Living Fire
Shaping Alabama’s Human and Natural Environments Through Time

Amber C. Marable
Rebecca J. Barlow
John S. Kush

With Photographs By
Ashley Young
About The Authors

Amber C. Marable

M. Natural Resources, Auburn University School of Forestry & Wildlife Sciences
Email: dunnamb@aces.edu

Amber Marable is passionate about outreach programming and has been involved in environmental education and interpretation with many organizations during high school and college including the Alabama Cooperative Extension System, Redstone Arsenal, The Land Trust of Huntsville and North Alabama, the Auburn University Student Chapter of The Wildlife Society, the Student Conservation Association at Great Smoky Mountains National Park, Joe Wheeler National Wildlife Refuge, and the Birmingham Zoo. She completed her B.S. in Wildlife Science in 2009 and graduated in 2012 with her Master of Natural Resources degree, both from Auburn University’s School of Forestry & Wildlife Sciences. She is now working as the 4-H and Youth Development Regional Extension Agent for Barbour and Russell Counties with the Alabama Cooperative Extension System.

Dr. Rebecca J. Barlow

Alabama Cooperative Extension System Forestry Extension Specialist and Auburn University School of Forestry & Wildlife Sciences Associate Professor.
Email: rjb0003@auburn.edu

Dr. Barlow has worked in the area of timber management on private forests since 1992. Forestland management basics are a focus of her outreach work where she aids private forest landowners in the management of their property for multiple uses. She has helped develop Cooperative Extension System programming in longleaf pine management, pine straw production, and agroforestry applications which provide landowners with options for generating additional revenue from their forests. In addition, she also teaches two upper level forest measurements courses at Auburn University’s School of Forestry & Wildlife Sciences.
Dr. John S. Kush

Longleaf Pine Stand Dynamics Lab, Auburn University School of Forestry & Wildlife Sciences Research Fellow
Email: kushjoh@auburn.edu

Dr. Kush has been involved in longleaf pine research since 1984. His efforts have focused on the natural regeneration of longleaf pine, studying the effects of fire on longleaf pine and associated plant communities, and re-introducing fire into fire-suppressed ecosystems. He has studied longleaf pine stand dynamics from regeneration to old-growth. He has taught several classes including longleaf pine ecology and fire management.

Ashley Young

Bachelors in Art Studio, University of Alabama in Huntsville College of Liberal Arts.
Email: amy0002@uah.edu

Ashley Young is a graduate with a Bachelors in Art Studio focusing in photography and printmaking at the University of Alabama in Huntsville. Ashley has been surrounded by and enjoyed photography her whole life. Recently Ashley placed 1st in a student art show. A Dean's list student, Ashley plans to pursue a Master's Degree in Fine Arts. Her dream is to achieve a career teaching art to students of all ages. This is her first project of this nature, but she looks forward to many more of the kind.
Acknowledgements

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How To Use This Book

This book is intended to be a starting point for 3–5th Grade teachers interested in natural resource education. It is a ‘starting point’ because each class is unique, and the lesson plans provided can be adapted to the time requirements and interests of each classroom. Estimates for time include coverage of all sections in class as well as participation in all activities. We encourage teachers to explore their creativity in expanding the content and making connections to students’ lives.

The lessons are designed to stand alone, but can also be taught in a series. Alabama’s learning objectives have been incorporated in all subject areas for the targeted grades where possible. Charts on the following pages display the teaching objectives met by grade, lesson, and subject area. Many objectives are met directly. Others (such as those for reading comprehension) can be incorporated by having students read the sections. Note pages at the end of each lesson are provided for the convenience of planning. We encourage teachers to provide feedback on ways we can improve this curriculum.

Thank you for your passion for the environment and the education of future generations. It is our hope that this book will allow you and your class to discover more about natural resources and ultimately, yourselves.
# Teaching Objectives
3rd Grade

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Introduction to Living Fire

It is said that we became truly human when we learned how to use fire. Fire is used to warm us, cook our food, and give us light. In historic times, people used fire to increase wildlife habitat and forage for livestock. Much the same way today, people use prescribed burns to increase habitat for wildlife and reduce the threat of destructive wildfires.

However, fire is more than just a utility to people. How many times have you sat around a campfire and roasted marshmallows, singing songs and telling stories? What about those barbecues at Labor Day? What is it about chestnuts roasting on an open fire that signifies the holidays? And many adults still love to watch fireworks on the 4th of July. In the past, as today, people used fires to connect with each other through songs, stories, food, and fellowship.

Fires also have the capacity to instill deep fear in people. House fires and raging wildfires are the stuff of nightmares, causing damage to lives and property. Much of the news involving fire revolves around these terrifying events. This fear has evoked interest historically and currently in reducing risk through campaigns and community-based programs like Firewise. These programs focus on personal responsibility and active safety.

In addition to these human dimensions, fire is also an integral part of the natural environment. Fire frequently occurs naturally as a result of lightning strikes. Rather than being harmed by fires, native species of plants and animals have adapted to the presence of regular fire on Alabama landscapes. Far from being negative, these wildland fires allow many species to live and reproduce through maintaining habitats and increasing food. Longleaf pine ecosystems are a good example of natural environments which require fire for maintenance. Longleaf pine ecosystems are among the rarest and most diverse ecosystems. The plants and animals that inhabit them, many of which are endangered or rare, are highly specialized and need fire in the landscape to allow them to survive.

What people think and how we feel about fire is influenced largely by what we experience firsthand through our own experiences or second-hand through the experiences of those around us and media such as television. Community attitudes affect us, but we can also affect the attitudes in the community. Participation in democratic processes like voting influence policy and attitudes on a local scale. However, often the best way to influence attitudes is simple conversation with your family, friends, and neighbors. Everyone can make a difference, no matter how small.

Fire may seem to be a simple chemical reaction, but it results in dynamic processes affecting human and natural environments. Fire is interwoven in the fabric of Alabama’s history, ecology, and culture. Living without fire is impossible. A better understanding of fire’s role in the natural world and society will help Alabama’s residents to live with fire respectfully, responsibly, and appreciatively.
Lesson 1
Birth of a Fire:
What Starts a Fire and How Does It Work?

Introduction

When you think of fire, how do you feel? Many people feel curious about fire. Others are afraid of it. Fire is often used as a symbol of heat, warmth, or power. Most of the time we associate the word ‘fire’ with danger. If you have ever seen an uncontrolled fire, you may think of danger first. However, fire is also a symbol of life and liveliness. Have you ever met someone with a ‘fiery personality?’ Let’s take a closer look at fire to try to understand what it really is.

Time Estimate: 3 Hr
Cost Estimate: $5-10

Materials:
- 1 Small Candle
- 1 Ceramic Plate
- 1 Small Glass Jar
- 5-6 Matches
- 1 Long Stick
- 1 Helium Balloon
- 1 String 4’’ Long
- 1 Fire Triangle Handout/Student
- 3 Brads/Student
- Lesson 1 Presentation
- Paper and Pencils
- Crayons
- Scissors

Vocabulary

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Convection</th>
<th>Fuel</th>
<th>Man-made</th>
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<tr>
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<td>Crown</td>
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<td>Stability</td>
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<td>Formations</td>
<td>Precipitation</td>
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<td>Aspect</td>
<td>Elevation</td>
<td>Ignite</td>
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<td>Availability</td>
<td>Firebrands</td>
<td>Intense</td>
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<td>Barriers</td>
<td>Fire Whirl</td>
<td>Ladder Fuels</td>
<td>Slash</td>
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<td>Combustion</td>
<td>Fire Triangle</td>
<td>Litter</td>
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<td>Flaming Stage</td>
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What Is A Fire?

Fire is a chemical reaction that releases energy in the form of heat and light. This reaction happens when oxygen combines with materials quickly. The chemical reaction is called combustion, or burning. When a fire is burning, you can think of it as ‘breathing.’ Like a living creature, fire needs oxygen to stay alive.

But breathing, alone, is not enough to keep it burning. Fires must also ‘eat,’ or consume fuel. A fuel is any material that burns. But not all things burn, even though they are exposed to oxygen constantly.

One other ingredient is needed to begin combustion. Heat has to be supplied to a fuel in an amount large enough to start, or ignite, it. Without this heat of ignition, there can be no fire.

These three things (oxygen, fuel, and heat) make the legs of the fire triangle. If any one of the legs of the triangle is removed the fire cannot start, or if it is already burning, it will die.
Materials:  
- Glass Jar  
- Ceramic Plate  
- Candle  
- 5-6 Matches  
- 1 Handout/Student  
- 3 Brads/Student  
- Crayons  
- Scissors  

Time:  
Approximately 30-40 Min  

Activity I  
Demonstrate the need for oxygen, fuel, and heat with two matches, a candle, a ceramic plate, and a jar. Hold up the match and show that without heat for ignition (from friction against the strike strip to create a spark) the fire will not start.

Light the match and place it on the plate. Allow it to burn up. Ask the students what happened to the fire (it ran out of fuel).

Strike another match, light the candle, and place it on the plate. Place a small glass jar over the candle until the mouth of the jar rests flat against the plate. Watch the candle flame and see how long it takes to go out. Ask the students what happened to the fire (it ran out of oxygen).

Explain to the class that fire has to have three things (heat, oxygen, and fuel) in order to burn. Give each student a copy of the fire triangle handout. Have children cut out, assemble with brads, label, and color individual fire triangles.
How Is A Fire Born?

A fire is born, or started, when heat ignites a fuel. Ignition heat can come from many sources. Sources as different as lights, campfires, grills, burning trash piles, lit cigarettes, and lightning strikes give off enough heat to start a fire.

