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Flathead Family Forestry Expo Forestry Tour Original workbook developed for Douglas County Extension Service, Roseburg, OR Adapted by the Flathead Family Forest Expo Committee for local use. 2021 Edition

TO THE FLATHEAD FAMILY FORESTRY EXPO

Welcome to the Flathead Forestry Expo

Springtime in the Rocky Mountains is a great time of year to learn about the many aspects of a forest ecosystem. Soon you will attend the Family Forestry Expo and get to meet and talk with different people who work and play in the forests of Northwest Montana. This book will provide you with information to broaden your knowledge about our forests and the ways people rely on them for food, clean water, products, and of course, fun.

WHAT IS A FOREST?

Many people think of forests as only trees, but trees are just a part of the forest. Forest communities include other plants such as shrubs, wildflowers and grasses. Forests also include insects, fish, birds, mammals and other animals. Forests are affected by natural features such as soil, rainfall, sunlight, temperature and elevation. All these things interact to make up a forest ecosystem.

Forests don't stay the same. They are always changing. Forests are affected by natural processes such as fire, wind, floods, insects and diseases. Plants grow and then die. Some live for weeks, while others live for centuries. Across a large



area, the forest includes a patchwork of grasslands, open areas with mainly young trees, older dense forests and everything in between. Streams and ponds are scattered throughout the forest. This variety of habitats helps support a wide variety of plant and wildlife <u>species</u>. Animal communities change over time as the vegetation changes.

WHY ARE FORESTS IMPORTANT TO PEOPLE?

People have always depended on the forest for survival. For thousands of years, Native Americans relied on the forest for food, water, shelter and other <u>resources</u>. Today, people continue to hunt and fish in the forest. Forests provide us with clean water, places for hiking, camping and other recreational activities. Forests also provide trees for lumber to build our homes, wood chips to make paper to print books and material for many other manufactured products.

In this book and at the Family Forestry Expo, you will explore how people manage the forests for different uses. Forests can be managed in many different ways, depending upon what the landowners want.

You may be wondering, "Who owns the forest?" Here in Northwest Montana, many of the forests public lands, are owned by all Americans. National forests such as the Flathead National Forest belong to the American people and are managed by the U.S. Forest Service for many different purposes. National parks such as Glacier National Park also belong to the American people and are managed by the National Park Service to protect its natural state while allowing people the opportunity to experience the beauty of the park. State forests such as the Stillwater State Forest are owned by the State of Montana and are managed by the Department of Natural Resources and Conservation to provide funds for our public schools. Other local forested land is owned by private companies that manage the land to produce timber for their sawmills. Individuals also own forested land, and they have their own ideas about how to manage or take care of their land. They may manage it for timber harvest, wildlife habitat, scenery or all of these purposes.

What is your favorite forest to visit?

Glossary Terms

resources portions of the environment upon which people see as being valuable for human use.

species a population of individuals that are more or less alike and that are able to breed and produce fertile offspring.

MY NOTES & DRAWINGS



First People in the Forest

People have been part of forest <u>ecosystems</u> for thousands of years and have relied on forests to provide basic resources needed for survival, including shelter, food and water. Native Americans were the first people in the forests of northwest Montana. Native American tribes adapted to forest ecosystems and used fire to maintain open land for better hunting, travel, grass and food production.

List four things yo	ou need to survive:		
1		 	_
2		 	-
3		 	-
4		 	-

There are several Native American tribes whose members live in Montana today. Those living closest to the Flathead Valley include the Confederated Salish and Kootenai Tribes and the Blackfeet Nation.

THE BLACKFEET NATION

The Blackfeet (*Siksitaisitapi*) are of the Great Plains cultures, who lived on the east side of the Continental Divide. People of the Great Plains cultures were <u>nomadic</u> and highly mobile hunters and gatherers. They relied heavily on bison herds, roots and berries for survival. They needed to be able to



quickly move their camps to follow these food sources. They tended to camp in the same locations at certain times of the year and rarely constructed permanent lodges. Their bison and deer skin lodges were put up and taken down in a matter of minutes and could be easily moved to a new camp using a <u>travois</u> pulled by dogs or horses. They also used animal skins to craft clothing and household items. Heavier items made of wood, stone and bone were less common because of the need to travel light.



