Fire Ecology Learning Lab

Igniting Curiosity in Young Minds

Middle School Curriculum

Who are we?

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Funded by the Southwest Fire Science Consortium

What is the Fire Ecology Learning Lab Middle School Curriculum?

Outreach by the Southwest Fire Consortium, focused on Arizona and New Mexico

Low/no cost lessons for middle school classrooms

Follows NGSS and AZ learning standards

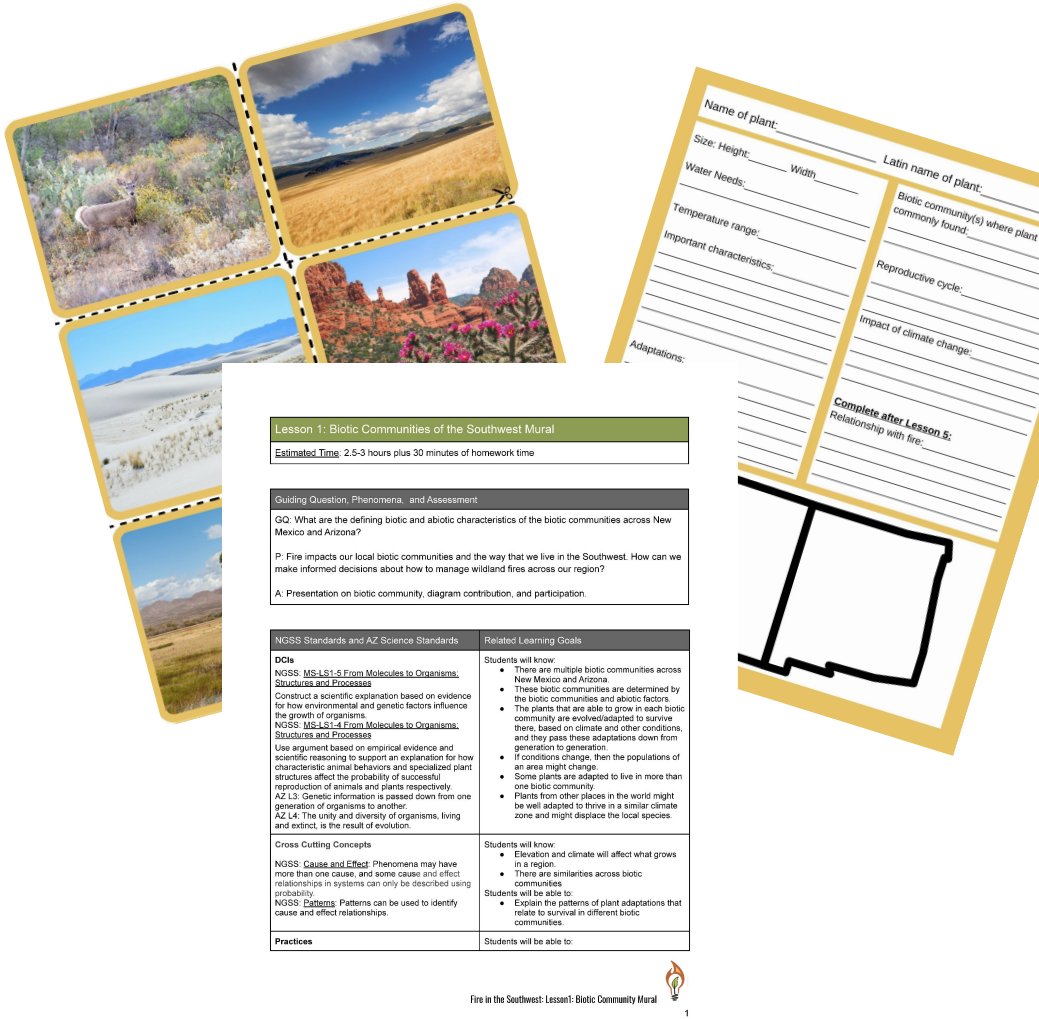
Free to download

Introducing the next generation of wildland fire managers to this topic and career

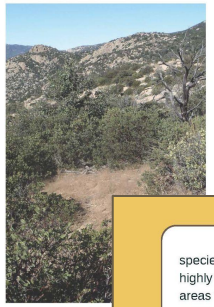
Overview of Materials

Each lesson includes:

