

U.S. Department of the Interior
Bureau of Land Management

Wildland Fire in Alaska

4th-6th Grade Environmental Education Activity Guide



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Cover photo: BLM Alaska Fire Service firefighters set up site near a fire.

All photos courtesy of the Bureau of Land Management (BLM) and BLM Alaska Fire Service (AFS) unless otherwise noted.

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How to Use This Activity Guide

This Wildland Fire in Alaska curriculum provides a simple set of activities that anyone can use with students in 4th–6th grade (9–12-year-olds) to teach them about wildland fire. It was designed for use by BLM fire specialists and agency staff but can be used by anyone as part of an informal or formal learning process.

This curriculum consists of three activities, each 45-55 minutes long.

Activities focus on:

1. Wildland Fire Triangle
2. Fire in the Boreal Forest
3. Wildland Fire Careers

The three activities work well in sequence or alone. Feel free to adapt these activities to fit your situation.

Printing Instructions

Each activity includes step-by-step instructions and the basic materials needed to teach it. Materials begin on page 16 and include instructions for single-sided or double-sided printing. Look for italicized text in the activity instructions for when to use photos and diagrams.

Activity 1

Wildland Fire Triangle

Students explore the fire triangle and characteristics of wildland fire through two interactive games.



Time: 55 Minutes



Big Idea: Fire Triangle



Lesson Goals

- Students will explore the fire triangle and the three components of a wildland fire
- Students will understand three things that influence fire behavior



Materials

- Fire Triangle component cards (one for each student)
- Fire Behavior Triangle component cards (one fuel, one topography, and one weather for each student)
- Fire Triangle, Fire Behavior Triangle and Fire Types diagrams



Getting Ready

- Print and cut apart materials
- Find an area where students can safely move around

Conducting the Activity

Introduction 5 minutes

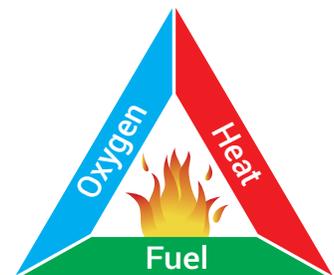
1. Explain to students that they will be exploring how wildland fires start and grow. Ask them to give you a “thumbs up/thumbs down/or thumbs to the side” if they have heard the term “wildland fire” before.
 - a. Explain that wildland fires burn in forests, grasslands, shrublands, and tundra in Alaska. Many wildland fires occur away from communities. Fires near communities are a bigger concern. These fires are more likely to threaten human life or property and are put out as quick as possible.
 - b. Have students share one question they have about wildland fire with the person next to them. Choose a few pairs to share with the whole group.

Explain to students that while wildland fire is a natural part of the forests and tundra, it was also used by Alaska Native peoples to change the forest and tundra. For example, Gwich'in people (an Athabascan group in Interior Alaska), burned trees or brush so they could walk around easier to hunt animals like moose and caribou.

The Fire Triangle 15 minutes

Activity Introduction

Fires need three things to burn. These three things make up the fire triangle. If one of these things is removed, the fire triangle collapses, and the fire goes out. Review the three components of the fire triangle: heat, oxygen, and fuel. Hold up the Fire Triangle diagram as you discuss the three components. Mention that there are different sources of heat and the fuel (things that can burn) varies from one area to another. Although oxygen is present everywhere, winds can add more oxygen to a fire making it grow larger and move faster.



Fire Triangle: Oxygen, Heat and Fuel.

Activity

1. Give each student a card that has one component of the fire triangle. Each card has either a fuel, oxygen, or heat source, so try to distribute even amounts of each.
2. Have students spread out in the play area.
3. On your signal, students should run around and find two other students with different fire components so that together they have all three parts of the fire triangle. They should link arms to form a triangle.
4. Yell “stop” when all are in groups of three and have them discuss their fire in their groups: What source of heat started your fire? Was it natural or human-caused? What fuel burned in their fire? If any students ended up alone or in a pair, have them discuss what components are missing from their fire triangle.
5. Play again.

Conclusion (after second round)

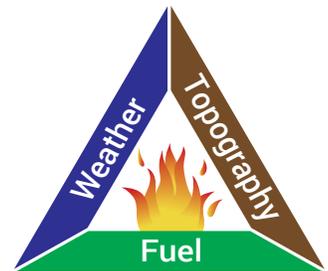
Discuss in small groups. Which of the three components of the fire triangle would be the easiest to remove to put out a fire? Which would be the most difficult to remove? Why? Explain that the job of wildland firefighters is to prevent fire from burning into communities. Firefighters must consider how the components of the fire triangle work together.

Tell them that they will explore some of the things that make fires spread with the next activity.

Fire Behavior Triangle **20 minutes**

Activity Introduction

1. Tell students that, just like the fire triangle, the fire behavior triangle is made of the three things that affect how a fire burns and spreads.
2. The legs of this triangle are weather, topography (shape of the land), and fuel (things that can burn). Hold up the Fire Behavior Triangle diagram. Explain that these components contribute to how hot a wildland fire burns and how fast it spreads. Give a brief explanation of each.



Fire Behavior Triangle: Weather, Topography, Fuel.

- a. Weather conditions, such as wind, temperature, humidity (water in the air), and precipitation (rain, snow, or ice), are hard to predict as weather changes quickly and frequently in Alaska and the mountains. Wind adds oxygen and strong winds spread fire quickly. Water in the air (humidity) and precipitation slow fire growth.
- b. Topography (shape of the land) changes how fire spreads. Fire moves faster uphill in steep areas and slower in flat areas.
- c. How much fuel, how it is spaced out in the area, how big or thick it is, and how wet or dry it is also affects how a fire spreads and how hot it burns.

Activity

1. Explain that each student is going to form a fire behavior triangle.
 - a. Hand out the cards and have students lay them out face down in the play area.
 - b. On your signal, have the students walk around and turn over the cards one at a time. Their goal is to find a card for each component of the fire behavior triangle by turning over cards one at a time. If they turn over a card that has a component of the fire behavior triangle they do not have, they should pick it up; if they turn over a card that has a component they already have, they should turn it back face down and continue turning over another card.
 - c. Tell students to gather on one side of the play area when they have completed their fire behavior triangle.
 - d. Once every student has formed their own fire behavior triangle, have them find a partner to compare triangles.

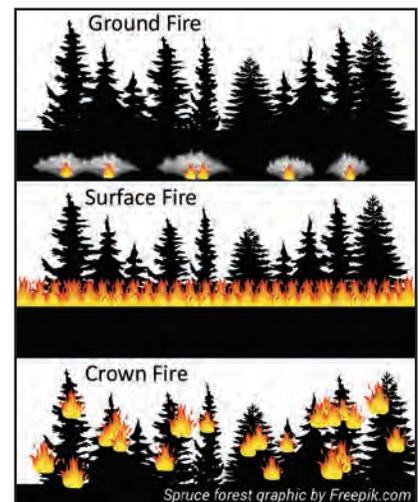
2. Give each pair a copy of the *Wildland Fire Behavior Fact Sheet* to guide their discussions
 - a. Tell students to start by describing the fuel, topography, and weather characteristics of their triangle to their partner.
 - b. How do the three components differ in the triangles they each made? What do the components tell them about how the fire may burn?

Wildland Fire Types 10 minutes

Activity Introduction

Show the group the *Wildland Fire Types* diagram. There are three basic types of wildland fires that are caused by different types of fuels, weather, and topography:

- a. **Ground fires** burn the dead moss and plant material and tree roots that are below the surface. These fires can be hard to detect and hard to control because as they can burn or smolder underground without showing flames on the surface.
- b. **Surface fires** burn dry leaves, dead branches, bark, twigs, and other fuels and do not reach into the tree canopy. They can move quickly. Surface fires can be easy or difficult to control, depending on what type of fuel the fire is burning in, how dry the fuels are, and how fast the wind is blowing.
- c. **Crown fires** occur when a surface fire burns up to the tops of the trees (crowns). They are difficult to control, and the fire's behavior can be hard to predict. Wind helps this type of fire reach the crowns by throwing embers. These types of fires can kill the trees and other vegetation in the forest.



