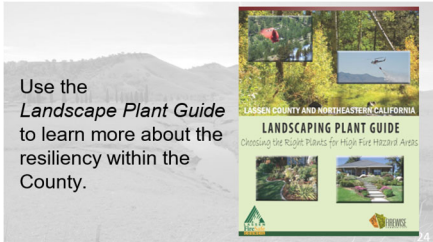


Natural Fire Cycle graphic from Open Space Authority
<https://www.openspaceauthority.org/>



Lassen County Forest Zones from low to high elevation:
 Grasslands, Shrublands, and Coniferous trees.

Image: Lassen Peak



Pass out a Lassen Fire Safe Council Landscaping Plant Guide to each student.
 The Guidebook can also be accessed on our website:
<https://www.lassenfiresafecouncil.org/landscaping-plant-guide>



Grasslands – Willow Creek
 Shrublands – Termo, Ravendale, Madeline
 Coniferous Trees – Southern Cascades

Use the Guidebook and content from the presentation to make a side-by-side graphic comparing a healthy versus unhealthy forest. In addition to illustrations, bullet point or make notes describing elements for each side. It is recommended students learn about the forest zone they live in, not necessarily the forest zone their school is located in. Depending on time, color can be added, the activity could be taken outdoors to sketch the forest around you, or students can share their work with a partner. This activity can also be given as homework or saved for another day to give more time for quality work.

Assessment Activity:

Contact the Lassen Fire Safe Council for copies of the Lassen County Landscaping Plant Guide.

Use the Guidebook and content from the presentation to make a side-by-side graphic comparing a healthy versus unhealthy forest. In addition to illustrations, bullet point or make notes describing elements for each side. It is recommended students learn about the forest zone they live in, not necessarily the forest zone their school is located in. Depending on time, color can be added, the activity could be taken outdoors to sketch the forest around you, or students can share their work with a partner. This activity can also be given as homework or saved for another day to give more time for quality work.

Encourage students to take the Guidebook home to share with their families. The Guidebook is intended to give Lassen County landowners information and recommendations to reduce wildfire risk on their property. Each section contains background information, signs of health, strategies for maintaining or improving health, proper care after a wildfire, Traditional Ecological Knowledge connections, and a local success story. It also demonstrates the differences between good fire and harmful fire, and the impact each could have on a forest.

Option 1: The whole class focuses on the forest zone closest to their school or where they live.

Option 2: Divide the class into three and have one-third of the class learn about each forest zone. After students are finished with their diagrams, make groups of three with a student representing each zone. Students share their findings and compare similarities and differences between the three forest zones.

Evaluation:

	Good	Fair	Poor
Diagram	Students make a comparison illustration and include three or more written points about forest health.	Students make a comparison illustration and include one or two written points about forest health.	Comparison sketches do not include written points about forest health.
Explanation	Students can give three or more examples of elements of a healthy versus unhealthy forest.	Students can give one or two examples of elements of a healthy versus unhealthy forest.	Students cannot give an example of element of a healthy versus unhealthy forest.

Lesson Extensions Recommendations:

Fire Nature Journaling: REDI Jedi Master Program

Lesson 1: Landscape Patterns, Patches, and Fire

<https://buttefiresafe.net/education-programs/fire-redi-master-program/>

FireWorks: Northern California Oak Woodlands

Natural and Cultural Ecology Cycle (M.1.1- M.1.7)

<https://www.frames.gov/fireworks/curriculum/norcal-oak-woodlands>

FireWorks: Sierra Nevada

M11 Who Lives Here? Adopting a Plant, Animal, or Fungus

<https://www.frames.gov/catalog/24552>