Fires can be natural or man-made. Lightning striking a tree in the forest is a natural way for a fire to start. A burning cigarette carelessly tossed from the window of a car is a man-made source of fire. What other ways can you think of that a fire could start?

Materials:
- Lesson 1 Presentation

Time:
- Approximately 10-15 Min

Activity II

Use the Lesson 1 Presentation to show the following scenarios of fires being started one at a time:

- Lightning strikes a tree
- A campfire is left unattended
- A cigarette is thrown out the window of a car

Ask students to classify the ignition as either man-made or natural.
How Does A Fire Grow?

Fires grow like living things. Energy must be supplied to new fuels for fires to grow and spread. This energy is transferred as heat. How fires grow depends on the way the heat is transferred.

Heat moves in three ways: conduction, convection, and radiation.

- **Conduction** happens when heat is transferred through direct contact—like when you touch a hot stove.

- **Convection** is when heat warms a substance (like air or water) and the substance moves and carries the heat to another place—like steam rising during a hot shower.

- **Radiation** is when heat travels as an energy wave through the air—like when you get hot on a sunny day.

Any of these types of heat transfer can cause fires to spread.
Fires take different shapes as they grow. Each fire has two stages: a flaming stage and a smoldering stage.

The _flaming stage_ comes first, and happens when fuel gases combine with oxygen and are burned. A flame can be thought of as a bulb with oxygen surrounding the sides and fuel gases in the center. The sides of the bulb are where the oxygen and fuel gases combine and combustion occurs. A struck match is a good example of a flaming fire.

The _smoldering stage_ happens later, when solid fuels are slowly combined with oxygen. Smoldering fires give off smoke but do not have flames. A good example of a smoldering fire is the coals left in a campfire after the flames are out.
Materials:
- Pencils
- Paper

Activity III
Demonstrate convection, conduction, and radiation. Ask for three volunteers. Have each volunteer write the message “heat” on a piece of paper. Have the volunteers wad up the papers. Tell the students that heat is a “message” that must be sent to the back of the room, and that there are three different ways to do it.

Ask one volunteer to pass the paper wad to the student in the first row. Continue passing the paper from student to student until the last student in the row gets it. Have that student open it up and read it. Explain that this form of heat transfer is called conduction, and involves direct contact of heat from student to student.

Ask another volunteer to throw his/her paper wad overhand to a student in the back row. Have the student who receives it open it up and read it. Explain that this form of heat transfer is called convection, where air carries heat to another student.

Ask the last volunteer to get the message to the back row in a different manner. See if he/she can come up with the final way heat “messages” can be sent. Have the volunteer open the paper, get out his/her “phone” (hand sign for phone with thumb and pinky), and “call” the person in the back row to deliver the message. Have the receiving student pick up the “phone” and repeat the message. Explain that this form of heat transfer is called radiation, where heat waves flow directly from one student to another.

Ask the volunteers to try sending the messages at the same time to three different students in the back row. You can make it a race, or time it to see which method is the fastest. (Conduction should be slowest, radiation should be fastest.)

Time:
Approximately 15-20 Min

HEAT: The “message.”
Photo Credit:
Ashley Young

“Calling” to deliver the “message.”
Photo Credit:
Ashley Young
How Do Fires Move?

The environment around a fire shapes the way it moves, or behaves. Three main factors in the environment shape fire behavior: fuel, weather, and topography. Each of these factors is complex, and shapes fires in a variety of ways.

**Fuels**

A *fuel* is anything that can burn. Fuels in nature include living and dead plants and animals. Houses and other buildings are examples of man-made fuels.

The kind and amount of fuels, the availability of fuels, and the way they are arranged influence how a fire moves. Grasses, trees, *litter* (leaves and other small debris on the ground), and *slash* (trees and limbs lying on the ground) are different kinds of fuels.

The amount, or *loading*, of fuel is the weight of fuel in an area. This can be written in tons of fuel per acre. Fuels can also be classified by *availability*, or how long they will burn. Small fuels, such as twigs and leaves, burn more quickly than large fuels like logs.

The *arrangement* of fuels is how the fuels are spread out in an area. Fuels can be arranged in patches, in the soil, on the surface of the ground, and in the air (tree tops). Fuels which are somewhere between the ground and tree tops are called *ladder fuels*, because they allow fire to jump from the ground into trees.
Weather

Weather is short-term variation in the atmosphere. Characteristics of weather such as temperature, relative humidity, precipitation (like rain or snow), wind, and atmospheric stability affect the way fires move.

Higher temperatures allow fuels to dry faster and burn more easily. Relative humidity is the amount of moisture air can hold. The higher the temperature, the less moisture air can hold, and the lower the relative humidity. A lower relative humidity makes it easier for fires to spread because fuels dry quicker. Precipitation, like rain, can make fuels so wet they will not burn.

Wind is moving air. Fire is pushed in the direction that the wind is blowing. This happens because wind carries heat ahead of the fire and pushes the flame toward new fuels.

Atmospheric stability is a measure of how easy or hard it is for air to move up and down. The easier it is for air to move up and down, the less stable the atmosphere is. Lower stability makes it easier for air to carry heat by convection and carry firebrands (or flaming particles) to other places.
Topography

Topography is how the earth is laid out. Topography includes land features of slope, aspect, elevation, geological formations, and even man-made things like roads.

Slope is a measure of the steepness of the land. Fire burns faster when it is headed upslope because the flames are closer to the new fuels in front of the fire. Aspect is the direction (North, South, East, or West) that a slope is facing. South-facing slopes receive more sunlight and are usually drier and warmer than other slopes. Fire burns more rapidly on South-facing slopes for this reason.

Elevation is how far a place is above sea level. Fires are less likely to burn at higher elevations because it is colder and moister there.

Geological formations, such as mountains and valleys, affect the spread of fire through aspect, slope, and elevation. They can also act as funnels for wind or opportunities for fires to change direction.

Barriers are things that stop a fire from spreading. Lakes and rivers can act as barriers to fire spread, as can man-made roads.
Materials:
- Stick
- Helium Balloon
- String 4” Long

Time:
Approximately 15-20 Min

Activity IV

Take a straight stick and tie a helium balloon to one end with a short piece of string. Tell the class that the stick represents a “slope,” and the balloon represents a “flame.” Explain that fuels are arranged all along slopes in nature.

Take the free end of the stick in your hand and tilt the stick so that the end with the balloon is much higher than the end in your hand. Ask them where the “flame” is, in position to the “slope” (uphill). Ask them if the sides of the “flame” are far away or close to the rest of the fuel on the “slope” (far away).

Tilt the stick so that the end with the balloon is much lower than the end in your hand. Ask the class if the “flame” is still uphill (no, it is downhill). Ask them whether the “flame” sides are far away or close to the fuels on the “slope” now (close).

Ask if they think it would be easier for the fire to spread if it was close to the fuels on the “slope” or far from the “slope” (close). Discuss how much faster fire can move traveling uphill.

Ask some students to try using the stick and balloon to demonstrate this effect.
How Hot Is Fire?

Fires can burn slowly or quickly, more or less hot, depending on weather, topography, and fuel. Some combinations of these factors are dangerous. When these conditions aid each other, fires can be very intense (hot) and spread very quickly. There are special types of fire spread that can happen in these conditions.

Trees are spaced very closely together and a fire is very intense.

Crown fires are fires which jump from crown (tree top) to crown without touching the ground. These fires are common when lots of ladder fuels provide places for fire to jump from the ground to aerial fuels.

Spotting is when instability in the atmosphere and wind work together to spread firebrands from one place to another. When the firebrands land, they start small, spot fires.

Rarest of all are tornadoes of intense fire, called fire whirls. These form only during extreme conditions.

Sometimes entire trees or groups of trees are consumed almost instantly by fire. This behavior is called torching and happens when fuel
Materials:  
- Lesson 1 Presentation

Time:  
Approximately 15-20 Min

Activity V

Display the Lesson 1 Presentation provided. The slides contain pictures representing various fuels, weather conditions, and topography. For each type of factor (weather conditions, for instance) show a side by side of two conditions (rain and dry) and ask which one will be more likely to make a fire grow. Show videos of spotting, torching, and fire whirls via the links provided on the Presentation. See if students can identify these special cases of fire from the earlier reading of the section.
Conclusion

Fire is a chemical reaction caused by the rapid combination of oxygen with fuels. Heat is needed to ignite fires. Together, heat, oxygen and fuel form the fire triangle. Fires can be ignited by nature or man, and spread through conduction, convection, or radiation. Weather, fuel, and topography influence the way in which fires spread. Torching, crown fires, spotting, and fire whirls are specific types of fire spread caused by combinations of conditions favoring fire. Fire is a complex reaction that almost has a life of its own.

Photo Credit: Ashley Young.
Fire Triangle Handout

Step 1- Color and label the sides of the fire triangle.
Step 2— Cut out the sides of the fire triangle.
Step 3— Punch holes for brads.
Step 4— Place brads in holes and join the sides of the fire triangle together.
Notes
Notes
Lesson 2
Introduction

Close your eyes for a moment and think of a fire moving through a forest. What do you see after the fire goes out? Maybe you picture a charred and blackened landscape? Now think of a forest that is full of life. What do you see now? Are there birds in the trees and deer nibbling plants? It does not seem as if these two pictures would fit together. But they do, and they have for thousands of years. Fire has always been a part of Alabama’s history, but within the last hundred years, humans have changed the way fire affects Alabama. Let’s take a look at Alabama’s history with fire and see what lessons we can learn that might help us direct our future.

Time Estimate: 3 Hrs
Cost Estimate: $3-5

Materials:
- Pencils and Paper
- Lesson 2 Presentation
- 1 Fire Letter Handout/Student
- 1 Prescription Handout/Student
- 1 Heated Histogram Handout/Student

Vocabulary
- Alabama Forestry Commission
- Burn Managers
- Burn Plan
- Free-grazing
- Habitat
- Ladder Fuels
- Longleaf Pine
- Prescribed Fire
- Wildfire
Heated History?