Wildland Fire Types Diagram

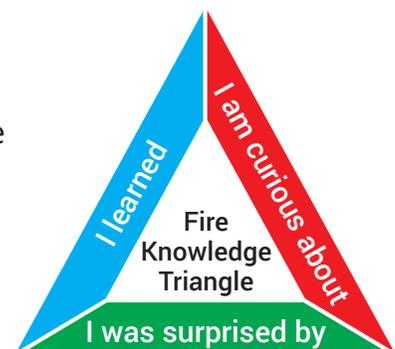
Activity

Have students examine their fire behavior cards and discuss with their partner. Will their three components result in a ground, surface, or crown fire? Do they think it will be big or small? *This can be purely imagination-based since the concept of fire intensity has not been taught in much detail.*

Reflection 5 minutes

Have students create their own “fire knowledge triangle” based on what they learned. Tell students the three components of their “fire knowledge triangle” are:

- a. Something they learned...
- b. Something that surprised them...
- c. Something they are curious to find out...



Activity 2

Fire in the Boreal Forest

Students investigate the effects of fire on the boreal forest ecosystem through the eyes of a wildland fire ecologist.



Sam Harrel, AK DNR.



Time: 50 minutes



Big Idea: Fire ecology



Lesson Goals

- Ecosystems are dynamic
- Fire causes change in the boreal forest



Materials

- 5 forest succession zone signs
- Succession relay cards
- Objects to mark each zone (cone, chair, backpacks, etc.)
- Succession pictures
- Succession Diagram, Boreal Forest photo, Boreal Habitat Mosaic photo



Getting Ready

- Print materials (Scramble cards are designed to be printed front/back.)
- Cut apart cards
- Find an area where students can move around, preferably outside
- Set up the playing field as shown in the diagram included in the materials. The size of the field will depend on the space available
- Begin by marking five distinct zones for each stage with a cone, chair, backpack, etc.
- Label each zone with a forest succession zone sign in the following order: Herb Stage, Shrub Stage, Young Forest Stage, Mature Forest Stage, and Climax Forest
- Place the succession cards picture side up in the correct zone. There will be no cards in the Herb Stage

Conducting the Activity

Introduction 5 minutes

1. Explain to students that wildland fires in Alaska burn in forests, grasslands, shrublands, and tundra. These fires influence what the landscape looks like. Fires that burn through an area can change what types of plants grow back depending on how the fire burns. Scientists that study these changes after a fire are called fire ecologists.
2. Explain to students that they are going to be fire ecologists in this activity. They are going to make observations about the land around them, they will study how plants gradually grow back after a fire, and they will make predictions, or hypothesize, how landscapes will change in the future with or without fire.

I Notice, I Wonder, It Reminds Me of ... 20 minutes

Activity Introduction

Explain that fire ecologists use observations to study fire behavior. To make these observations they use tools like compasses, increment borers (tree borers), clinometers (measures the angle of slopes), cameras, and measuring tapes. They also rely on their senses like seeing, listening, smelling, and touching to learn about an area. Today the students will use their senses to practice their observation skills.

Activity

1. For the first part of this exercise, have students work with a partner to make observations using the phrase “I notice.” Ask the students to walk around an outside area for a few minutes and share things with each other they observe using the phrase “I notice.” For example: *I notice that I can hear birds chirping.* Students might focus on a single tree or a small patch of ground or wander over a larger area to make observations. After a few minutes, bring the students together and ask each one to share one thing they noticed with the larger group.
2. For the next part of the exercise, explain that students are going to start asking questions about what they observed. They will use the phrase, “I wonder.” For example: *I wonder if the birds are talking to each other.* Instruct the students to walk around and revisit the things they noticed. Ask students to ask questions about things they noticed using the phrase “I wonder.” After a few minutes, ask if any students want to share any interesting questions that came up.
3. For the last part of this activity, have students make connections by asking themselves if what they noticed reminds them of anything. These connections will help them remember the things that they observed. For example: *The birds I hear chirping remind me of riding my bike. I hear birds chirping when I ride my bike to the playground.*
4. Give the students a few minutes to share their “it reminds me of” thoughts with each other. Bring the students together after a few minutes to share any interesting connections they made.

Activity Conclusion

Take a few minutes to have students reflect on the activity. Remind them of all the things they noticed about this place by making observations and asking questions. Explain these skills are observation skills that they can use anywhere. Fire ecologists also use observation skills to observe the world around them and to understand what might happen when there is a wildland fire.

Succession Scramble 20 Minutes

Activity Introduction

1. Explain to students that they are going to explore the impacts of wildland fire and why it is important to Alaska's landscape. Scientists study succession in a forest to identify how plants will grow back after a disturbance, such as fire, and make predictions how a landscape will change in the future with or without disturbances.
2. Show the students the *Boreal Forest* photo and explain where the Boreal Forest is located.
 - a. Circles the globe: Alaska, Canada, Northern Europe, and Russia.
 - b. Found from the Kenai Peninsula in the south to the tundra in the north
3. Explain that, over time, plant communities naturally change in a predictable way. This process of change is called **succession**. Use the *succession diagram* to show the students the different stages of succession. Discuss the plants and the animals in each stage.
4. Next, introduce the idea of **disturbances**. Explain that, at any time, the pattern of succession can be disrupted by a disturbance such as weather, floods, insects, human activity, and fire.
5. Tell students they are going to play a game to learn about the overall effect of these disturbances.
6. (Optional activity) Before playing the game, tell the students they must think like a tree to prepare for the succession scramble. Ask the students to stand up and shake out their wiggles. After a few seconds, ask them to plant their feet, stand still, and pretend they are growing like a mighty tree. Once they are standing up straight, tell the students to grow branches using their arms. Some may choose to have long branches with leaves and others may prefer creating a triangle above their head like an evergreen. Looking around at the other students, imagine that they are part of a forest that is constantly changing.

Activity

1. Ask the students to line up at the Herb Stage to begin.
 - a. Explain that the playing field is divided into sections and each section represents a different stage in succession: herb, shrub, young forest, mature forest, climax forest. Point out the boundaries of each stage as you explain the playing field.
 - b. To begin, the students will run, walk, or hop to the shrub stage area, pick up a card, read it, and do what it says (e.g., They may grow to the next stage, stay in their current stage, or go back to the herb stage). If their card sends them back to the herb stage,

they should run back to the herb stage and then return to the shrub stage and turn over another card. If they stay in the shrub stage, they should turn over another card; if they move on to the young forest stage, they should run to the next section of the play area and turn over a card there.

- c. After a student reads a card, they should leave it picture side up before they move on.
 - d. At any time during the game, the instructor may shout “stop succession,” which means the students must freeze.
 - e. The goal of the scramble is to see what happens to them as they try to move through the different stages of succession.
2. Begin the game and play for a few minutes. When the students are spread across the entire playing area, freeze the game, and discuss the following questions.
 - a. Has anyone returned to the herb stage more than once?
 - b. What types of disturbances have they experienced?
 - c. What sort of things helped them grow?
 3. Continue the game by shouting “start succession.” Allow the students to play for a few more minutes. End the scramble and gather the students. Ask the students to think like a fire ecologist and analyze the forest stages they traveled through by answering the following questions.
 - a. Why don’t all plants reach the climax stage? (Plants randomly encounter different disturbances that affect their growth). In the real world, disturbances do not typically wipe out an entire forest, just a small part of the forest resulting in plants being in all different stages in a large area.
 - b. Why is it important not all forests reach the climax stage? (Variations in plants provide different habitats for animals. For example, moose and snowshoe hares eat many plants in the shrub and young forest stage. As the forest grows into a mature forest, those animals move on, and new animals, such as bears, move in. The climax stage has the least number of animals. Refer to the *succession diagram*. Remind the students that it can take many years for a forest to transition from one climax stage to another.)
 - c. Do they think that the climax stage is the end of succession, or does it continue? (Even in the climax stage, a disturbance may occur, and succession begins again.)
 - d. Some fires in the Boreal Forest are big and some are small. Did any of the students experience a fire in the game and how did it affect their growth? (Students could have experienced hot fires, fires around them, lightning strikes that caught fire, escaped campfires, surface fires, and crown fires. The effect of these fires varies depending on intensity. These fires may have slightly singed their branches or completely burned and killed them.)