- Lesson plan
- Handouts, homework, reading, and/or other student materials
- Activities that are low or no cost



Interior Chaparral, Introduction



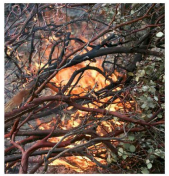
Interior chaparrals are usually located between deserts at their lower elevations and higher elevation woodlands. They are found in patches across the western United States and northern Mexico. Elevation ranges from about 800-2500 m (2500-8200 ft). Interior chaparral shrublands are found throughout the Great Basin, Colorado Plateau, Rocky Mountains, central Arizona including the Mogollon Rim, southern New Mexico, east to Texas, and south into northern Mexico. This **biotic community** is also found in the lower elevations of "Sky Islands", the mountains that rise up from the Sonoran, Mojave, and Chihuahuan Deserts.

These regions are filled with hardy **evergreen** and **deciduo**
Most plants are less than 3 m (9 ft) tall. Some regions are der
with little undergrowth. Other areas have more open spacing
These open areas are often filled with grasses and other sma
of the most common shrubs include shrub live oak (*Quercus*
manzanita (*Arctostaphylos* spp.), deerbrush (*Ceanothus* spp.)
(*Eriogonum* spp.), bitter cherry (*Prunus emarginata*), mountai
(*Cercocarpus* spp.). The smaller plants that make up the und
depending on the latitude and elevation. The most common **u**
plants are grasses. These grasses must be able to survive se
conditions. They include threeawn (*Aristida* spp.), grama gras
(*Bouteloua* spp.), and dropseed grasses (*Sporobolus* spp.).

Interior Chaparral, Fire

Interior Chaparral is one of the few biotic communities that continues to follow its natural **fire return interval**. Historically, when interior chaparral burns it was a **stand-replacing**, **high severity** event. This has continued to be true. Most interior chaparral species are highly **fire-adapted**. Many native plants from this region resprout quickly after burning and some produce fire-resistant seeds that grow in the next wet season. These regular fires kill most trees in the region. This pattern prevents interior chaparrals from becoming woodlands or forests. These regions burn regularly, and they depend on fire to maintain the ecosystem. Fires removed dry fuel and invasive plants. These areas historically burned every 35-100 years, and this pattern has continued.

At higher elevations, some interior chaparrals are temporary. They quickly grow after fires, filling areas that were recently burned wi
plants. These areas were forests before they burned and
forests as trees grow and mature, replacing the smaller s
temporary chaparral shrublands are found in patches acr
U.S., from the Cascade Mountains into the western Grea
Plateau, and Rocky Mountains, across central Arizona in
Mogollon Rim, southern New Mexico, western Texas, an
northern Mexico.



Over the past century p
allowed the natural fire reg
some interior chaparrals, v
build up of fuel. When this
ignite, it increases the sev
This pattern of fire suppres
severe burn has occurred
These fires are particularly
move quickly through dry b
people, livestock, and wild

species in the interior chaparral are highly fire-adapted. However, in areas that have not had regular fire activity, trees from upper elevations are dotted across the landscape, including juniper and piñon.

Many different species of wildlife can be found across interior chaparrals. Large mammals include mountain lions, coyotes, bobcats, foxes, javelina, deer, and bighorn sheep. As there are few trees, birds like quail, vireos, and towhees live on the ground squirrels, mice, and other small ro
chaparral habitats. Snakes and lizards ar
communities are also a part of interior ch
region include Payson and parts of Presc
contain interior chaparral on their lands in

Javalina

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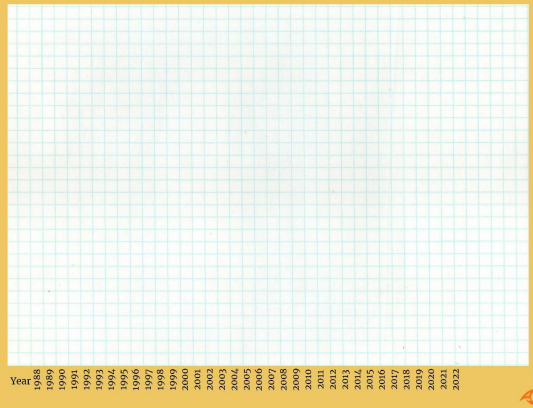
_____Average Average Annaul Precipitation by Year