Alabama has a long history with fire. In fact, fires have always been a part of Alabama’s landscape. Small, regular fires start naturally and maintain the forest. These fires clear away clutter, open the ground for new plants to grow, provide food and space for animals, and help to restore nutrients to the earth.

Once upon a time, fire passed through Alabama regularly. North and central Alabama experienced fire every 2-5 years. Coastal areas had more frequent fires (every 1-2 years) and more mountainous parts of our state saw fire every 5-7 years. These fires were not planned, but they helped to keep Alabama’s forests intact.
However, not all historic fires in Alabama have been natural. Native Americans realized that fire could be used to improve *habitat*, or living space, for animals. The hunters increased the numbers of game animals for hunting by setting fire to the landscape.

When European settlers arrived, they found a land that was regularly touched by fire, both natural and man-made. These settlers also found fire useful. Fires were used to encourage grass to grow for cattle and horses. Fires were also used to enrich the earth for farming, and to keep Alabama’s native *longleaf pine* forests open for grazing and logging.

**Activity I**

Use Lesson 2 Presentation. See list of discussion questions about early use of fire. The list includes questions such as, “How do you think Native Americans first came up with the idea to use fire to maintain lands?” Brain storm with the class listing ways it could have happened. Have the students vote on which way they think it really happened. Tally the votes and announce the winner.
Was Fire Fired?

For about a hundred years, fire was an accepted part of Alabama’s history. Admiral Raphael Semmes, the famous Naval officer from Mobile, once wrote about the fires while on his way to Montgomery:

“The pine woods were on fire as we passed through them, the flames now and then running up a lightwood tree, and throwing in weird and fitful glare upon the passing train. The scene was particularly Southern, and reminded me that I was drawing near my home and my people…”

Fire in a pine landscape in Alabama.
Photo Credit: Ashley Young
However, it wasn’t long before feelings changed. Laws were passed that made free-grazing, or letting livestock graze freely across the land, illegal. Most people had to remove their cattle from the woods. Fire was no longer used to increase grasses under the longleaf pine trees. Without the cattle and the fires, the forests became choked with undergrowth and fallen trees and limbs.

At the same time, logging removed many of the longleaf pines. The longleaf pines were replaced by other trees, like loblolly pines, which grow faster and cannot tolerate fire as well.

Soon people forgot how important fire could be to Alabama. Fire was fired.

Loblolly pines were planted to replace longleaf pines in many areas in Alabama. Photo Credit: Ashley Young

Materials:
- 1 Fire Letter Handout/ Student

Time:
Approximately 15-20 Min

Activity II

Have students write a short letter from the perspective of a person who had grown up around small, regular fires. Tell them to include things like emotions, actions, and plans for the future. Have three to four students swap letters and read out loud to the class.
Why Was Fire Feared?

Most of Alabama’s native longleaf pine forests almost disappeared overnight. The ones that were left became overgrown. When fires did start naturally or were started unintentionally by people, they damaged forests and property. These fires, called wildfires, were destructive and could not be controlled.

The loblolly and slash pines that were planted after the longleaf was gone often did not survive wildfires. The smaller trees, shrubs, and dead plants that built up around the trees acted as ladder-fuels which carried fire from the ground to the tree tops. Entire forests were destroyed and homes were threatened.

Fire seemed like an enemy, and concerned people went on a campaign to stop all fires.
Beginning in the 1920's agencies sent messages to the public, warning them about the dangers of wildfires. These messages were so successful that hardly any fires were set by people, and many wildfires were fought successfully. But this only made the conditions more dangerous for the next wildfires, since the forests continued to grow up.

Materials:  
- None

Time:  
Approximately 15-20 Min

Activity III

Divide the class into four groups: trees, fuels, fire, and citizens. Have the “trees” stand at the head of the class with arms upraised. Have the “fuels” (leafy plants, annuals, low-growth, leaf litter and slash) lay on the floor around the trees. Two at a time, send “fires” in to “clean up” (help up) the fuels on the surface of the ground. Have the “citizens” point and watch. Have the “fires” escort the “fuels” to the side of the room.

Explain that this is the way that small, regular fires work. These fires clean up the litter, slash and low-growth.

Reset the game. The “trees” are still standing. Have the “fuels” lay back down on the floor. Have the “citizens” argue that fire is not good. Have them circle and link arms around the group of “fires.” Tell the “fuels” to start building up and growing (crouch, kneel, then stand with bent knees and link hands with the “trees”). Tell the “citizens” that one of them has been careless and to let go. Tell the “fires” to move through again. This time, when the “fires” move through, they link arms with both the “trees” and the “fuels” and drag them off.

Explain that this is what happens when fire is entirely controlled. Ladder fuels build up, and when a fire does start, it destroys the small fuels and the trees, too.
Members of the Auburn University Student Chapter of The Wildlife Society demonstrate Activity III.
Photo Credit: Amber C. Marable
Can We Live without Fire?

In the 1950's, the attitude changed again. Every time a wildfire started, it grew more destructive. Raging wildfires proved that no matter how hard people tried, not all fires could be stopped. Living without fire was simply not an option.

People have learned more about fire in the environment since then. People began to realize that small, frequent fires are safer than large, uncontrolled ones. Many began to see that fires could be used to manage the land safely. When man-made fires are planned by experts to manage the land they are called *prescribed fires*. Like a doctor’s prescription, these fires are prescribed for a specific “patient,” or forest and are written to manage a specific problem.

Prescription burning is an important tool. These fires are used by experts to clear away undergrowth, increase food and habitat for animals, and help native plants to grow. Prescribed fires help keep people and forests safer, because they decrease the build-up of undergrowth that would lead to dangerous wildfires.
Materials:
- 1 Prescription Handout/ Student
- Lesson 2 Presentation

Time:
Approximately 15-20 Min

Activity IV

Tell the class that they are all doctors. Show them a picture of an overgrown wood with lots of ladder fuels from Lesson 2 Presentation. Have each one write a prescription for fire. This should include the prescription (fire), the benefits of the fire, and the directions for use. Have students tape these up on the wall.
Can We Live with Fire?

Prescribed burning is very beneficial to people and wild areas of the South-east. But many people may not be comfortable with the thought of using prescribed fires. Some wonder, “What if the fire gets away from the managers?”

Each prescription fire is carefully planned by experts. These experts take into account weather conditions, topography, fuels, land use, and many other aspects before they write a *burn plan*. A burn plan is a written document telling why and how a prescribed fire will be set to help the forest. *Burn managers*, the experts in charge, even plan for the direction the smoke from the fire will go, so that no one has to breathe smoky air.

These burn plans must be approved by the *Alabama Forestry Commission* before the experts can obtain a permit to burn. Safety is the number one priority, and burn managers are responsible at all times for the fires they set. Managers will not even set permitted prescribed fires until the conditions are just right.

Prescribed burning is the best way to keep wildfires from getting out of control.

*Expert John Gilbert patrols a prescribed burn.*
*Photo Credit: Craig Guyer*
Materials:
- Pencils and Paper
- 1 Heated Histogram Handout/Student

Time:
Approximately 20-30 Min

Activity V

Ask students how they feel about prescription burning. Take a vote using the categories of very bad idea, bad idea, unsure, good idea and very good idea. Tally the votes.

Have the students create individual histograms showing the division of the classes into bins.

Ask the students if they think they would get the same results if they asked another group of people. Why or why not?
Alabama’s history is closely tied to fire. The land has been maintained by both natural and man-made fire for thousands of years. When fires are removed, the forests change. Conditions start to favor destructive wildfires. Although concerned people have at times tried to stop all fires, most now recognize that some fires are good. Burn managers use prescribed fire to maintain Alabama’s forests for the benefit of animals, plants, and people. Prescription burning is the best way to protect Alabama’s citizens and forests from destructive wildfires.
Fire Letter Handout

Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Write a letter as if you had grown up around wildland fire.
Prescription Handout

Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Write a prescription for fire.

Dr. ________________________________

Prescription: ________________________________

Benefits: ____________________________________

Directions: __________________________________

_____________________________________________

_____________________________________________
Heated Histogram Handout

Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Create a histogram of the class response to fire.
Lesson 3
Growing Pains:
How Can Alabama Be Wildfire Wise?

Introduction

There are more wildfires in the South than in any other region of the United States, and more wildfires in Alabama than in any other state. Because wildfires are so frequent, it is important to understand more about them. Let's take a closer look at wildfire in Alabama to see what steps we can take to be wildfire wise.

Materials:

- Pencils and Paper
- Lesson 3 Presentation
- Computer/Internet Access
- 1 Fire Report Handout/Student
- 1 Wildfire Safe Home Handout/Student
- Yellow Arm Bands
- Blue Foam Balls
- Pipe Cleaners
- Black and White Craft Pom Poms
- Shoe Boxes
- Glue
- Markers

Time Estimate: 4 Hrs
Cost Estimate: $20

Vocabulary

<table>
<thead>
<tr>
<th>Alabama Forestry Commission</th>
<th>Burn Plan</th>
<th>Fire Weather Watch</th>
<th>Ignite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backing Fire</td>
<td>Conifers</td>
<td>Fire Whirl</td>
<td>Island</td>
</tr>
<tr>
<td>Barrier</td>
<td>Crown Fire</td>
<td>Firebrands</td>
<td>Ladder Fuel</td>
</tr>
<tr>
<td>Burn Ban</td>
<td>Deciduous</td>
<td>Firebreak</td>
<td>Prescribed Burn</td>
</tr>
<tr>
<td>Burn Manager</td>
<td>Defensible Space</td>
<td>Firewise</td>
<td>Red Flag Warning</td>
</tr>
<tr>
<td>Burn Permit</td>
<td>Drought</td>
<td>Flanking Fire</td>
<td>Species</td>
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<tr>
<td></td>
<td></td>
<td>Head Fire</td>
<td>Spot Fire</td>
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<td></td>
<td></td>
<td></td>
<td>Spotting</td>
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<td></td>
<td></td>
<td></td>
<td>Topography</td>
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<td></td>
<td></td>
<td></td>
<td>Torching</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wildfire</td>
</tr>
</tbody>
</table>
Are Wildfires Running Wild?