Boreal Habitat Mosaics Discussion

1. Reference the succession scramble to introduce the concept of habitat mosaics. Remind students that during the succession scramble, they experienced disturbances at all stages of the game and at different times than other students. This resulted in students being in all different stages of succession across the playing area. When this happens in the Boreal Forest, interesting patterns of growth can be seen across the landscape. These are called **Landscape Mosaics**.



A mosaic forest. NPS.

2. Show the students the *Landscape Mosaic* photo to introduce the idea of a mosaic forest.
 - a. Have students describe things they see in the picture. (Students should notice tall trees in some areas, shrubby areas, and open areas.)
 - b. Ask students to point to the different succession stages on the image.
 - c. Explain that we will be focusing on how fire changes large areas of land.
3. Explain that wildland fires can burn huge, large swaths of forest. They can also jump and skip through a forest, creating a patchwork of intensely burned, lightly burned, and unburned areas. As plants grow back after fire and other disturbances, what grows and how fast it grows will depend on the type and intensity of the disturbance. This variability creates different patterns of growth called mosaics across the landscape.
4. Fire ecologists study mosaics to learn about the influence of fire on a specific area. Different patches can reveal when a fire last occurred. Scientists observe plants to help determine the fire history of an area. For example, by boring into a tree, a scientist can count the growth rings to determine the age of the tree and look for fire scars. Scientist also look at the succession stage of the area to determine the history of fire. By looking at fire history, scientists can make predictions about when a natural fire may occur again.

Reflection **5 minutes**

Tell students they are going to do a pair-share reflection. Working with a partner, ask the students to answer the following questions. Afterwards, ask if any students would like to share with the group.

- a. What is one thing they learned about forest succession?
- b. What surprised them about Fire Ecologists?

Activity 3

Wildland Fire Careers

Students explore careers in Wildland Fire by participating in challenges.



Time: 45 minutes



Big Idea: Fire Careers



Lesson Goals

Managing wildland fires requires many different team members who work together in a fast-paced environment.



Materials

- 6 Station cards
- 5 copies of the map for GIS station
- 5 pencils/pens and 5 pieces of paper for Incident Commander station
- Spruce cone



Getting Ready

- Print out station cards and maps
- Spread out station cards in six different locations around a field or room
- Place pencils/pens and paper at Incident Commander station
- Place maps at GIS station

Conducting the Lesson

Introduction 10 Minutes

1. Explain to students that they will be exploring different jobs on a fire. Each person on a fire is part of the team that helps manage the fire's growth and keep communities and firefighters safe. Have students share with a partner about a time that they were a part of a team or worked in a group to meet a goal. Choose a few students to share out with everyone.
2. Ask students to tell you a few things that help them succeed when they are working on a team/in a group. Start with your own example to inspire students to respond. For example, "When I was on a fire last summer, it was really important that I listened to my teammates carefully and let them know when I had questions." (Student answers will vary and may include things such as trust, respect, communication, and cooperation.)
3. Tell students about your job and explain why teamwork is important for your role.

Wildland Fire Olympics 30 Minutes

1. Explain that managing wildland fire takes many different people with different roles to play and sometimes the team is huge (hundreds or even thousands of people). Introduce the next activity and explain that they will get to learn about jobs on a fire and how each team member helps keep communities and firefighters safe.
2. Tell students that for this activity they will learn about six different jobs on a fire and complete a challenge for each. Point out the six stations and tell them that they will have five minutes at each station to read about the job and complete the challenge. Afterward they will rotate to the next station on your signal.
3. Separate students into six groups (if it is a small group, send participants out in pairs) and send each group to a different station. Tell them to wait until you yell "go" to start their challenge.
4. Yell "go," then set a timer for 5 minutes. After the first 5 minutes tell students to rotate to the next station and point in the direction of where to go.
5. Repeat step 4 until each group has been to all the stations.
6. After the last station bring all the students together and have them form pairs or trios and share with each other one job that surprised them and one teamwork skill that they thought was interesting.
7. Have a few students share out with the entire group.
8. Conclude the activity by underscoring the many different jobs involved in managing fires and that teamwork is essential.

Reflection 5 Minutes

1. Gather students in a circle and explain that they are going to toss a spruce cone around the circle so that each person gets it one time. When the object comes to them, they should share something about the activity. This could be something they **liked**, something they **learned**, something they **want to know more about**, or something they want to **use in the future**.
2. Give students a minute or so to think about the activity. When they are ready to share, have them hold their hands in front of their bodies.
3. When everyone is ready, start the sharing by tossing the spruce cone to one of the students. Have students toss the spruce cone to each other until everyone has had a chance to share.

Works Cited

Alaska, U. o. (2022). Alaska EPSCor. Retrieved from Fire Curriculum: <https://www.alaska.edu/epscor/fire-and-ice/dew-team/Fire-curriculum.php#:~:text=The%20curriculum%20engages%20students%20in,be%20influenced%20by%20human%20activities>.

Association, A. N. (2016). Other Fire Activities and Resources. Retrieved from Other Fire Activities and Resources.

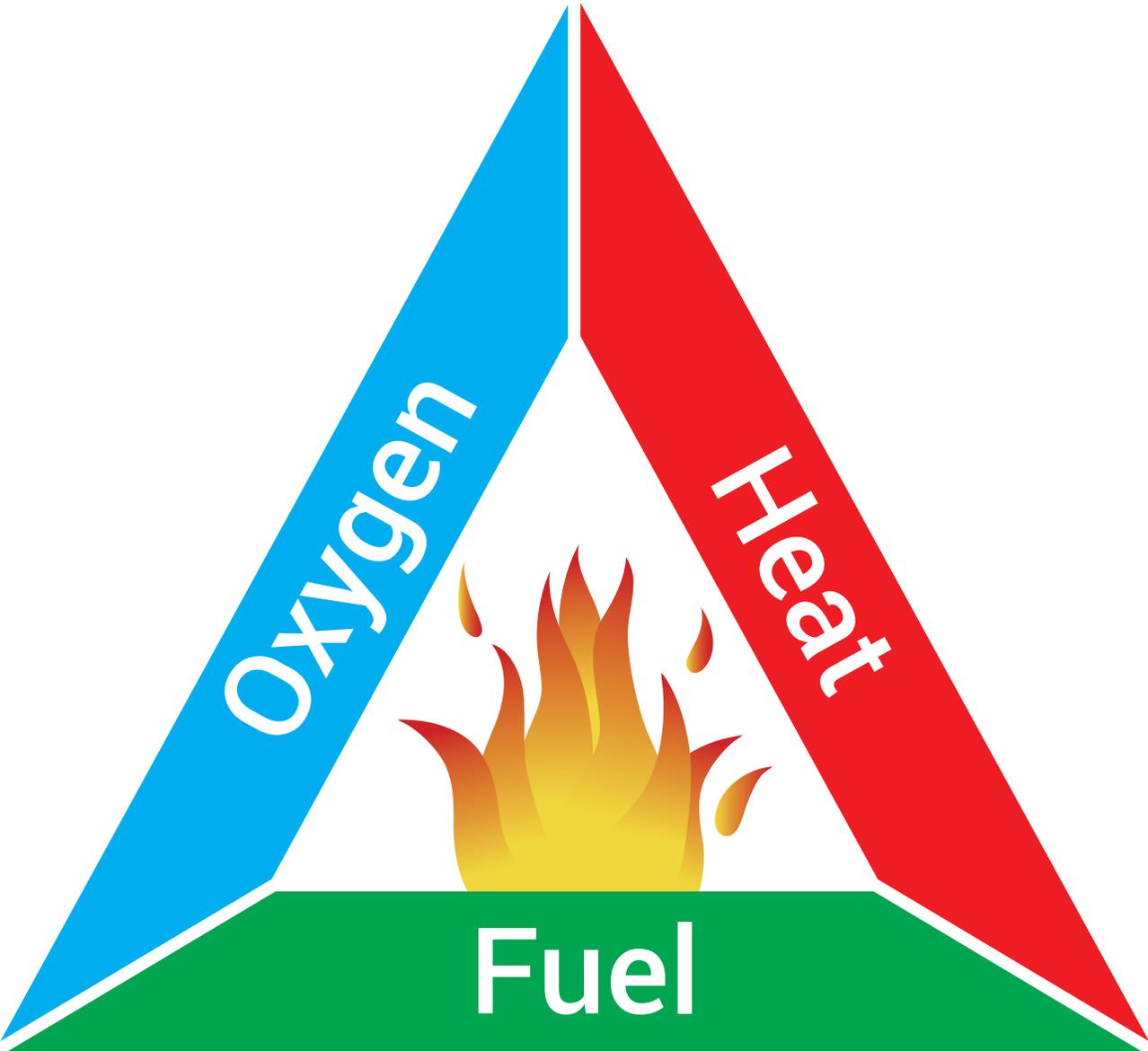
U.S. Fish and Wildlife Service (1992 revised 2003). The Succession Race. Retrieved from Role of Fire in Alaska: https://www.arlis.org/docs/vol1/83599936/succession_race.html