THE CONFEDERATED SALISH AND KOOTENAI TRIBES

The Salish Tribe (*Séliš*) and the Kootenai Tribe (*Ktunaxa*) formed an alliance under the Hellgate Treaty of 1855 and became the Confederated Salish and Kootenai Tribes. These tribes relied on hunting, fishing and gathering wild plants for survival. In early spring, they dug bitterroot, camas, wild carrots and onions, and other roots and bulbs. They also gathered moss, berries and medicinal plants as they came into season. They caught whitefish and bull trout using fishing gear made from materials found in the forest. They also hunted caribou, moose, elk, deer, mountain sheep, bison and small game animals such as rabbit and grouse. During the late fall, they dried and preserved meats and plants and processed hides for various uses.

What forest materials do you think could be used to make fishing gear?

NATIVE AMERICAN WAYS OF THINKING ABOUT FOREST USE

It is important to remember that there is no single "Indian" culture. Hundreds of Native American tribes and languages existed when Europeans first arrived in North America. There

are many cultural differences among the tribes, but there is also a notable similarity. Native Americans practiced a way of life that was respectful of and in tune with natural ecosystems. Living this way means understanding that humans are a species sharing the Earth with other equally important species and that we are all connected. We use, consume and learn from each other through interdependence.



Talking with Native American people today, we can learn about traditional uses of the forest in past generations. We can also learn how they are using the forest now, perhaps in ways their ancestors did thousands of years ago.

ARCHAEOLOGY

Another way we can learn about how people used the forest in the past is through archaeology. Archaeology is the study of the culture, technology and behavior of ancient peoples. When archaeologists find and study human-made artifacts such as stone tools, they

can determine when and how people used the forest. For example, an ancient campsite may include remains of animals and plants, as well as tools. Archaeologists also study how the forest has changed over time. By analyzing trees, they can determine how fires have changed the forest and whether humans used fires to manage the forest.



What artifacts would an archaeologist find from your home to provide information on the culture, technology and behavior of your family?

PROTECTING ARCHAEOLOGIC SITES

Our public lands include thousands of archaeologic sites that tell us about the past. These sites must be protected from disturbance that could be caused by our present-day uses of the forest, including road building, timber harvest and development of

recreational facilities. Vandalism and looting of archaeologic sites are illegal and can destroy the past that these sites contain.

You can help protect archaeologic sites by reporting any artifacts you find on public lands to the U.S. Forest Service office nearest you or to the Montana Department of Natural Resources and Conservation. Ask your friends to do the same!



Glossary Terms

archaeology the study of the life and culture of ancient people.

artifacts objects of past human workmanship, typically a simple tool or ornament.

ecosystem all living organisms in an area and their physical environment interacting.

interdependence when two or more species or organisms rely on each other for survival.

nomadic a member of a group of people who have no fixed home and move with the seasons to find food and water.

MY NOTES & DRAWINGS



Forest Plants

very living thing on this planet depends on plants. Even carnivores could not survive without plants, because a carnivore's diet consists of plant-eating animals and insects. For example, a wolf eats many types of herbivores, such as deer and rabbits. The deer and rabbits eat grass, shrubs and other plants, without which they would starve. And without the existence of plant-eating prey, the animal-eating predators would starve.

Plants are not just a source of food, however. They serve many additional important functions, such as:

- Provide oxygen to our atmosphere and take in carbon dioxide
- Provide shelter for wildlife and people
- Provide medicine for people
- Store and purify water
- Hold soil to prevent erosion
- Stabilize weather patterns

Can you think of at least 2 other reasons why plants are important?

The Salish (*Séliš*), Kootenai (*Ktunaxa*) and Blackfeet (*Siksitaisitapi*) tribes have used plants for centuries to fulfill basic needs, such as food, clothing, shelter and medicine. In addition to all of the useful functions of plants, people also enjoy plants for their incredible and inspiring beauty.