Fire is a natural part of the ecosystems in Alabama. Small, regular fires are healthy for the environment. When fire is kept out of our forests long enough, fuels build up. When this happens, a fire may burn intensely (very hot), spread quickly, damage more, and be harder to control. These fires are called wildfires. *Wildfires* are fires that are natural or man-made and that are destructive. Most wildfires in Alabama are no serious threat to people’s homes. However, where people live close to forests and agricultural fields, wildfire can be a concern. Wildfires can also damage forests, and endanger the firefighters who try to fight them.
The **Alabama Forestry Commission** keeps count of the wildfire records in the state. The Alabama Forestry Commission website (www.forestry.state.al.us/) has detailed records of the numbers of wildfires reported in Alabama. This information is listed for Alabama and for each county. This website also has maps of fire occurrence by county and fire risk information for communities. Although these wildfires rarely damage homes in Alabama, there are a few conditions which might make wildfires more dangerous.

Current Wildfire Map generated March 24, 2012.
Image Credit: Alabama Forestry Commission
Materials:
- Computer/Internet Access
- 1 Fire Report Handout/Person

Time:
- Approximately 30-45 Min In Class
- Approximately 1 Hour At Home

Activity I

Have students visit the Alabama Forestry Commission online at www.forestry.state.al.us/. Guide them through the link on the left hand side of the page called “Fire in the Wood.” Click on the subheading “Current Wildfire Totals.” Show the students that this webpage shows the number of wildfires in Alabama for that day, and the previous day, week, month, and year. Show them that they can use the drop-down menu below the report for all of Alabama to display figures for each county. Go through the process a few times so that students are familiarized with it. Next, visit the subheading “Fire Risk Assessment Maps.” Choose the icon on the far right labeled “Fire Occurrence Areas (Historic Fire Data).” A list of all the Alabama counties will be displayed. Click on one to pull up the Fire Occurrence Area Map for that county. Explain about map scales and legends, and what the different colors and symbols on the map represent.

Assign each student a county and give them a Fire Report Handout. Make sure that each student receives a different county, and that one student is assigned the county in which the school resides. Have students write a Fire Report of wildfire occurrence in the county assigned to include a printout of the Fire Occurrence Area Map for that county, and a typed or handwritten summary of the number of fires in the county (that day, and over the previous day, week, month, and year). Have each student bring his or her report to the front of the class, point out the county on a large map of Alabama, and read his or her wildfire report. Have each student show the printed Fire Occurrence Area Map and identify scale and the colors and symbols from the legend for the class.
Does Fire Behave Badly?

The way a fire moves is affected by three main things: weather, topography, and fuels. Certain conditions of those three factors allow fires to spread very easily.

**Weather**

Weather conditions such as high temperatures, **drought** (when it does not rain for a long time), and low relative humidity (a measure of the moisture in the air) dry out plants and other fuels. When this happens, only a very small amount of heat is needed to start a fire, or **ignite** the fuels.

Winds dry fuels and allow fires to spread more quickly. Sometimes winds carry **firebrands**, or pieces of flaming fuel, in the air. When these firebrands land, they start **spot fires** ahead of the main fire. When this happens, it is known as **spotting**, and the fire is much harder to control.

If the atmosphere is unstable and there is high wind, fires can form fire whirls. **Fire whirls** are tornadoes of fire which can be very small or very large, depending on the conditions.
Topography

Topography, or the lay of the land, can shape the way a fire moves, too. Steep slopes make it easier for fires to spread when moving uphill, since the flames are close to the fuels in front of the fires. Hillsides that face the south receive more sunlight and are drier. Fire on these slopes tend to spread more quickly.

Fuels

Fuels also influence the way fires move. When fuels are clumped together, fires can spread easier than when they are far apart. Small fuels, like leaves, burn faster than large fuels, such as logs.

When debris and smaller shrubs grow up under taller trees, they are called ladder fuels. Ladder fuels allow fire to jump into the tree tops, or crowns. While small fires on the surface of the ground do not usually damage grown trees, crown fires are difficult to control and can kill the trees.
The kinds, or species, of fuel plants also influence how much damage a wildfire causes. Some species of trees such as longleaf pine, actually need fire on the landscape. Other species, such as loblolly pine, do not tolerate fire and can be damaged heavily. Conifers, or evergreens, have waxy sap that burns easier than deciduous, or hardwood, trees. Sometimes small conifers such as Eastern red cedars will ignite and burn almost instantly. This is called torching. Torching can consume either single trees, or small clumps, at a time.

Since there are many conditions that make it easy for wildfires to start and spread, is Alabama one big wildfire waiting to happen?

Materials:
- Lesson 3 Presentation
- Computer/Internet Access

Time: Approximately 15-20 Min

Activity II

Show Lesson 3 Presentation. Slides contain pictures of weather conditions, topography, and fuels. At each slide, ask students whether the condition (ex. high temperature) would allow wildfires to move more or less easily. Have students shout out answers and explain why or why not.

Have students visit the US Forest Service website, http://www.fs.fed.us/rm/fire_game/, to play the game “Living With Fire.” This interactive game allows students to make choices as a burn manager and to see the outcome of the resulting fire.
Wildfire Waiting To Happen?

For many decades, people were so concerned about wildfire that they controlled all fires in the landscape. Fuels that would normally have been removed every year or two by small fires began to build up. Before long, ladder fuels that allow fire to spread into tree crowns become common.

Many of the native, or local, fire tolerant plant species have been replaced by plants that cannot tolerate fire easily, like loblolly pine. These circumstances allow fire to cause more damage than fires in natural ecosystems would. Wildfire in these changed ecosystems makes fire seem like a bad thing.
When people are careless, man-made wildfires can start. Since Alabama’s environment is so very different from what it once was, it is very easy to accidentally start a wildfire. Wildfires are often started because people throw burning cigarettes out of car windows onto the roadside.

People can also start fires accidentally by leaving cars parked running on the sides of roads or in grassy areas. Sometimes, people start fires for some purpose, like barbecuing, but the fires get out of hand. Other examples of fires that easily escape occur when trash or leaf piles are burned, or fireworks are used in a dry area.

Once a wildfire is reported, firefighters rush to fight it. These men and women brave the danger to control wildfires. Altered landscapes make it easy for wildfires to start and put both humans and the environment at risk.

Changing the landscape back to the way it was when small fires regularly burned through may be the best way to control wildfires. But how would you start?
Materials:
- Yellow Arm Bands
- Blue Foam Balls

Time:
Approximately 45 Min

Activity III

(Adapted from Fire in Florida’s Ecosystems by the Florida Department of Agriculture and Consumer Services, Division of Forestry) To start, designate one child as the spark (that starts the fire). One quarter of the class will be firefighters (tie yellow arm bands to the firefighters). Each firefighter should be armed with two or three “waters” (soft blue foam balls). The rest of the students are trees (or fuel) which allow the fires to grow. At the beginning, explain to the players what each of their roles will be. Have the spark go to one end of the playing area and align the firefighters at the other end. Now tell the trees to “take root and grow” anywhere they wish on the playing field. They should stand with their arms held up to mimic tree branches.

The spark starts the game by tagging a tree. Trees may not run from fire! Tagged trees become part of the fire and must join hands with the spark. The fire must now continue its pursuit of trees as a unit, attempting to capture trees with their free hands. Captured trees must join the chain of fire. Fire can either move as a long chain, or may break into several smaller groups and travel as spot fires. They may not travel as individuals (pairs or more only!). This distinguishes them from trees.

Firefighters should be held on the sidelines until the fire has had a chance to “grow” to 3-4 players. At this point, ask the firefighters, “Do you smell smoke?” They will be raring to go, so when they yell “Yes!”, allow them to go fight the fire.

Firefighters must avoid fire (they, too, can become fuel for the fire and must join the fire if caught) while attempting to slow the fire’s growth. They can do this in 3 ways:

- Removal of fuels - Firefighters may tag trees and escort them out of the game to the sidelines. Firefighters and trees may not be captured by fire en route!
- Direct attack - Firefighters may tag fire with their blue foam balls. Fire units that get hit with water must walk from that point on.
- Containment - Firefighters may work together to encircle or contain a spot fire (wet fires are the easiest to contain). Contained spot fires must go to the sidelines.

The game is over when no trees remain or the fire is controlled. Compare the number of “fire” players left at the end of the game with the number of players on the sidelines. Who won, the firefighters or the fire? Point out similarities and differences to real life.
Fighting Fire With Fire?

People cannot control the weather or the topography in an area. But we might be able to control the fuels two ways. First, we can plant more native plants, like longleaf pine, which need fire in the landscape. Second, we can remove the ladder fuels before they build up.

Prescribed burning can reduce the fuels that build up in an altered landscape. *Prescribed burning* is when fires are planned and set by humans for a specific purpose—management. Prescribed fire removes fuels before they can become ladder fuels. Since it is planned, prescription fire also allows for fires to be set on days and in places where weather conditions and topography will not allow the fire to get out of control.