Activity 1

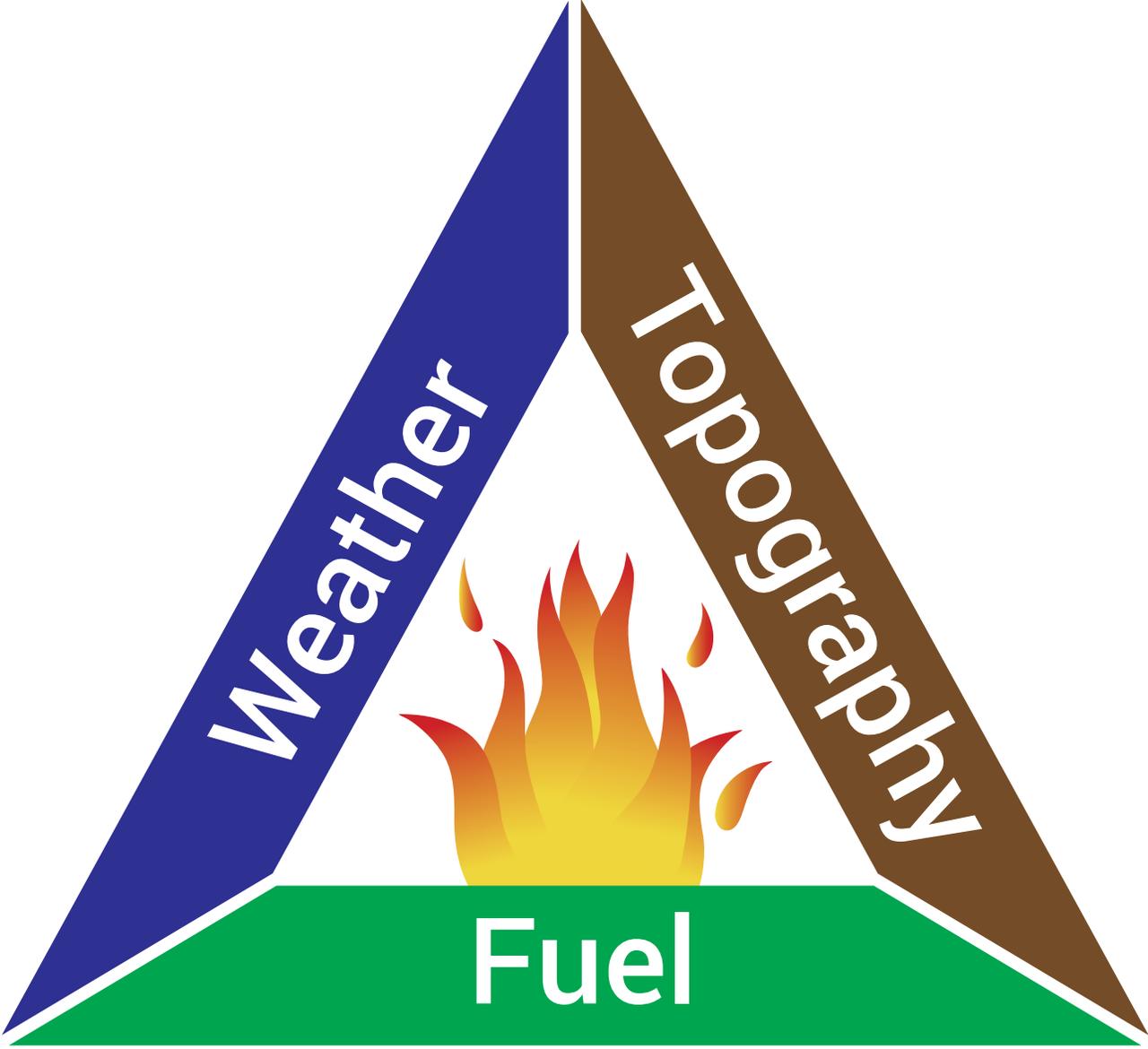
Materials

Print pages 17-33 single sided

Fire Triangle



Fire Behavior Triangle



HEAT



**Campfire
gets away**

HEAT



**Campfire
left burning,
no rain for
3 days**

HEAT



**Lightning
strike,
no rain**

HEAT



**Lightning
strike on
steep slope**



HEAT

Lit match



HEAT

Lightning
with
heavy rain



HEAT

Very hot
day, low
humidity



HEAT

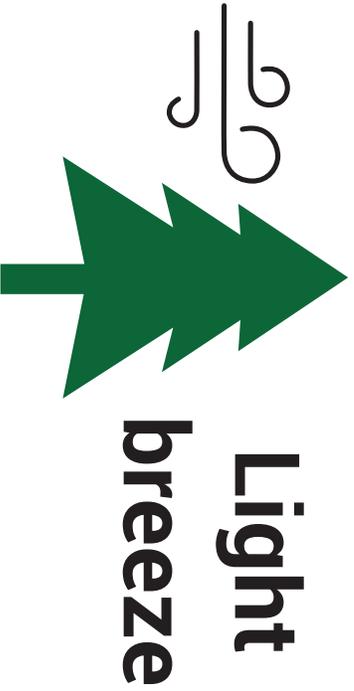
Lit cigarette
dropped on
dry ground

HEAT



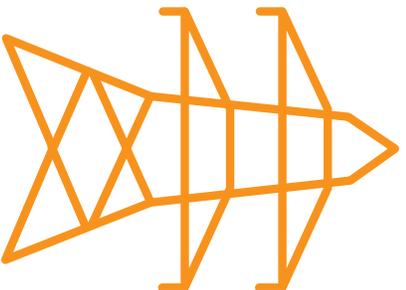
**Spark
from the
exhaust**

OXYGEN



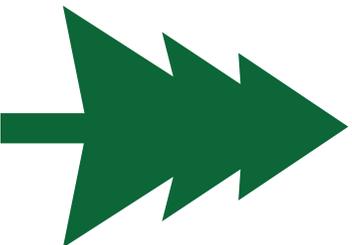
**Light
breeze**

HEAT



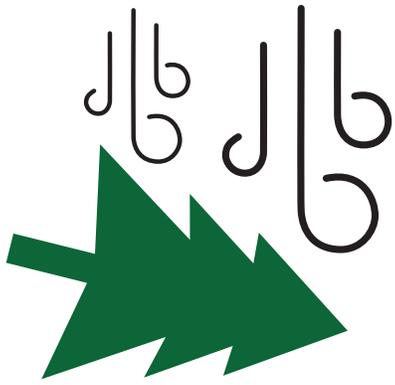
**Fallen
Powerline**

OXYGEN



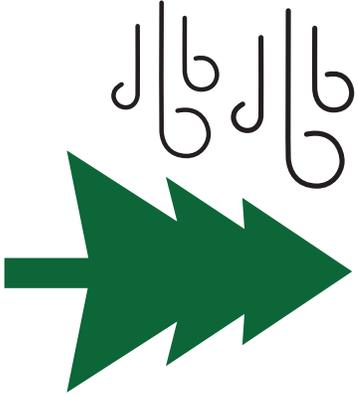
**No
wind**

OXYGEN



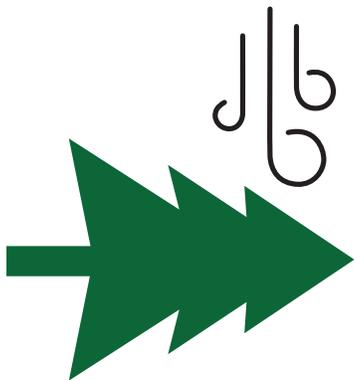
**High
winds**

OXYGEN



**Strong
breeze**

OXYGEN



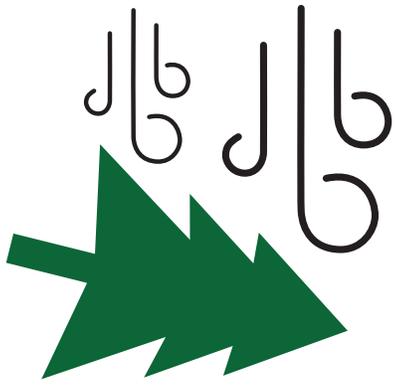
**Light
breeze**

OXYGEN



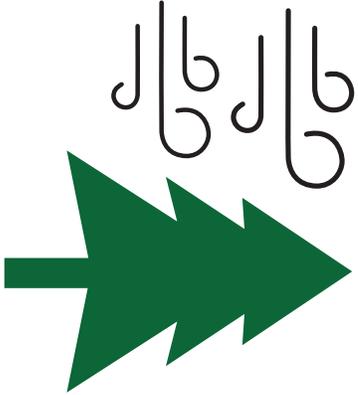
**Gale
force
wind**

OXYGEN



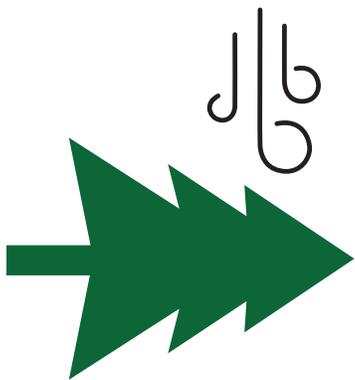
**High
winds**

OXYGEN



**Strong
breeze**

OXYGEN



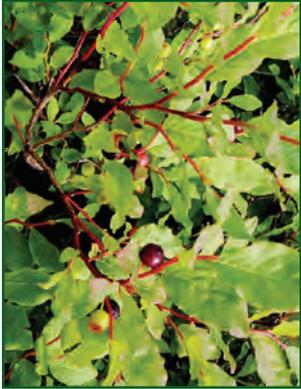
**Light
breeze**

OXYGEN



**Gale
force
wind**

Tabitha Graves, USGS



FUEL

**Small
shrubs**

Sarah Sten, NPS



FUEL

**Mosses
and
lichens**



**Old logs
lying on
forest floor**

FUEL

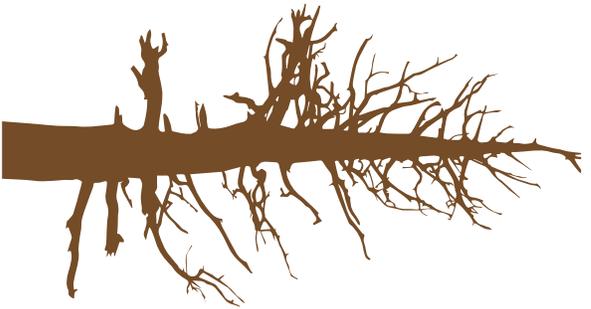


**Dry
grasses**

FUEL

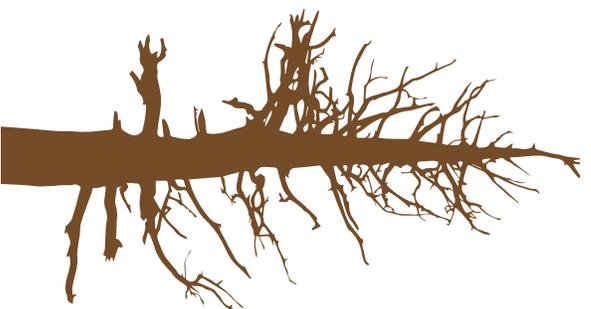