NATIVES, NON-NATIVES AND WEEDS

A <u>native plant</u> is one that occurs naturally within an ecosystem without any evidence of having been brought to the area by humans. Native communities of plants and animals have lived together for a long period of time and developed a balanced relationship.

<u>Non-native plants</u> are plants that come from somewhere else. When non-native plants cause problems for native plants, animals or humans, we call them weeds.

Weeds can quickly take over an area of land. They may crowd out native plants for water, space and sunshine. Often wildlife and livestock do not like to eat weeds, and there may not be any insects available to eat them either. In the Flathead Valley, spotted knapweed is a troublesome weed. It gives off a chemical that prohibits other plants from growing near it.

When weeds become a problem, land managers tackle them in different ways. They may use chemical spray to kill the weeds, or they may pull the weeds by hand.

PLANT PARTS AND FUNCTIONS

To distinguish native from non-native plants, it's important to be able to identify plants by examining their parts.



Roots anchor the plant, store food and absorb water and nutrients from the soil. There are billions of tiny root hairs on a single plant.

Stems provide support and are the transportation system of plants. Water goes up, and food goes down.

Flowers and cones are the reproductive system. They produce seeds.

Leaves are food factories. <u>Photosynthesis</u> is the process that creates food. A green chemical called chlorophyll combines with carbon dioxide from the air and water from the roots to make a form of sugar. The energy needed to fuel this process comes from the sun. Photosynthesis means "to put together with light." The plant then changes the sugar to a starch and stores it in all parts of the plant. Oxygen is also formed in this process. Some of the oxygen is kept for the plant, and some is released into our atmosphere.

PLANT IDENTIFICATION

When scientists and others want to talk about plants, they need a way of communicating clearly. For this reason, there is a system for organizing or classifying plants and plant groups.

A plant may have more than one common name, but scientists use the system to give each plant its own unique name using two scientific words. For example, a dogtooth violet and a glacier lily are two common names for the same plant, *Erythronium grandiflorum*. You will see this yellow beauty as the snow is melting on mountain trails. Grizzly bears like to eat its bulbs.



Scientists also use special words or terminology to help identify specific plant parts. A plant key is a tool for identifying plants using words and pictures.



Here are six terms to describe plant leaves:

A good quality flower field guide will include pictures, descriptions, common and scientific names, information about where a plant is found and how it may be used by wildlife and people. It will have a glossary with pictures to help the user identify plant parts, such as leaves that are "lanceolate" (looks like a lance or blade) or "palmate" (looks like the palm of a hand.)



Once you can identify different parts of a plant, you can begin to organize plants into different groups or families. For example, if you've ever grown peas in your garden, you know what the pods look like. Most members of the pea family (*Fabaceae*) will have pods, along with compound leaves and butterfly-like flowers with "wings."

Exploring plants in the area you live and in places you visit can become a lifelong hobby. You can find information about Montana plants at Montana Field Guide: fieldguide.mt.gov.

Glossary Terms

native plant a plant that occurs naturally without any evidence of being brought to an area by humans.

non-native plant plants that have been brought to an area from somewhere else.

photosynthesis "to put together with light," a process where plants use sunlight for energy to produce food from water, carbon dioxide and chlorophyll.

MY NOTES & DRAWINGS



Tree Identification

Trees are the dominant plants in the forest ecosystem. In the forests of Northwest Montana, there are more than 20 commonly found tree species. When you are at the Forestry Expo, see how many of the different tree species you can spot that are listed in this chapter.

Amazing facts about trees...

- Trees produce oxygen and remove harmful gases like carbon dioxide, making the air we breathe healthier.
- There are more than 250,000 different species of trees on Earth. Trees have evolved to grow in a wide range of climates, elevations and soil conditions.
- Trees are the largest plants in the world and live the longest. Some western larch in Montana are older than 1,000 years.
- About 25% (or one-fourth) of the land in Montana is covered with trees.

We can identify a tree's species by identifying its leaves or needles, bark, fruit, buds and shape. To begin the identification process, we group trees into different categories.

EVERGREEN or DECIDUOUS?