A fire crew managing a prescribed burn.
Photo Credit: M. Kyle Marable

A fire crew keeping a watchful eye on a prescribed fire.
Photo Credit: M. Kyle Marable

A prescribed burn in a pine landscape.
Photo Credit: Ashley Young
A prescription fire has three main parts: the head fire, the backing fire, and the flanking fires.

- The *head fire* is at the front of the fire. This is the part of the fire that is pointing in the direction the fire is moving, usually with the wind.
- The *backing fire* is on the opposite side of the fire from the head fire, and is moving against the wind.
- *Flanking fires* are on either side of the head fire and backing fire, moving out from the main body of the fire.

Together, the three fires form one large ring, which can be any shape. The point of ignition is where the fire is started. *Islands* are unburned areas of fuel within the fire ring. *Spot fires* may start in front of the head fire as *firebrands* are carried by the wind. *Barriers* to fire movement can be natural, like rivers and lakes. Barriers can also be man-made, like roads. Firefighters create barriers called *firebreaks* by cutting down plants and digging up the soil. This reduces the fuels that fires can use and usually stops fires from spreading across the firebreak.

![Diagram of a prescribed fire.](Image Credit: Amber C. Marable)
When a prescription fire is properly planned and managed, it is a safe way to remove unwanted fuels. Only experts, called burn managers, are allowed to use prescribed burning. And these people are only allowed to set prescription fires after the Alabama Forestry Commission approves a burn plan and issues a burn permit.

Materials:
- 1 Shoebox/Student
- Pipe Cleaners
- Black and White Craft Pom Poms
- Markers
- Glue

Activity IV

Have each student construct a prescribed fire using pipe cleaners and craft pom poms in shoebox dioramas. Red represents a head fire. Yellow represents a backing fire. Flanking fires are orange. Use blue to shape a water barrier (such as a river). Use green to represent fire breaks. Black pom poms represent spot fires. White pom poms represent unburned islands. Use the glue to hold the pipe cleaners and pom poms in place. Have students label the parts of their prescribed fire with markers.

Time:
Approximately 20-35 Min
What Can I Do?

Not everyone can use prescription burning, but there are many ways to help Alabama be wildfire wise. The easiest thing to do is to be alert and responsible. If you smell smoke, or see an unattended fire in the woods or on the side of the road, report it by calling 911. Never leave a camp fire or barbecue grill unattended. Before your family shoots fireworks or burns a pile of leaves, check to see if any fire alerts have been issued.

*Fire weather watches* and *red flag warnings* indicate that conditions are perfect for wildfires. You can find out if there are any fire weather watches or red flag warnings in effect by checking the National Weather Service website at [www.alerts.weather.gov](http://www.alerts.weather.gov). *Burn bans* are issued by the state, and mean that no one is allowed to set any fires, even grilling. You can check online at the Alabama Forestry Commission website or listen to the local news to see if any burn bans are in effect for your area.
The *Firewise* program was created to help people know how to protect their homes from wildfire. You can make your home wildfire safe by following a few steps from the Firewise program. The most important part of Firewise is creating a *defensible space* at least 30’ away from your home on all sides. Your defensible space may need to be larger than 30’ if you live on the top of a hill, because fire spreads easier up slopes. These steps will help you to create your defensible space:

- Clear all plants, mulch, and other debris at least 3-5’ away from your house.
- Clear debris and other objects from under your house crawl space and under your porch
- Close off the crawl space and porch from the outside with underpinning
- Clean gutters and roof regularly to remove any build-up of leaves (especially pine needles)
- Pick up any dead branches, rake leaves, and mow the defensible space frequently
- Remove any shrubs growing under your trees that would act as ladder fuels
- Make sure that trees are spaced so that the crowns are at least 10-15’ apart
- Prune remaining trees and shrubs regularly to remove dead material
- Trim tree limbs at least 6-10’ off the ground
- Regularly water the plants around your home so that they do not dry out
- Safely store firewood, propane, and other fuels at least 30’ away from your home

These simple steps can help you keep your home wildfire safe.
Activity V

Have students develop instructions for how to make their homes wildfire safe using the Wildfire Safe Home Handout. Be sure to include an overhead sketch of the house and yard, a description of steps for creating defensible space in their yards, and a fire safety plan for what to do if a fire starts. Have a few volunteers come forward and read their instructions to the class. Make sure students take the plans home to discuss with their parents.
Conclusion

Although fire is a natural part of Alabama’s landscape, the changes humans have created in the environment may make wildfires more likely to occur. Wildfires rarely damage homes, but certain weather, topographic, and fuel conditions can make wildfire a concern. Naturally occurring, small, regular fires and prescribed fires can help remove fuels that build up in the landscape. Removing these fuels decreases the chances of destructive wildfires. You can keep Alabama wildfire wise by being alert to wildfires, being responsible in the fires you set, and by creating a defensible space around your home.

Photo Credit: Ashley Young
Fire Report Handout

Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Put name of county assigned below your name
Step 4: Fill out report

_________________________   __________________________

_________________________

Number of Current Fires:

_________________________

Number of Fires Yesterday:

_________________________

Number of Fires in Last Week:

_________________________

Number of Fires in Last Month:

_________________________

Map Scale:

_________________________

Identify Symbols and Colors:
Wildfire Safe Home Handout

Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Write instructions for making your home wildfire safe.
Step 4: Discuss with family.

_________________________  __________________________

_________________________

1. ______________________

2. ______________________

3. ______________________

4. ______________________

5. ______________________

6. ______________________
Lesson 4
Life Support: What Can Fire Do For Nature and Us?

Introduction

Alabama is rich in natural resources. In fact, Alabama is the 5th most biologically diverse state, having more kinds of plants and animals than the 45 other states. Fire plays a key role in maintaining this diversity in our state. Many of the species which grace Alabama have special adaptations to fire that allow them to thrive in fiery ecosystems. Let’s take a closer look at the natural ecosystems of Alabama to better understand the interactions between fire-adapted species and fire.

Time Estimate: 3 Hr
Cost Estimate: $10-15

Materials:
- 1 Paper Towel Cardboard Roll
- Markers, Crayons, etc.
- Plastic Bag
- Large Bag of Colored Craft Pom Poms
- 1 Wildland Wildfire News Update Handout/ Part
- 1 Alabama Longleaf Pine Handout/ Student
- Masking Tape
- Measuring Tape
- 1 Who’s Who of Wildland Fire Wildlife Handout/ Student
- Computer/Internet/Printer Access

Vocabulary

<table>
<thead>
<tr>
<th>Biologically Diverse</th>
<th>Extinct</th>
<th>Longleaf Pine Ecosystems</th>
<th>Red-Cockaded Woodpecker</th>
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</thead>
<tbody>
<tr>
<td>Cavities</td>
<td>Forb</td>
<td>Native</td>
<td>Threatened Species</td>
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<tr>
<td>Cover</td>
<td>Germinate</td>
<td>Overstory</td>
<td>Understory</td>
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<tr>
<td>Eastern Indigo Snake</td>
<td>Gopher Tortoise</td>
<td>Perennial</td>
<td>Wildfire</td>
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<tr>
<td>Ecosystem</td>
<td>Habitat</td>
<td>Resin Well</td>
<td>Wildlife</td>
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<tr>
<td>Endangered Species</td>
<td>Keystone Species</td>
<td>Seed Bank</td>
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Do We Have Fiery Forests?

Fire is a natural component of Alabama ecosystems. Some regions of Alabama, such as the coastal plain, experienced regular fires every year or every other year. Fires burned naturally through other areas in Alabama every two to seven years, depending on the environment. These small fires are naturally started and benefit the environment by maintaining ecosystems. *Ecosystems* include the living (animals, plants, etc.) and non-living (climate, soil, water, etc.) parts of the environment. Small, regular fires maintain ecosystems by clearing away fuels such as dead plants. Without fire, these fuels would build up and create conditions perfect for more destructive fires, called *wildfires*. But how do living plants deal with fire?

Small, regular fires maintain ecosystems like this one.
Photo Credit: Rebecca J. Barlow

How do living plants deal with fire?
Photo Credits: Ashley Young
Materials:
- None

Activity I

Ask students “who in here has chores to do at your house?” Have students raise hands and pick a few to explain what their chores are. Ask them generally what those chores are about (washing dishes and clothes, taking out garbage, and sweeping are all examples of cleaning). Explain that fire is a natural “cleaner” for the environment. It removes all of the “junk” (dead and dying plants and other materials) and keeps unhealthy “germs” (wildfires) from growing.
Do Plants Love Fire?

Plants are *sessile*, or not able to move. How then do plants escape being damaged by small, regular, natural fires? Many plants *native*, or local, to Alabama are adapted to live with fire. These plants are able to tolerate fire in several ways. Some plants, like mature longleaf pines, are large and resistant to fire. Other plants, such as grasses and other *perennial* plants (plants that return year after year), may burn up, but the roots remain safe underground. These plants send up green shoots quickly after a fire.

The roots of plants like this may remain safe underground in a fire. The plants will sprout again soon after a fire has passed.

Photo Credit: Ashley Young
Many plants are not only fire-resistant, but fire-dependent. These plants actually need fire to grow.

Fires break down dead material into nutrients that living plants need to grow. Some smaller plants will be burned during a fire. However, this makes room for other seeds in the soil, or seed bank, that would not have had access to sunlight or nutrients to grow without fire. Some seeds are specially adapted to require fire before beginning to grow, or germinate. For example, longleaf pine cone seeds need bare mineral soil to increase chances of survival. Fires may also help to control diseases and parasites that plants face.