FUEL

Dead tree
branches



FUEL

Dead trees



FUEL

Dry plants
and grass
on forest
floor



FUEL

Build up of
moss and
dead plants
on forest
floor



FUEL

Little
fuel on
forest
floor



TOPOGRAPHY

Brushy



FUEL

Birch and
willow
saplings



Lauren Utykanski, NPS

TOPOGRAPHY

Loose
rocks

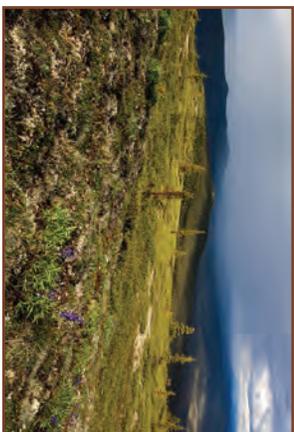


TOPOGRAPHY



**Very
steep
slope**

TOPOGRAPHY



**Flat
tundra**

TOPOGRAPHY



**Flat
open
field**

TOPOGRAPHY



**Flat
open
field**

TOPOGRAPHY



**Low
elevation**

TOPOGRAPHY



**High
elevation
with
snow**

TOPOGRAPHY



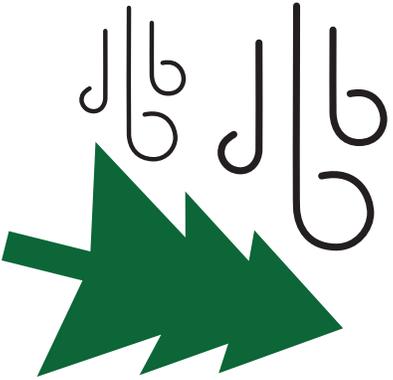
**Valley
with a
wide
river**

TOPOGRAPHY



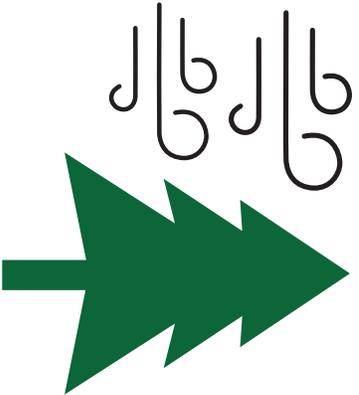
**High
elevation**

WEATHER



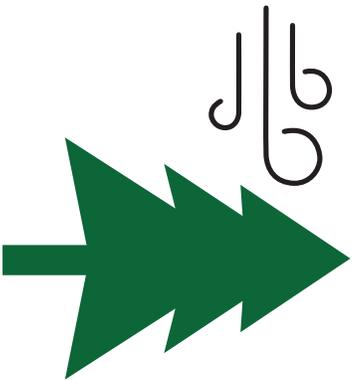
**High
winds**

WEATHER



**Strong,
breeze**

WEATHER



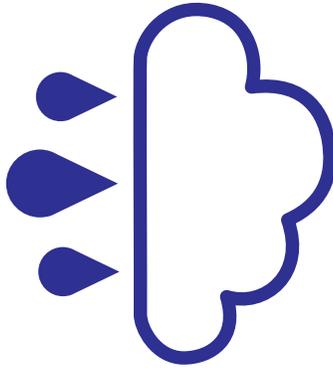
**Light
breeze**

WEATHER



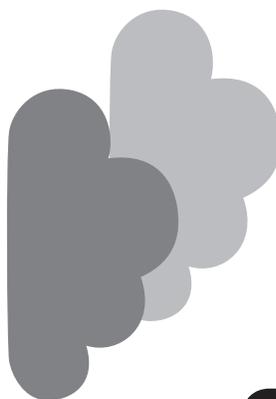
**Strong,
gusty
winds**

WEATHER



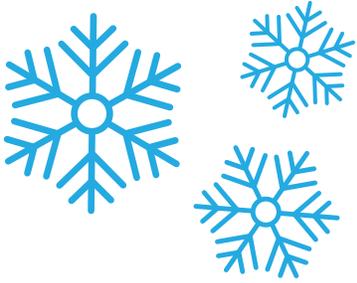
Light
rain for
a week

WEATHER



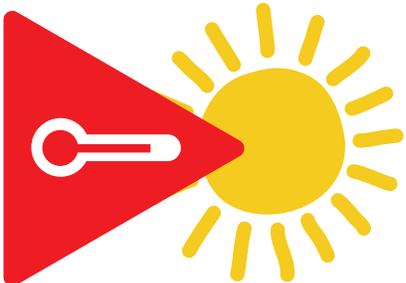
Overcast
and
humid

WEATHER



25°F, light
snow

WEATHER



Very hot
and dry

WEATHER



**Lightning
with
heavy rain
showers**

WEATHER



**Heavy rain
yesterday,
dry and
sunny today**

Wildland Fire Behavior Fact Sheet



FUEL

Certain vegetative properties, such as amount, size, and moisture, influence fire behavior and intensity.