Evergreen trees are those species that normally retain most of their needles throughout the winter. Most evergreens have needles for leaves. **Deciduous** trees, on the other hand, drop their leaves in the winter. Most deciduous trees have broad, flat leaves.

CONFIER or BROADLEAF?

<u>Conifers</u> are trees with cones. They generally have slender needles and are usually evergreens. An exception to this rule is the western larch, which drops all of its yellow needles every fall. <u>Broadleaf</u> trees generally have large, flat leaves rather than needles and are usually deciduous.

HARDWOOD or SOFTWOOD?

As you would guess, hardwood or softwood refers to the hardness of the tree species' wood. If

you needed to chop firewood, it would be more difficult to chop hardwood and easier to chop softwood. In general, broadleaf trees are hardwoods and conifer trees are softwoods.

LEAVES & NEEDLES	FRUIT	BARK
Leaves have distinctive sizes,	Just as you can tell a cherry	Bark can best be described
shapes, colors and textures.	tree from an apple tree by its	by color, pattern and
Some feel rough or hairy, and	fruit, you can learn to	texture.
others feel smooth. Some are	identify many forest tree	
thick, and others are paper	species by the shapes and	For example, some trees
thin.	sizes of their fruit.	have white, brown and
		blocky bark. Others have
Needles also have distinctive		black and ridged bark.
characteristics. Some are long	Examples of fruit are cones	_
and slender, and others are	and juniper berries.	Examples of texture include
short and flat. Some are sharp		plate-like (ponderosa pine)
and pointed (spruces) and		and stringy (western red
others are soft and rounded		cedar).
(firs). Needles can grow		
singularly or in bunches,	A	
depending upon the tree		
species.		
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Tree Identification Guide

Black Cottonwood (Populus trichocarpa)

- Largest hardwood growing in northwest Montana, often reaching 150 feet tall
- Grows along rivers and streams
- Gets its name from the white, fluffy windblown seed tufts that fill the air in spring
- Wood is used primarily used to make paper, plywood, wood shavings



Leaves: 3- to 6-inches long, pear shaped, shiny green on top, silvery-white on bottom. Edges are smooth or finely saw-toothed. Pointed buds are filled with sweet-smelling sap that permeates the air in spring.

Fruit: 4-inch long, grape-like bunches of capsules

Bark: Smooth and gray on young trees, dark gray and deeply furrowed on older trees.

Douglas-fir (Pseudotsuga menziesii)

- Not a true fir species
- Commonly found throughout western Montana; along with ponderosa pine and lodgepole pine, Douglas-fir is the species you will see most often in our forests (look for them at Lone Pine State Park)
- Used for making lumber and plywood
- Popular choice for Christmas trees because of its soft needles



Needles: ¾- to 1-¼-inch long, single, attached to twig

with a tiny stem, pointed but not sharp, soft to touch, "friendly fir." Buds are pointed, reddishbrown and shiny.

Fruit (cones): 2- to 3-inches long with 3-pointed <u>bracts</u> that stick out been the scales. The bracts look like the tail and hind legs of a mouse diving into the cone.

Bark: smooth, gray-brown with <u>resin</u> blisters on young trees. Thick, reddish-brown, deeply grooved and cork-like texture on older trees.

Subalpine Fir and Grand Fir (Abies spp.)

- Two true fir species that are native to western Montana (look for Subalpine fir on top of Big Mountain)
- Used to make lumber, plywood and paper
- Popular choice for Christmas trees due to soft needles
- Tops are dense and pointed and look like church spires

Needles: ½- to 2-inches long, single, stemless, thick, dark green with rounded tips. Grow in flat rows.

Cones: 2- to 4-inches long, grow upright on top branches. Scales fall off one-by-one, leaving the cone core attached to the branch.

Bark: Thin, smooth, gray-brown with resin blisters on young trees. Red-brow, rough or cracked on older trees.





- Montana's state tree
- Named for its great size, can grow up to 120 feet tall and 5 feet in diameter (look for them along the Swan Highway between Bigfork and Seeley Lake)
- Can live to be 400-500 years old, older trees are sometimes called "yellow pine" because of bark color
- Younger trees are sometimes call "bull pine"
- Used for making lumber and plywood

Needles: 5- to 11-inches long in bundles of 3.