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Name of Biotic Community :_

General description:_____

Important Native Plant Species:_____

Invasive Species:_____

Important Native Animal Species:_____

Elevation Range:_____to _____

Other notes:

Average annual precipitation:_____

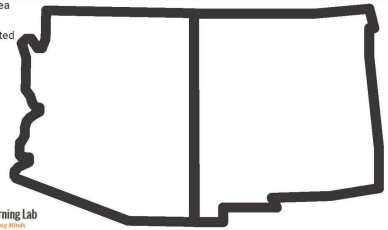
Overview of Seasonal Temperature and Precipitation Patterns:_____

Annual high:_____

Annual low:_____

Potential impact of climate change:_____

Map: Shade the area where your biotic community is located



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Overview of Themes

Theme 1: Biotic Communities

Theme 2: Wildland Fire

Theme 3: Wildland Fire Management

Biotic Communities: Theme 1 Lessons

Lesson 1: Biotic Community and Climate Research and Mural

Lesson 2: Explore and define your local biotic community

Lesson 3: Compare and contrast fire, cellular respiration, and decomposition

Which biotic communities are covered?

Desert Scrub

Desert Grasslands

Grasslands

Interior Chaparral

Sagebrush Shrubland

Oak Woodlands

Piñon-Juniper Woodlands

Ponderosa Forests

Mixed Conifer Forests

Wildland Fire: Theme 2 Lessons

Lesson 4a: Classroom Fire Safety

Lesson 4: Wildland Fuel Properties Experiment - Burning trays of fuel to demonstrate fuel properties

Lesson 5: Biotic Communities and Fire Adaptations

Lesson 6: Student Designed Experiment

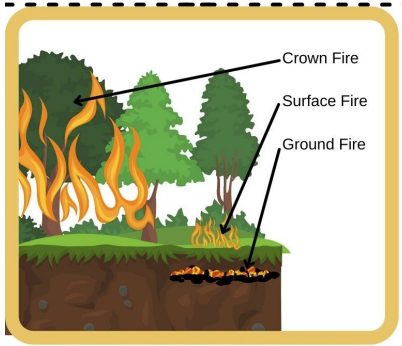
Lesson 7: Determining Fire Regimes of Biotic Communities

Fuel Size and Shape

Fuels can have different sizes and shapes. Depending on its size and shape, the fuel will burn differently. Grasses burn fairly quickly at at a low temperature. Large pieces of wood contain much more stored energy. These take longer to burn and will reach a much higher temperature.

Fuel Moisture

As anyone who has ever tried to start a fire with wet wood will tell you, wet fuel is much more difficult to burn than dry fuel. Areas with dry grasses, leaves, branches, or wood are much more likely to burn than areas with green, moist plants. Wet, green plants often slow fires. Dry plants will spread fire. This can vary by season, temperature, and drought.



Fire Type

Wildland fires are categorized by where they are burning:

- Ground fires burn the organic matter that is under the leaf litter. This type of fire is uncommon in New Mexico and Arizona.
- Surface fires burn leaf litter, woody debris, grass, and small plants.
- Crown fires burn through the crowns of shrubs and trees. Grass fires are called crown fires becuse the entire fuel is consumed.

Wildland Fire Management: Theme 3 Lessons

Lesson 8: Historical Fire Management and Tree Ring Exploration

Lesson 9: City Council Debate about Controlled Burn

Lesson 10: Letter to Wildland Fire Managers

Next Steps and Timeline

Late October: Finish curriculum and post Beta version on SW Fire Science website

Winter: Collect teacher reviews and make edits to curriculum

Spring 2022: Add wildlife, funded by NM Share with Wildlife Grant

Summer 2022: Train the trainer events

You can help!

Work with classroom teachers to conduct burning experiments: **Lesson 4**: Burning fuels to demonstrate fuel properties

Some classroom teachers might not feel comfortable working with fire

They could use your expertise in their classes!

Questions? Ideas? Suggestions?

Contact Information

Would you be interested in working with classroom teachers to help beta test lessons?

Please contact: Mollie Parsons - mollie@ceriseconsultants.com

Visit the SW Fire Science Consortium website to learn more about their work: swfireconsortium.org/