- **Amount:** The more fuel available, the longer a fire can burn and the more heat it can produce.
- **Size:** Smaller fuel particles are easier to ignite, heat up faster, and burn up more quickly. Larger fuel particles burn more slowly.
- **Moisture:** The drier the fuels, the easier the ignition. Fuels are harder to ignite and burn more slowly when they are damp or wet.



WEATHER

Weather conditions like sunshine, wind, temperature, and humidity contribute to fire behavior.

- **Wind:** One of the most important factors. Stronger winds make the flames grow larger and the fire spread faster.
- **Temperature:** Warmer temperatures quickly dry out fine dead fuels, increasing the risk of ignition.
- **Humidity:** The amount of water vapor in the air affects the moisture level of fuels in an area. Fuels become drier and ignite more easily at low humidity levels than high humidity levels.



TOPOGRAPHY

Various features of the land can change where a fire burns and how quickly it spreads.

- **Slope:** Fire spreads uphill much faster than downhill.
- **Aspect:** The direction that a slope faces determines how much heat it is exposed to from the sun. South slopes are warmer than north-facing slopes.
- **Elevation:** The height of terrain above sea level influences precipitation (rain or snowfall), air temperature, and wind exposure. Higher elevations are more prone to lightning strikes.

Natural or man-made features of the land, such as fields, roads, streams, lakes, and rocky areas, can act as barriers that stop or slow down the spread of fire.

Ground Fire



Surface Fire



Crown Fire



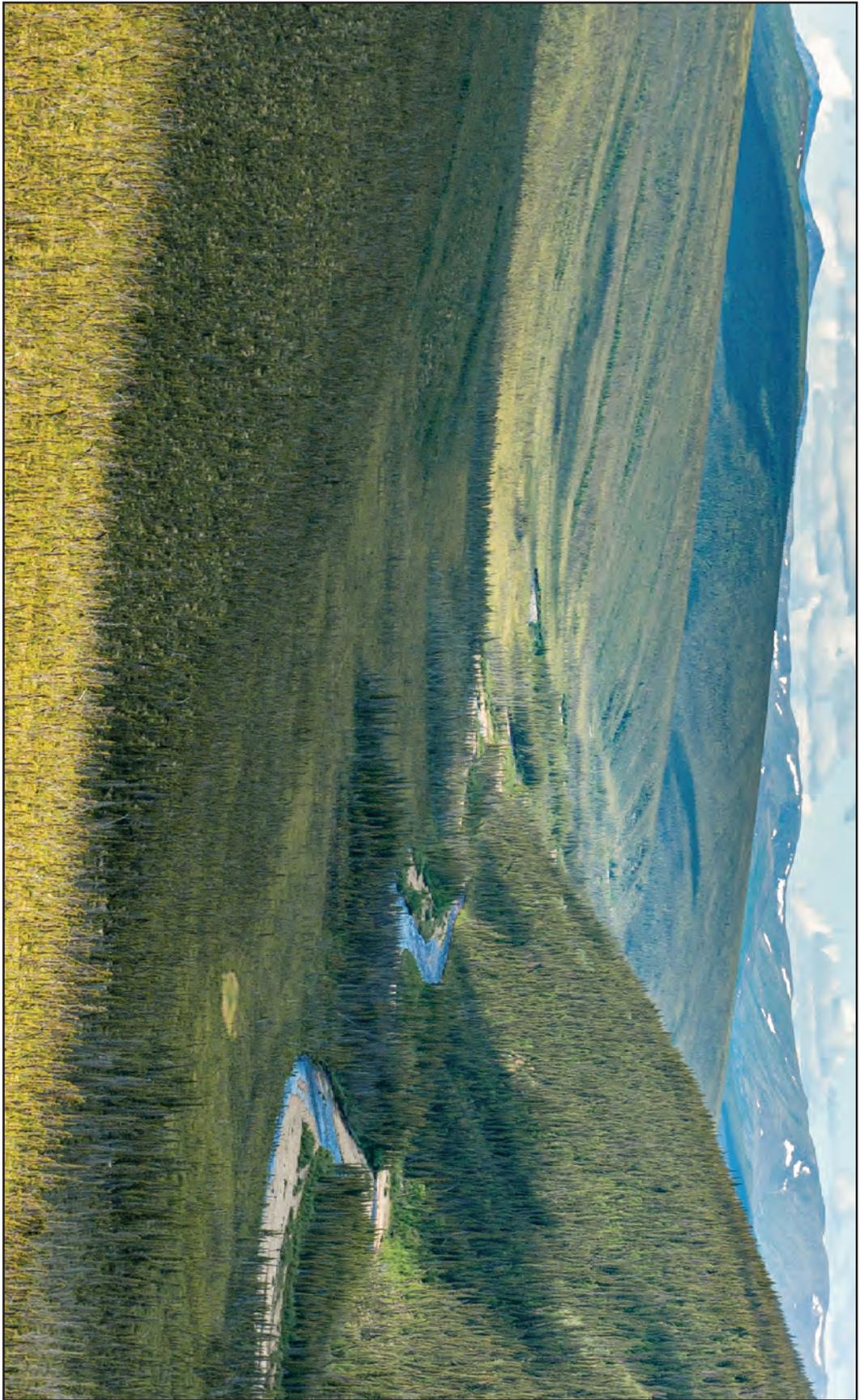
Spruce forest graphic by Freepik.com

Activity 2

Materials

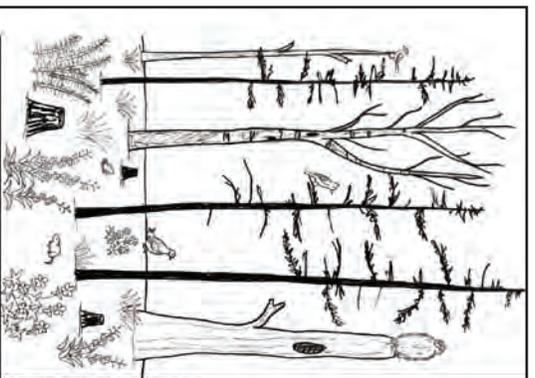
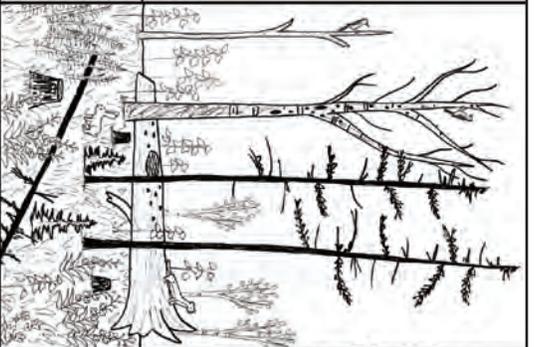
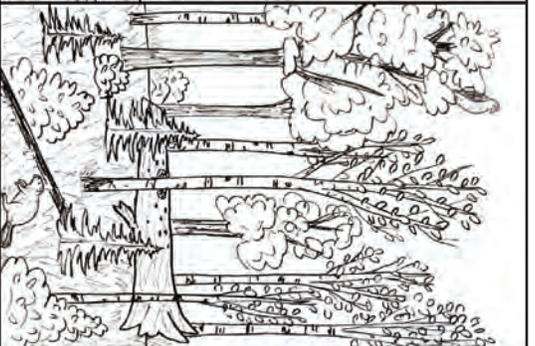
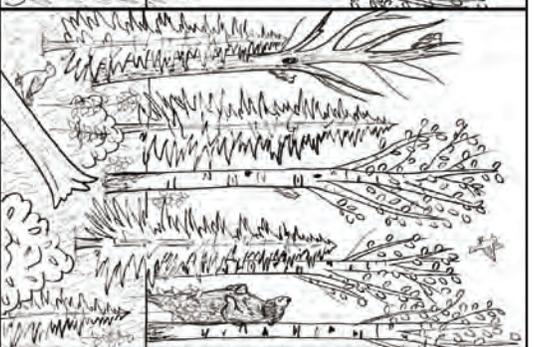
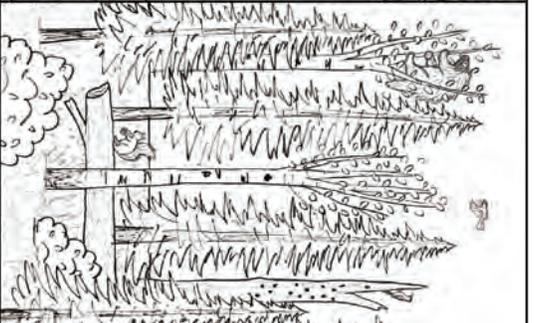
Print pages 35-40 single sided