Cones: 3- to 6-inches long, egg-shaped, scales have sharp points.

Bark: Dark on young trees. Older trees are yellow-brown to cinnamon-red, thick with scaly plates that look like jigsaw puzzles. Smells like vanilla.





Western Redcedar (Thuja Pilcata)

- Grows well in shade and moist places (look for them on the Trail of Cedars in Glacier National Park)
- Can live for more than 1,000 years
- Used to make fence posts, siding and roofing, used by Native Americans to make canoes and houses
- Contains strong-smelling oils that make it burn easily, protect it from insects and act as a preservative



Leaves: Scale-like, overlapping in pairs. Branchlets are flat, underside looks like butterflies outlined in white.

Cones: ½-inch long, in clusters, turned upward on the branch.

Bark: Thin, stringy, reddish-brown on young trees and gray-brown on older trees.

Western White Pine (Pinus monticola)

- Not commonly found in the Flathead Valley
- Cones are the largest of any conifer that grows in Montana
- Wood is of high value due to its light, soft, easily worked nature
- Used to make cabinets, windowsills, door trims and novelty items

Needles: 2- to 4-inches long in bundles of 5

Cones: 5- to 12-inches long

Bark: Dark gray, broken into small squares making a tile-like pattern



Lodgepole Pine (*Pinus contorta*)

- Used by Native Americans to make tipis, lodges and travois because of its tall straight form, hence the name "lodgepole" pine
- Often grow in dense thickets after a wildfire (look for them on the North Fork Road on the way to Polebridge)
- Can grow 80 to 100 feet tall
- Used for posts, poles, house logs, lumber and paper

Needles: 1- to 3-inches long in bundles of 2.

Cones: 1- to 2-inches long, scales have sharp points.

Bark: Black to reddish-brown, thin and scaly.

Engelmann Spruce (Picea spp.)

- Found in the high parts of mountainous regions of Montana
- Prefers areas that are cool and wet
- Shake hands with the "spiny spruce" to feel the difference from the soft-needled "friendly fir"
- Used mainly for lumber

Needles: 1-inch long, stiff and prickly, each one is on woody stem.

Cones: 2-inches long with paper scales, hang downward from branch.

Bark: Reddish-brown, thin and scaly.



Western Larch (Larix occidentalis)

- Montana's only deciduous conifer (look for their golden color in the fall on the mountainsides around your town)
- Used to make lumber and plywood

Needles: ½ to 1 ½-inches long in clusters of 14 to 30, turn soft and light green in the summer, turn bright yellow in the fall and drop to the ground, tree is bare in the winter.

Cones: 1- to 1 ½-inches long with single-pointed bracts that stick out like snake tongues

Bark: Reddish-brown with flat plates on older trees, thick bark protects tree from wildfires.

Pacific Yew (Taxus brevifolia)

- Bark contains taxol, a cancer-fighting agent
- Cattle can get ill or die from eating Pacific Yew leaves in large quantities
- Rarely grows over 15 feet tall
- Grows in moist soils and shady areas

Leaves: ½- to 1-inch long, single, flat, pointed, green on top and paler on the underside

Cones: Hard, bony seed surrounded by fleshy tissue that is green when young and red when mature, looks like a berry

Bark: Very thick, scaly, dark purple-brown

Glossary Terms

bracts leaflike plant part usually found at the base of a flower or flowering part of a plant.

broadleaf a plant with wide leaves such as an oak or maple.

conifers plants that bear their seeds in cones.

deciduous a plant that periodically loses all of its leaves, usually in the autumn.

evergreen a plant that does not lose all of its leaves at one time.

resin a semi-solid substance secreted in the sap of some plants and trees.





MY NOTES & DRAWINGS



Fire in the Forest

Do you think forest fires can have positive effects in the forest?

After you have finished reading this Chapter, answer this question again. Did your answer Change?