So what is the recovery time from a blackened forest to a green one? A flush of new green plants may appear in just a few short days after a fire. We can see how plants thrive in a fiery environment, but how do animals live through fires?
Materials:
- 1 Paper Towel Cardboard Roll
- Markers, Crayons, etc.
- Plastic Bag
- Large Bag of Colored Cotton Balls

Activity II

Take a cardboard roller from a roll of paper towels and decorate it like a tree before class (with markers, crayons, etc.), sealing off one end of the “tree” and designating that end the “crown.” Take a large bag of colored cotton balls and explain that the colors stand for nutrients (red can be nitrogen, white can be potassium, blue can be phosphorous, etc.). Explain that your “tree” needs to use those nutrients to survive, and that trees absorb nutrients from the ground through their roots. Show them that the cotton balls (still in the bag) won’t fit in the tube. Ask the students to try it (they will have fun trying to stuff the bag inside the tube).

Once they agree it can’t be done, ask if they can think of a way that the “roots” can absorb the “nutrients.” Someone will suggest you open the bag. Allow them to open the bag and start putting the nutrients inside the tree through the “roots.” Explain that fire breaks down plant and animal material both chemically and physically into smaller packages (molecules) that tree roots can absorb.

“The bound “nutrients” are unavailable to the “tree.”
Photo Credit: Ashley Young
What About Wildlife and Fire?

Wild animals, or **wildlife**, also have fire-adaptations. Although animals are not able to tolerate flames the way some plants are, animals have an advantage over plants: they can move! When fires move through forests, animals move out of the way.

Some species escape the flames by going to a different part of the forest. Other species avoid fires by moving into underground burrows, or high into trees, where they are safe. Animals which live in and around water like fish, amphibians such as frogs, and reptiles such as aquatic turtles, are quite safe from flames. Few animals are harmed by fires.
Wildlife, too, are dependent on fire. The removal of some plants creates habitat, or living space, that many species, or kinds, of animals are able to use. The new green plants that grow after fires often provide food for wildlife such as wild turkeys and white-tailed deer. Insects are attracted these new plants, and provide food for many birds.

New plant growth also provides cover, or shelter, that is used for nesting, denning, and protection. Certain ecosystems, such as longleaf pine ecosystems, require regular fire. The species that depend on these ecosystems also depend on the fire. So how long does it take after a fire to see animals back in the forest? Not long. Animals almost immediately begin to return to the forest after a fire. Often, not everything burns. Shelter and food that the animals need can still be found.
Materials:
- 1 Wildlife News Update Handout/Part

Time:
Approximately 30-45 Min

Activity III

Have students volunteer to read parts in the Wildlife News Update. This is a reader’s theatre where students take parts as animals being interviewed by other animals following a small, naturally occurring fire. The animals explain to each other how they avoided the fire and what benefits fire will have for them.

Members of the Auburn University Student Chapter of The Wildlife Society demonstrate Activity III.
Photo Credit: Amber C. Marable
What Is Alabama’s Most Famous Fiery Forest?

Although many of Alabama’s native ecosystems are adapted to regular fire, longleaf pine ecosystems are the most famous of our fiery forests. These ecosystems are also the most dependent on fire to maintain them in a natural state.

Longleaf pine forests once covered about 15 million acres in Alabama, almost half of the state! Although these ecosystems are named for the most common species of tree found there, longleaf pines, many species of plants thrive in these forests. Longleaf pines make up the majority of the overstory, or tall trees. But the understory, made of shorter plants, is extremely diverse. In fact, longleaf pine ecosystems are the most diverse ecosystem on the planet on a small scale (within one square meter).
If you were to visit a longleaf pine forest, you would see an amazing sight. Longleaf pines grow over 120 feet tall and live for well over 400 years. Beneath the trees is an almost park-like sight. Most of the understory plants are short, no more than two to three feet high. This understory is mainly native grasses and forbs (non-grass herb-like plants). From a distance, these plants look very even and similar. But if you were to examine them closely, you could find more than 40 species in just one square meter!

The understory diversity in longleaf pine ecosystems is very high!
Photo Credit: Rebecca J. Barlow

Materials:  
- 1 Alabama Longleaf Pine Handout/Student 
- Markers, Crayons, etc. 
- Masking Tape 
- Measuring Tape

Time:  
Approximately 20 Min

Activity IV

Visit the Longleaf Alliance online at http://www.longleafalliance.org/next-generation/lesson-material/range-color.pdf/view to see the area of Alabama historically covered by longleaf pine. Have students make a sketch showing how much area longleaf pine ecosystem once covered using the Alabama Longleaf Pine Handout. Explain that longleaf pine is one of most diverse ecosystems on the planet. Ask students to vote which of the following is the most diverse: Tropical rainforest of the Andes, coral reefs, or longleaf pine ecosystem? Listen to answers, explain that it’s a trick question- it depends on the scale. On the scale of a square meter of land, longleaf pine ecosystems have greater plant diversity than anywhere else on the planet.

Have students measure a square meter on the floor using masking tape. Ask them how many people can fit in the square meter. Not very many! Then ask how many species of plants do they think could fit in the same tiny space? Over 40 species can fit in that small of a space if you are in a longleaf pine ecosystem!
Does Fire Encourage Rare Species?

Some species of animals are very rare and are called *endangered species* or *threatened species*. These animals need special protection in order to exist. Some species require longleaf pine ecosystems in order to survive. Since longleaf pine ecosystems are becoming rare, these animals are in danger, too. Three rare species in Alabama are particularly impacted by longleaf pine ecosystems: the gopher tortoise, the Eastern indigo snake, and the red-cockaded woodpecker.

![Gopher Tortoise](image1)

**Gopher Tortoise**

*Gopher tortoises* are most frequently found using the sandy soils and plants of longleaf pine ecosystems in order to survive. These tortoises are social land turtles that like to burrow. They dig tunnels that can be up to 30 feet long and 9 feet deep. These burrows are home to many other species of Alabama wildlife. In fact, these burrows are so important to the plants, animals, and soils of longleaf pine ecosystems that gopher tortoises are often called key-stone species. *Keystone species* are species that have an extremely important role in the lives of other species of animals and plants in the ecosystem.
**Eastern Indigo Snake**

*Eastern indigo snakes* are the longest native species of snake in the South-eastern United States. These snakes are dark blackish purple in color on the back with a red/orange splashes under the chin. They can reach over 8 feet in length! These snakes depend largely on longleaf pine ecosystems for habitat. They may even use abandoned gopher tortoise burrows. Although considered *extinct* (none left alive) in Alabama for many years, they have been recently reintroduced in longleaf pine ecosystems in the state through the efforts of Auburn University and other organizations.
Red-Cockaded Woodpecker

Red-cockaded woodpeckers are also dependent on longleaf pine ecosystems for survival. These striking black-and-white birds have white cheek patches. Males have red streaks, called cockades, that are very difficult to see. Red cockaded woodpeckers nest only in holes, or cavities, of mature pine trees between 80 and 120 years old. They also need open areas to find food.

Longleaf pine ecosystems are some of the few that can meet these requirements. To keep predators from invading their nest cavities, these woodpeckers drill small pits, called resin wells, around the entrances. The resin wells leak sticky and stinging sap, which discourages predators that would eat woodpecker eggs from visiting.

These species, and many more, depend on longleaf pine ecosystems for survival. Longleaf pine ecosystems, in turn, depend on regular fire for maintenance. Without fire, Alabama’s forests can never be natural.
**Materials:**
- 1 Who’s Who of Rare Wildlife Handout/Student
- Computer/Internet/Printer Access

**Time:**
- Approximately 30 Min In Class
- Approximately 45 Min At Home

**Activity V**

Have students break up into teams to research a species (students can pick longleaf pine, red-cockaded woodpecker, indigo snake, or gopher tortoise) on the internet. Each team will prepare a quick Who’s Who of Rare Wildlife entry using the handout provided. Each entry will include a picture of the species, a description of the species (example: classification, color/pattern), a description of where it lives and how it needs fire.

**Conclusion**

Alabama is among the most biologically diverse states. Many of these species of plants and animals are specifically adapted to not only tolerate, but require regular fire. Longleaf pine ecosystems are Alabama’s most famous fiery forests. Many species, including endangered species, depend on these forests to survive. Fire is life support for Alabama.
Wildlife News
Update Handout

Reporter Raccoon: *Very Official* Hi there and hello. I’m here today to bring you another Wildlife News Update! Excuse me sir, did you see the fire?

Chippy Chipmunk: *Speaking Very Fast* Yes, sir! My name is Chippy and I saw the fire moving through the forest and you know what I did- the very first thing I did? Huh? Huh?

Reporter Raccoon: *Chuckling Slightly* Take a breath there, Chippy! I bet I can guess!

Chippy Chipmunk: *Speaking VERY Slowly Now* Right you are! I got out of there quickly! Right down into my comfy burrow.

Reporter Raccoon: *Concerned Tone* But weren’t you scared Chippy? And you don’t have to talk so slowly…

Chippy Chipmunk: *Talking Super-Speed Again* No, not at all!

Reporter Raccoon: *Sighing Because Chippy Talks Too Fast* And why is that, Chippy?

Chippy Chipmunk: *Still Talking Fast* Because fire comes through here all the time! It never bothers me! My family and I are safe underground!
Reporter Raccoon: *Cheery Again* Well thank you for your time Chippy! Let’s see what this young lady has to say!

Dotty Deer: *Speaking Sweetly And Softly* Hello there, dear.

Reporter Raccoon: *Gently* Did you see the fir, miss?

Dotty Deer: *Still Softly* Oh, I came as fast as I could.

Reporter Raccoon: *Concerned* Oh, no! Did you have family near here that were harmed by the fire?

Dotty Deer: *Lightly Laughing* No, my dear! After a fire burns through, lots of new green plants spring up.

Reporter Raccoon: *Slightly Embarrassed* Err…why would that bring you running?

Dotty Deer: *Laughing Harder* Why, honey, I’m a deer! There’s nothing better to eat than new green plants!