Print pages 41-50 double sided



Boreal Forest. NPS

Boreal Forest: Activity 2, Succession Scramble

	<p>Herb Stage (0-5 years)</p> <p>Plants: Fire leaves the soil nutrient rich for plant growth. Seeds buried in the soil and blown in from surrounding areas begin to sprout.</p> <p>Common plants include fireweed, wild geranium, horsetail, raspberry, rose, aspen, birch, willow, and spruce.</p> <p>Animals: Small rodents and birds eat grasses, plants, and seeds.</p>
	<p>Shrub Stage (6-25 years)</p> <p>Plants: A variety of shrub and sapling trees are present, including willows, birch, aspen, poplar, raspberry, and rose. A few spruce seedlings start to grow.</p> <p>Animals: Birds, rodents, snowshoe hares, and moose use shrubs and saplings for shelter and food. These animals also attract predators like foxes, weasels, and lynx to the area.</p>
	<p>Young Forest (25-50 years)</p> <p>Plants: The forest canopy is made up by birches, aspens, and/or poplars. Spruce trees continue their slow growth. Herbaceous plants remain plentiful on the forest floor.</p> <p>Animals: Birds nest in the trees, and beavers use the young trees as food and to build their dams.</p>
	<p>Mature Forest (50-150 years)</p> <p>Plants: When hardwood trees begin to die, the open canopy allows spruce trees to thrive. Some birch and aspen seedlings, shrubs, grasses, and herbs continue to grow in the under story.</p> <p>Animals: Bears, woodpeckers, squirrels use the trees for food and shelter.</p>
	<p>Climax Forest (150-300 years)</p> <p>Plants: Spruce dominates the forest canopy, but some birch, aspen, and poplar may be present. Some sunlight reaches the forest floor, allowing grasses, shrubs, and herbs to grow.</p> <p>Animals: Spruce trees provide habitat for porcupines, squirrels, and birds.</p>

Forest succession.

Boreal habitat mosaic. NPS



Boreal Forest: Activity 2, Succession Scramble



Successional Stage:

Herb

1-5 years after a fire



Successional Stage:

Shrub

6-25 years after a fire

NPS



NPS

Successional Stage:

Young Forest

25-50 years after a fire



USFWS

Successional Stage:

Mature Forest

50-150 years after a fire

Boreal Forest: Activity 2, Succession Scramble



NPS

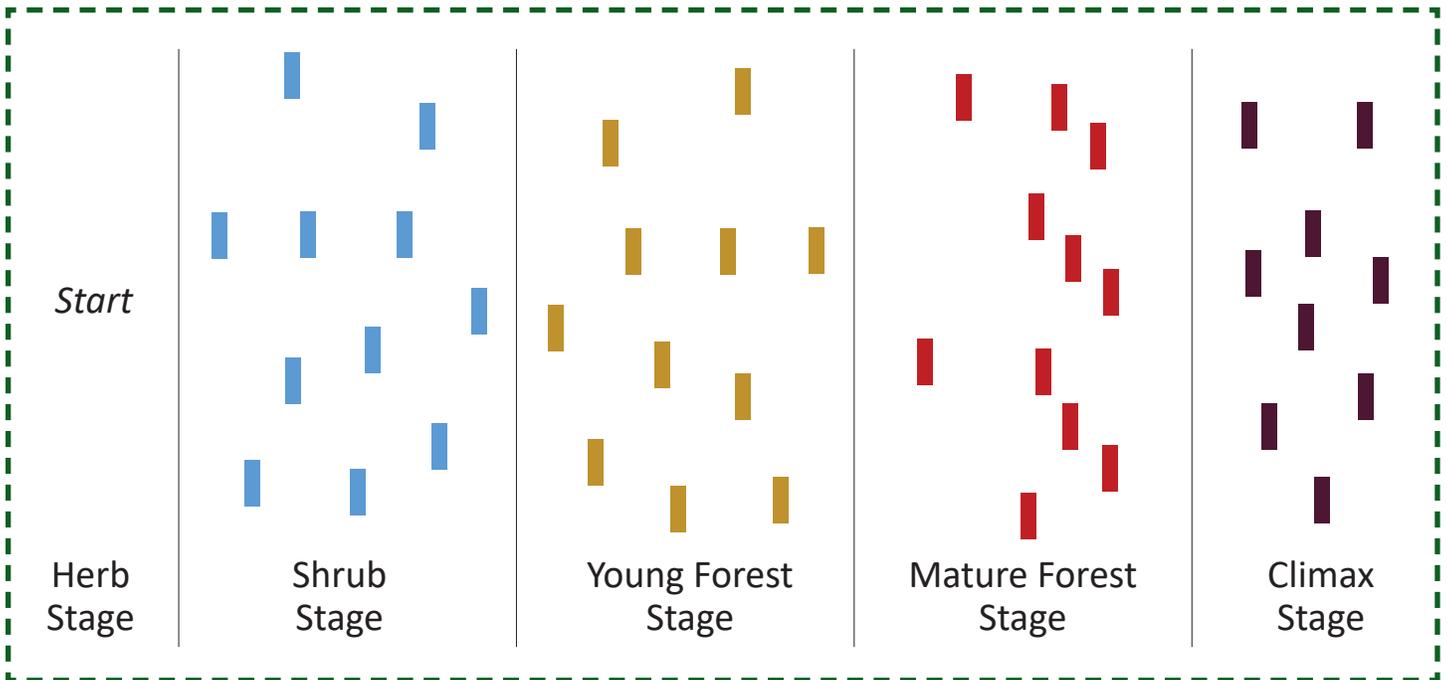
Successional Stage:

Climax Forest

150-300 years after a fire



Size of field depends on space available



A surface fire ignites on dry leaves and burns you. Return to the herb stage.



A warm summer allows you to grow into the young forest stage.



The soil around you is heavily burned making it hard to absorb water. Stay here.



Snowshoe hares chew on your branches. You must return to the herb stage.



There is little rain and your leaves dry out. Return to the herb stage.



Minerals in the burned soil around you help you grow to the young forest stage.



Lots of rain floods the ground around you. Return to the herb stage.



Long sunny days allow you to grow into the young forest stage.



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



Moose eat some of your branches. You need time to recover. Stay here.



Snowshoe hares nibble on the plants nearby allowing you to grow into the young forest stage.



Avalanche debris from last winter covers you most of the summer. You return to the herb stage.



There is a lot of sun and water, allowing you to reach the young forest stage.



A campfire escapes from a nearby campground and burns you. Return to the herb stage.



Moose around you eat all the young trees. You remain in the young forest stage.



A surface fire burns you and most of your roots. You must return to the herb stage.



A windstorm breaks many of your trees. Stay here and recover.