When you hear the words "Forest Fire!", you might imagine leaping flames, fleeing wildlife, and charred trees. Smokey the Bear warns that "Only You Can Prevent Wildfires." Smokey's message helps prevent unwanted fires, but only tells part of the story. We want to prevent fires that will destroy our homes or wildlife habitat or damage other valuable resources, like highways or important historical sites. But some fires are necessary and healthy for the forest.

PEOPLE USE FIRE TO MANAGE THE FOREST

Used carefully, fire has become an important tool for taking care of forests. In western Montana, our climate and soils allow trees to grow about twice as fast as they decompose and return to the soil. Forest fires recycle the vegetation and create conditions for new plants and animals to live. When <u>foresters</u> and firefighters intentionally start fires to remove <u>fuel</u>, improve wildlife habitat, or prepare a <u>seedbed</u>, it is called <u>prescribed fire</u>. Fires started accidentally or by lightning are called <u>wildfires</u>. Before starting a prescribed fire, managers carefully plan the burn and monitor the wind, air, temperature and humidity.

Managing wildfires is a balancing act between deciding when a fire is beneficial to the ecosystem and when it is a threat to lives and property. Foresters put out wildfires when commercial timber, critical resources, private property, or people are threatened. Wilderness



and park managers use fires caused by lightning to benefit the natural <u>environment</u>.

Fires have always been part of our ecosystem. We have learned that we can not stop all fires. We need to be smart and learn how to live with fire. One way to do this is to make our homes in the woods fire safe by having a fire-resistant roof and not stacking firewood against the house.

Northwest Montana is experiencing hotter, drier summers and milder winters as a result of climate change. These conditions create the potential for larger and hotter fires to burn in the

forests. Many tree species can live for more than a century, so further climate change has the potential to affect the forests that are here today.

Smokey reminds us to always be careful with fire, and to not burn fields on windy days and make sure sparks from lawn mowers or chainsaws don't accidentally start a fire during hot, dry weather. Visit Smokey's website (www.smokeybear.com) to learn more about how to prevent wildfires.

What steps Can you take to prevent unwanted fires when you are Camping in the forest?

FIRE STIMULATES NEW PLANT LIFE

Fire is nature's way of managing the forest. Many plants have adapted to survive and thrive in areas that have burned, and others depend on fire.

A fire changes plant material into ash, which contains important <u>nutrients</u> and minerals such as phosphorous, calcium, potassium, and nitrogen. These are the vitamins a forest needs to grow. When it rains, the nutrient-rich ash soaks into the soil.

After a fire, plants spread out into the newly opened areas to take advantage of increased sunlight, moisture, and nutrients. Wildflowers, grasses, and other plants grow first and are eventually shaded out by shrubs and young trees. When new plant species grow and replace other plant species, this is called <u>plant succession</u>.

Certain species of trees have adapted to survive low-heat fires. Ponderosa pine and Western larch have thick layers of bark that can withstand the heat of a low-intensity fire. Montana's Ponderosa pine forests have historically burned every five to 25 years, creating open forests with widely spaced trees.

Lodgepole pine is another tree species that has adapted to survive fire. Lodgepole pine have thin bark and they die easily after a fire passes through, killing most of the trees. However, lodgepole pine trees produce two kinds of cones. Some of the cones open each fall and release



their seeds, but other cones, called serotinous, remain closed until heated by a fire. The millions of released seeds thrive in the more open forest with lots of sunshine. For this reason, lodgepole pine is often the first tree species to grow in a burned area.

FIRE CREATES WILDLIFE HABITAT

Animals also take advantage of changes caused by fires. Fire stimulates lush new plant growth, providing an important source of food for birds and other wildlife. Wildlife managers use prescribed fire as a tool to stimulate shrub growth on winter game ranges. Fire encourages the growth of aspen, serviceberry, mountain maple, and other plants that elk and deer like to eat. Fire also encourages new growth of huckleberries and chokecherries, favorite foods of black and grizzly bears. Bears rely on the berries they eat in the fall to survive the long winter.