Reporter Raccoon: *Looking Shocked* Oh! Well…yuck. But as long as you’re happy, all of our viewers are happy! Thank you for joining us. And on to the next interview! Excuse me sir, what did you think of the fire?

Frederick Fish: *Looking Clueless* What fire?

Reporter Raccoon: *Astonished* You mean, you never even noticed?

Frederick Fish: *Bored* Apparently not.
Reporter Raccoon: *Quickly Moving On* Well thank you for your time anyway, Mr. Fish. Time for just one last interview. Excuse me, ma’am, did you see the fire?

Rita Red-Tailed Hawk: *Fiercely* I did!

Reporter Raccoon: *Shuffling Nervously* Oh, well. What did you think?

Rita Red-Tailed Hawk: *Eyes Gleaming* I thought ‘yum, yum’ when all the little mice ran scurrying out of the forest ahead of the fire!

Reporter Raccoon: *Edging Away* How…nice. Um. Well thank you for talking to our listeners.

Rita Red-Tailed Hawk: *Happily* My pleasure!

Reporter Raccoon: *Recovering* I’m sure… *Cheerful Again* Well, there you have it! Thank you all for joining me today for another Wildlife News Update where wildland fire is always welcome!
Step 1: Put your name on the top left line.
Step 2: Put the date on the top right line.
Step 3: Sketch the historic and current range of longleaf pine in Alabama.
Who’s Who of Rare Wildlife Handout

Name: ___________________________  Date: ________________________

Picture of Species Goes Here

Species: ___________________________

Classification: ____________________

Description: _______________________

Habitat: ___________________________

Why It Needs Fire: ___________________


Lesson 5
Hot Topics:
What Do You Think About Fire?

Introduction

People are much like fire. We start small and grow bigger over time. Most importantly, we change our minds over time like fire changes direction with the wind. There are many different perspectives on the use of fire in maintaining ecosystems, and Alabama is no exception. The differences in the way people think about fire matter. These different opinions by different people over time have led to some very heated debates and political battles. Let’s take a closer look at fire with regard to social ties, news and other media, politics, and democracy.

Time Estimate: 4 Hrs
Cost Estimate: $10-15

Materials:
- Firewood
- Orange, red, and yellow crepe
- Tape
- 1 Copy of the “Heated Opinions” Handout
- Lesson 5 Presentation
- Copies of “Electing Fire” Handout
- Scissors
- Tri-fold Cardboard Exhibit
- Markers, Crayons, etc.
- 3 Copies of the “Hot Topics” Handout/Student

Vocabulary

Alabama Forestry Commission
Burn Bans
Democracy
Fire Weather Watch
Firewise
Free-grazing Laws
Fuels
Heat
Ignite
Prescribed Fire
Public Opinion
Wildfire
Is Fire A Social Interaction?

Fires start when *fuels* are combined with oxygen, *heat* is provided, and the fuels *ignite*. So we see that fire is a chemical reaction. But is fire also a social interaction? It is said that we became truly human when we first began to use fire. Through the years humans have used fire for cooking, heating, managing land for agriculture, livestock, wildlife and forestry, and even warfare. The social significance of fire through time may not be apparent at first, but read the words of a famous Navy officer of the South, Admiral Raphael Semmes.

The pine woods were on fire as we passed through them, the flames now and then running up a lightwood tree, and throwing in weird and fitful glare upon the passing train. The scene was particularly Southern, and reminded me that I was drawing near my home and my people..."
His words leave no doubt that the fires he saw made him feel closer to his family and community. Today we still celebrate fire socially with fireplaces in our homes, barbecues, cookouts, and bonfires. And what good camping trip would be complete without a campfire, toasted marshmallows and a good story? These activities are all social events centered on fire.

Many social events center around fire. Photo Credit: istockphotos.com

Materials:
- Firewood
- Orange, red, and yellow crepe
- Tape

Activity I

Ask students to build a “campfire” in the classroom. This can be done using some pieces of firewood surrounding a small fan with pieces of red, yellow, and orange crepe attached. Have students sit around the “fire” and tell stories for a few minutes. Ask them if they have ever had a campfire before. Ask students to think about campfires through time (Native Americans, colonists, cowboys, military) and ask them to explain what things they think these groups might have talked about over the flames. Ask if they think that campfires might be enjoyable.
How Do People React To Fire?

Each person is unique. And it is true that no two people ever agree on all things. Perspectives on fire vary widely. Some people may think that fire is useful and necessary to maintain forests. Others may think it is not.

Moreover, perspectives change through time. At one time, small, natural, frequently occurring fire was an accepted part of our daily lives in Alabama and throughout the rest of the South. But changes in forestry and agriculture practices allowed some fires to become wildfires (or uncontrolled destructive fires). These fires damaged property and forests, and endangered lives. It was then that people started fearing fire. Beginning in the 1920s, the United States began to control all fires. This plan was very successful. It was so successful, that it started causing problems. After a while, fuels which would have been removed every few years by small, natural fire built up and contributed to the destructive force of wildfires whenever they occurred. People slowly began to realize that fire was needed in the landscape. To manage the risk of wildfires and return the ecosystems to a natural state, fire was once again proposed. This fire, called prescribed fire, is used today. Approved by the Alabama Forestry Commission and set and managed by experts, fire is once again an important part of Alabama’s ecosystem. But is it accepted by most people?

Damage caused by a wildfire.
Photo Credit: Steve Hillebrand, U.S. Fish and Wildlife Service
Materials:
- 1 Copy of the “Heated Opinions’ Handout

Time:
Approximately 15-20 Min

Activity II

Ask students if they think everyone in the classroom is similar? Ask students to stand up and gather in the room. Then ask the students to divide into groups based on the list of questions found on the “Heated Opinions Handout” (note that it is not necessary to give students a copy). These questions include ones such as “What is your favorite color?” Then follow with “If your favorite color is blue stand on that side of the room, if your favorite color is pink, stand on the opposite side.” Continue separating children with questions focused on preferences (favorite subject, favorite food, do they like dogs, etc.). Make sure that none of the questions asked focus on any physical appearance or property (ie. race, hair color, height, possessions) since these are not opinions or choices. Continue asking questions until each student forms his or her own “group.” Ask the children how many questions it took to divide the class? Not very many, probably. Ask how similar the students think they are now? Explain that all opinions and perspectives are this way. There are as many different opinions as there are people.
Is No News Good News?

Have you seen fires in local or national news? What kinds of fires are they? Most of the stories about fires concern house fires or raging wildfires. The beneficial aspects of fires are almost never reported. In fact, most news reported is bad news.

Why are news reports biased towards bad news? One of the reasons is because people are deeply moved when we hear about dramatic or tragic stories.

What people hear on the news tends to impacts what we think and do. What people think about fire is very influenced by what we see. It is no wonder that few people appreciate fire when the only experience with fire that many have is very negative.

Wildfires like this one are on the news because they threaten communities.
Photo Credit: Blaine Inglis, U.S. Fish and Wildlife Service

Prescription fires like this one may look scary, but they are managed by experts and help control wildfires.
Photo Credit: M. Kyle Marable
Materials:
- Lesson 5 Presentation
- Computer Access

Time:
Approximately 10-15 Min

Activity III

Ask students if they have seen fire mentioned in the news. Have them raise their hands and give specific details. Ask if anything they have heard is pleasant. Show a clip of raging wildfires (provided in Lesson 5 Presentation). Then ask if anyone has ever seen a prescription burn in the news? Ask students if they think people tend to report the bad or scary news more than the good or beneficial news?

Prescription fires rarely make the news.  
Photo Credit: Craig Guyer
Heated Debates?

The impression that people get from news influences how they think about fire. What people think, or *public opinion*, matters because we live in a *democracy*, where people elect representatives and vote on laws. What each person believes about fire affects the way he or she votes. But the power of the people does not end there.

Once a politician is elected, he or she has to be careful to support what the voters want. If not, he or she will not be re-elected. One of the primary concerns that these elected officials might have is “how will a particular law that he or she supports look on tv?”
At one time, fire in Alabama was considered as normal as rain. But when *free-grazing laws* were passed that made it illegal for people to let livestock graze in wild areas, attitudes began changing. Forested areas were cut down to provide more room to graze on individually owned property. Soon the more productive non-native grasses were grown to provide the livestock enough to eat. Those grasses do not allow fires to burn as easily, and small, natural fires became less common.

At the same time, the larger longleaf pine forests were harvested for timber and replanted with faster-growing loblolly pine. Loblolly pine does not tolerate fire well. When fires did start, they caused damage to the loblolly forests. People quickly decided that fire was bad and using fire became politically difficult. Campaigns against forest fires were started. And anything to do with fire was labeled bad.
Since that time, many people have realized the benefits that small, natural, regular fire provides. These benefits include reducing risk of destructive wildfires by removing fuels, allowing native plants to grow, and supporting many species of wildlife. Although scientists know that fire is important to natural ecosystems and to people, too, the question remains: “how does it look on tv?”

Materials:
- Copies of Electing Fire Handout
- Scissors
- Tri-fold Cardboard Exhibit
- Markers, Crayons, etc.

Time:
Approximately 45 Min

Activity IV

Have students assemble for a vote on whether or not to “elect” prescription fire in Alabama. Use the “Electing Fire Handout” to cut out “ballots” that allow students to circle “yes, I want to elect prescription fire” or “no, I do not want to elect prescription fire.” You can create a “voting booth” by standing a tri-fold cardboard exhibit (appropriately decorated) on someone’s desk and securing it with tape. Move that desk to the front of the class and point it so that students cannot see behind it. Place voting strips in a basket on the desk and have students line up to vote, one at a time. Pick one or two students to help you tally the votes and announce whether or not the prescription fire was “elected.”