Shrub Stage



Shrub Stage



Shrub Stage



Shrub Stage



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



<p>Lots of rain and cloudy days slow your growth. Stay here.</p> 	<p>A volcanic eruption kills you. Return to the herb stage.</p> 
<p>A lightning strike near you burns the ground around you. Stay here and recover.</p> 	<p>Sun, warm weather and lots of rain allow you to grow to the mature forest stage.</p> 
<p>Decaying plants around you provide nutrients to grow into the mature forest stage.</p> 	<p>There are fewer critters around to eat you. Grow to the mature forest stage.</p> 
<p>Beavers built a dam nearby and flood the forest. Return to the herb stage.</p> 	<p>Warm weather and light rain allow you to grow to the mature forest stage.</p> 

**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



**Young Forest
Stage**



<p>You are cut down to build houses. Return to the herb stage.</p> 	<p>A road is built through the forest, return to the herb stage.</p> 
<p>A very hot fire burns you back to the herb stage.</p> 	<p>Spruce bark beetles kill you, returning you to the young forest stage.</p> 
<p>Sun, water and nutrients help you grow into the climax stage.</p> 	<p>A warm summer and light rain allow you to grow. Grow into the climax stage.</p> 
<p>A light fire chars your branches and the plants around you. Stay here and recover.</p> 	<p>A small fire burns around you, but you are untouched. Stay here.</p> 

**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



**Mature Forest
Stage**



Lots of sun and fresh water allow you to thrive. Stay here.



It is a warm summer with lots of rain. Stay here.



A surface fire burns the forest floor. Stay here and recover.



A big windstorm breaks off your branches and you don't recover. Return to the herb stage.



Spruce bark beetles attack your trees, returning you to the herb stage.



Developers clear the land around you for houses. Return to the herb stage.



A crown fire burns you and the other trees around you. Return to the herb stage.



Lots of light, water and soil nutrients keep you growing. Stay here.



Climax Forest



Climax Forest



Climax Forest



Climax Forest



Climax Forest



Climax Forest



Climax Forest



Climax Forest



Activity 3

Materials

Print pages 52-58 single sided



Smokejumper

I jump out of airplanes with a parachute to get to remote fires to put them out. I need good balance and strong legs to do my job.

Challenge

Test out your balance by standing on one leg in “tree pose” for 1 minute.

Teamwork Skills

Courage | Jumping out of a plane to a fire takes courage. Tell a neighbor about a time when you had to be courageous to accomplish a goal.



Fire Ecologist

I study an area after a fire to see how the plants and animals change. Making observations is a big part of my job.

Challenge

Practice your observation skills. Find a partner. Stand across from each other and take 1 minute to make observations about the other person. Turn around and change 3 things about your clothes (tuck in your shirt, untie your shoes, etc.) Then stand face to face again and try to find what is different.

Teamwork Skills

Patience | Looking for small things like changes in plant species takes patience. Does patience come easily to you? Tell your partner why or why not.

Hotshot Firefighter

I go to the hottest parts of the fire and work with my team mates to help control it. I often carry a heavy pack full of supplies and tools for miles to reach the fire.

Challenge

Work on your fitness with these exercises:

- 10 squats
- 15 Jumping Jacks
- Run across the field and back

Teamwork Skills

Hard Work | What is something that you have to work really hard at to do well?



GIS Map Maker

I use computers to make maps of the fire to help everyone understand how it is changing.

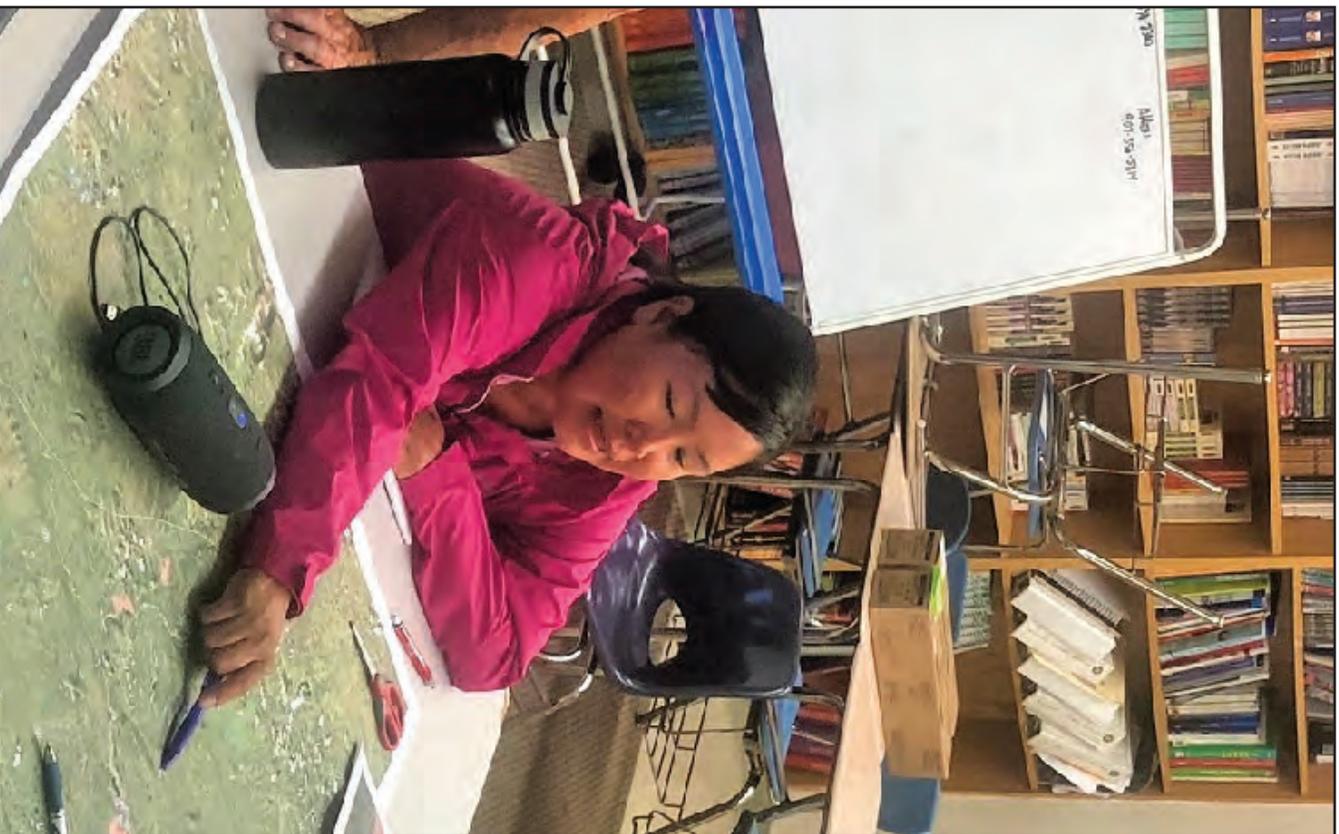
Challenge

Find a partner and work together to find each of the items below on the map. Use the key to help you.

1. Quartz Creek
2. 3 cabins
3. A closed road
4. Evacuated area (“go”)
5. Something else you notice

Teamwork Skills

Attention to Detail | There are so many details (small things) on a map. Find a partner and point out five details you notice about the map.



Incident Commander

I am the boss on the fire. I give instructions to help keep everyone safe and control the fire.

Challenge

Find a partner, one of you should take a piece of paper and pen/pencil. Sit back to back. One partner tells the other how to draw something (choose anything simple). Check the drawing to see if it looks like what you were describing and then switch roles and try it again.

Teamwork Skills

Leadership | Tell a partner about a great coach or teacher that you admire. What made them a good leader?



EMT (Medical Responder)

I take care of firefighters who get hurt or sick during a fire. Checking their hearttrate and breathing is one of the first things I do.

Challenge

- Step 1:* Find a partner.
 - Step 2:* One person finds their own pulse by putting two fingers (not a thumb) on the inside of their wrist and starts counting. Meanwhile the other person silently counts to ten.
 - Step 3:* Both of you do twenty jumping jacks.
 - Step 4:* Repeat Step 2.
- What happened to your pulse? Switch roles and try it again.

Teamwork Skills

Kindness | Tell your partner about something kind you did for a team mate, friend, or family member.