Fires also create standing dead trees, called <u>snags</u>, which are used by a variety of birds. Woodpeckers drill out nesting holes in snags, and bluebirds and

flying squirrels use old woodpecker holes for nests and roost sites. In some forests, beetles may attack weakened trees that survived the fire. Woodpeckers feed on the beetle eggs and larvae beneath the tree bark. Black-backed and three-toed woodpeckers rely on the beetle larvae for

survival and, therefore use burned areas more than other forest areas. Many species besides birds use snags and downed trees after a fire.

Name three good effects of fire:

TYPES OF FOREST FIRES

There are many different types of wildfires. Some are big covering many square miles, and others are as small as a campfire. Some burn extremely hot, like a roaring tree-top fire. Others burn less hot, like a surface fire that burns more slowly under the trees. Many factors influence how a fire behaves. These factors include the amount of fuel a fire can reach, the weather (moisture, wind, temperature), and natural features of the land such as steepness.

Some forests only burn once every 100 years or more. These forests have large amounts of fuel, because dead logs, branches, and leaves pile up. Fires in these areas can burn large areas and burn very hot. A forest can look black and desolate after a hot fire. However, as we have learned, this is nature's way of starting the forests over again.



Are there any areas near your home that have been affected by forest fires?

Glossary Terms

environment the total of all surroundings... air, water, vegetation, human elements and wildlife.

forester a person who studies and manages forests. Someone who is trained in forestry.

fuel the living and dead vegetation that can be burned in a wildland fire. Fuel includes dead woody material, leaves of trees and shrubs, duff, grasses and other plants.

nutrients in forestry, this refers to the minerals in the soil that help provide food for plants to grow.

plant succession the orderly, gradual and continuous replacement of one plant by another.

prescribed fire a land management technique where fire is deliberately set and controlled to a specific area.

seedbed a bed of soil prepared for planting seeds.

snags standing dead trees from which most of the leaves and branches have fallen.

wildfires fires that are not intentionally set as controlled or prescribed fires, often started by lightning or human carelessness.

MY NOTES & DRAWINGS



Fish and Wildlife of the Forest

The forests of western Montana are home to more than 600 species of wildlife, including birds, small and large <u>mammals</u>, fish, <u>reptiles</u>, and <u>amphibians</u>. The forests are also home to thousands of species of insects, spiders and other tiny, non-backboned creatures. The species of plants and animals that occupy our forests today are the result of millions of years of the natural give-and-take process called evolution. Each and every species is an important part of forest life.

All animals need food, water, and shelter (protection from <u>predators</u> and extreme weather) to survive. The place an animal lives and gets its food, water, and shelter is called its <u>habitat</u>. The ways in which an animal gets what it needs for survival and the role it plays in the ecosystem is called its <u>niche</u>. Not all forest animals rely on the same habitat type, nor do they have the same niche in the forest ecosystem.

Many animals rely on adaptations or certain traits to help them survive within their particular niche. For example, the snowshoe hare is a favorite food for Canada lynx. Lynx have large, round, furry feet to help them travel across the snow to catch the hares.

Can you name another forest animal and an adaptation it uses to survive? (Hint: think color, wing shape, eyesight.)

Herbivores, like elk and deer, eat almost entirely plants. <u>Carnivores</u>, like hawks and wolves, eat mostly other animals. <u>Omnivores</u>, like bears and mice, eat plants and other animals. <u>Decomposers</u>, like <u>fungi</u> and bacteria, consume decaying plants and animals and cycle these back into the basic elements that plants need to grow.

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Each animal species has a well-defined food source. For example, some carnivore species eat large mammals, while other carnivore species eat small mammals or types of insects. Any animal that is hunted by another animal is <u>prey</u>.



Just as each animal species has a well-defined food source, each species also has specific shelter needs. Large carnivores, like mountain lions, need little or no protection from natural predators, but they do need protection from extreme cold and hot temperatures. Herbivores and small omnivores, however, need almost constant protection from predators.

All animals need water to drink, but the amount they need varies greatly among species. Some animals must drink several times a day. Others can go for days without drinking

water. Some animals get their water from lakes or streams, and others get enough water from the food they eat or from the nightly dew. Some animals also use water for protection or shelter, like a beaver in its pond or a black swift that nests in the spray of a waterfall.