An example “voting booth.”
Photo Credit: Ashley Young
What Are the Hot Topics in Your Community?

Politics are decided locally. What your community thinks matters. You can find out how your community feels about fire by asking a few questions. Does your community participate in the *Firewise* program? Do most of your neighbors stay aware of *burn bans* and *fire weather watches*? Have there been any tragic house fires in your community that have impacted your neighbors? Do you know any firefighters in your community? Think about how fire may influence the perspectives in your community. Do you think the same as they do? How did you feel about fire when you began learning about it? What about now?

How do you feel about fire?

Photo Credits:
Top – Amber C. Marable; Bottom – Ashley Young
Your opinion matters. You are part of your community. How you feel will influence your community. One day your vote may make the difference in which laws are passed and which people are elected. These people and laws, in turn, will affect your neighborhood. But you do not have to wait until you are grown to begin to make your voice heard.

You can raise awareness of issues in your neighborhood through talking to people about what you believe. Asking your neighbors questions about what they believe and sharing your knowledge in return will open doors for change.

The experiences in your community influence the way your community feels about fire. You can add your experiences to the community, too.

Photo Credits: Top Left– Ashley Young; Top Right– Ashley Young; Center– Ashley Young; Bottom Left– Blaine Inglis, U.S. Fish and Wildlife Service; Bottom Right– Rebecca J. Barlow.
Materials:
- 3 “Hot Topics” Handouts/
  Student

Time:
Approximately 60 Min In Class
Approximately 60 Min At Home

Activity V

Ask students to interview two people in their community using the questions provided on the “Hot Topics Handout” (each student will need three copies). One interviewee can be a parent, the other needs to be a neighbor or other relative living in the community. The handout includes questions such as “How do you feel about fire in the environment?” and “Do you know what a burn ban is?” Have students then ask a parent to interview him or her, asking the same questions. Once the three interviews are completed, ask students to bring them back to share with the class. Have each student stand up and tell what the general feelings were, as well as his or her own feelings.

Conclusion

Fire is, and has always been, a social interaction for people. But people react in different ways to it. Trends in opinions on fire change over time, influenced by what people hear and see on the news and in the community. These opinions influence voting and election of politicians. What the people in your community believe matters. You can influence the beliefs of your community through sharing your knowledge of the importance of fire.
Questions:

1) What is your favorite color?
2) What is your favorite food?
3) What is your favorite subject?
4) What is your favorite tv show?
5) What is your favorite movie?
6) Do you like pets?
7) What is your favorite season of the year?
8) What holiday do you like best?
9) What is your favorite sport?
10) What is your favorite book?
11) What is your favorite time of day?
12) What is your favorite meal of the day?
13) What is your favorite chore?
14) What kind of car do you want?
Electing Fire
Handout

BALLOT

Yes, I want to elect prescribed fire.

No, I do not want to elect prescribed fire.

BALLOT

Yes, I want to elect prescribed fire.

No, I do not want to elect prescribed fire.

BALLOT

Yes, I want to elect prescribed fire.

No, I do not want to elect prescribed fire.
Hot Topics Handout

Step 1: Put your name on the top left line and the date on the top right line.
Step 2: Conduct interview using questions provided.
Step 3: Record responses.

Name of Person:

How do you feel about fire in the environment?

Have you ever seen fires on the news?

Have you seen fires in this neighborhood? Please describe them.

Do you know any fire fighters?

Does fire seem scary to you? Why or why not?

Do you take measure to keep your home Firewise?
Glossary

of

Vocabulary Terms

Alabama Forestry Commission- State agency that assists with numerous forest activities including reviewing burn plans for prescribed burns.

Arrangement- How fuels are spread out in an area.

Aspect- The direction (North, South, East, or West) that a slope faces.

Atmospheric Stability- The measure of how easy or hard it is for air to move up and down.

Availability- How long fuels will burn.

Backing Fire- The part of the fire opposite to the head fire and moving against the wind.

Barriers- Things that stop fires from spreading.

Biologically Diverse- An area that has many kinds of plants, animals, and other life forms.

Burn Ban- Issued by the State when conditions are too dangerous to burn anything.

Burn Manager- Expert who supervises a prescribed burn.
Burn Permit- Permit issued from Alabama Forestry Commission for an approved prescribed burn.

Burn Plan- A written document telling why and how a prescribed fire will be set to help the forest and submitted to the Alabama Forestry Commission for review.

Cavities- Holes in trees.

Combustion- Burning; The process of combining oxygen with another material.

Conduction- The transfer of heat through direct contact.

Conifers- Evergreen trees like pines and cedars that do not lose their leaves in winter.

Convection- The transfer of heat by a substance absorbing it and moving it to another location.

Cover- Any structure (branches, bushes, logs, etc.) in the environment that provides shelter for wildlife.

Crown- The top of a tree (the leafy part).

Crown Fire- A fire which has moved from the surface of the ground to the crowns of trees and that now moves independently of the fire on the ground.

Deciduous- Hardwood trees like oaks and hickories that drop their leaves during the winter.
Defensible Space- Area around a house that is maintained to reduce risk of house fires and that allows for easy access by fire-trucks during a fire event, usually 30’ wide or more.

Democracy- Government ruled by the people.

Drought- Condition in which the land receives no rain for a long time.

Eastern Indigo Snake– Scientific name *Drymarchon couperi*; Rare species of snake native to Alabama which uses longleaf pine ecosystems.

Ecosystem- Living (plants, animals, etc.) and non-living (climate, water, soil, etc.) parts of the environment in an area.

Elevation- How far a place is above sea level.

Endangered Species- Rare species protected by law which need that protection in order to continue to exist.

Extinct- None left alive.

Fire Triangle- The three ingredients of heat, fuel, and oxygen, needed to start a fire.

Fire Weather Watch- Issued by the National Weather Service when extreme conditions support fire behavior and ignition is occurring or expected.

Fire Whirls- Tornadoes of intense fire.
Firebrands- Flaming airborne particles.

Firebreak- A man-made barrier to fire movement where plants and soil are removed to decrease fuels.

Firewise- A program which helps people to protect their homes from wildfires.

Flaming Stage- The time of the fire during which flames are visible.

Flanking Fire- The sides of the fire connecting the head fire and backing fire on each edge and moving outward from the main body of the fire.

Forb- Non-grass herb-like plant.

Free-grazing- A practice where livestock were allowed to graze freely across the landscape with no fences.

Free-grazing Laws- Laws that outlawed the practice of free-grazing.

Fuel- Anything that can burn.

Geological Formations- Rocky features of the Earth (example: mountains, valleys).

Germinate- The process of a seed sprouting or growing.

Gopher Tortoise- Scientific name Gopherus polyphemus, An rare species of turtle native to Alabama and frequently found in longleaf pine ecosystems.
Habitat- Living space for wildlife.

Head Fire- The front part of the fire in the direction the fire is moving, usually with the wind.

Heat- A form of energy.

Ignite- Starting or lighting a fire.

Intense- How hot a fire is burning.

Island- Unburned areas of fuels within the ring of a fire.

Keystone Species- Species that have an extremely important role in the lives of other species of plants and animals in the ecosystem.

Ladder Fuels- Fuels that allow fire to jump from the ground into the tree crowns.

Litter- Leaves and other small debris on the ground.

Loading- The amount (weight) of fuel in an area.

Longleaf Pine- A species of pine tree which once covered almost half of Alabama and which needs fire to thrive.

Longleaf Pine Ecosystems- Ecosystems dominated by longleaf pine, native to Alabama.
Man-made Fire- A fire that humans start either intentionally or unintentionally.

Native- Currently or historically local to an area.

Natural Fire- A fire that starts without human assistance.

Overstory- Tall trees in the forest.

Perennial- A plant that may die back each winter but returns year after year.

Precipitation- Any form of water that falls to the Earth’s surface.

Prescribed Fire- Beneficial fire planned and by experts to manage the land.

Public Opinion- What people think.

Radiation- The transfer of heat by a wave of energy.

Red Flag Warning- Issued by the National Weather Service when extreme conditions support fire behavior and ignition is occurring or expected.

Red-Cockaded Woodpecker- Scientific name *Picoides borealis*; rare species of bird native to Alabama which uses longleaf pine ecosystems.

Relative Humidity- The amount of moisture air can hold.
Resin Wells- Holes drilled in trees around the nest cavities of Red-Cockaded Woodpeckers that leak stinging sap and protect the nest from other animals.

Seed Bank- Seeds in the soil.

Sessile- Not able to move.

Slash- Trees and limbs lying on the ground.

Slope- A measure of the steepness of the land.

Smoldering Stage- The time during which a fire is burning but no flames are visible (example: coals).

Species- Kinds of plants, animals, and other life forms.

Spot Fires- Small fires started ahead of the main body of a fire due to firebrands which are carried by the wind.

Spotting- A phenomenon arising when conditions of the wind and atmosphere carry firebrands ahead of a fire and start spot fires.

Threatened Species- Species (more rare than most species, but not quite as rare as endangered species) protected by law which need that protection in order to continue to exist.

Topography- The lay of the land.

Torching- A phenomenon where trees or groups of trees are consumed almost instantly by fire.
Understory- Short plants found under the overstory.

Weather- Short term variation in the atmosphere.

Wildfire- A natural or man-made destructive fire that has the potential to damage forests and property.

Wildlife- Wild animals.
Additional Resources


Notes
Notes
Living Fire
Shaping Alabama’s Human and Natural Environments Through Time

Features
- Five easy lessons
- Integrated learning objectives
- Original photographs
- Fun activities
- Vocabulary lists and glossary of terms
- Time and cost estimates
- Simple explanations of complex scientific ideas
- Can be taught as unit or independently
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