SMALL ANIMAL NICHES

It's easy for people to see the value of large mammals, such as elk or moose or bears. And of course, it's exciting to see a large mammal when we are working or recreating in the forest. But

what about the smaller and lesser-known animals, such as mice, frogs, salamanders, and small birds that inhabit the forest? Although they may be small in size, they are large in number, and they are a vital to a healthy forest ecosystem. Many of these animals are the ones we are more likely to see on our forest outings, and they are interesting to observe.



Here are some important roles that small animals play in a healthy forest ecosystem:

- Birds eat insects that harm the trees and keep the insect populations from getting too big.
- Butterflies and bees **pollinate** many plant species, enabling the plants to reproduce.
- Mice enrich the soil by decomposing plant and animal matter.
- Small animals that dig holes in the forest floor help get air and water into the soil to aid tree growth.

MANAGING WILDLIFE HABITAT

It is important that our forests are composed of a variety of different habitats in order for the many different species to survive. When managing the forest, foresters and wildlife specialists consider all types of wildlife and tree species. They use various management techniques to help

maintain healthy and sustainable habitat. They often use natural process as guidelines for making decisions about how to manage forests.

Here are some examples of how to preserve a diversity of habitat when working in or managing a forest:

- When <u>harvesting</u> timber or firewood, leave some standing dead or dying trees for cavity dwellers to nest in.
- Leave some rotten logs in place for enriching the soil and for the insects, amphibians, and small mammals that depend on them for shelter and food.
- When bird nests are found, avoid disturbing them as much as possible.
- Plant or encourage the growth of native plants that are good food sources for wildlife.
- Leave some areas natural and undisturbed. Nature is the expert on creating good habitat.

If you were a forester or wildlife specialist, name three things you would do to encourage different animal species to live in your forest:

1	
2	
3	

FISH

Many people enjoy fishing. Here in the Flathead Valley, there are hundreds of miles of streams and numerous lakes in which to fish. There are 22 different species of fish in the Flathead watershed. Twelve of these species are the kind that people like to try to catch. They are called game fish.

Game Fish Species Transplanted from Other Areas:

Lake trout	Grayling	Northern pike
Rainbow trout	Kokanee salmon	Largemouth bass
Lake whitefish	Yellowstone cutthroat trout	Brook trout

Native Game Fish Species:

Westslope cutthroat trout	Bull trout	Whitefish
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There are three distinct fish life history patterns. <u>Resident fish</u> live their entire life in a short section of a stream. <u>Fluvial fish</u> are born in small creeks and swim downstream to a larger stream or river to spend most of their life. Fluvial fish generally grow to a larger size than the resident fish. <u>Adfluvial fish</u> are born in small streams and swim downstream in the larger rivers to Flathead Lake where they feed and grow for 1 to 4 years. Adfluvial fish grow to larger sizes than fluvial or resident fish.

Cutthroat trout and bull trout are adfluvial fish. In Flathead Lake, adult cutthroat trout range in size between 14 to 22 inches. Adult bull trout can grow to over 36 inches long and weigh more than 20 pounds. Adult cutthroat and bull trout return to small streams to <u>spawn</u>, and the life cycle begins again.



What are some differences you see between bull trout and Cutthroat trout?

A fish spawning site is often at the tail (downstream end) of a pool, where water can move down into the gravel and bring oxygen with it.



Water moving through the gravel

In the pictures below, the female trout "flails" (stirs up) the stream bed with the side of her body and tail, creating a <u>redd</u>. The female lays eggs in the redd, and a male trout fertilizes the eggs. The female moves upstream and repeats the process. As she digs each redd, she stirs up clean gravel that covers the previous redd.



Female trout digging a redd

It takes about one month for the eggs of cutthroat trout to hatch. It can take as long as 4 months for the eggs of bull trout to hatch.



Redds filled with eggs

When people build roads in the forest for timber sales and other human activities near streams and rivers, foresters and fisheries biologists work together to make sure that the activities do not increase the amount of <u>sediments</u> in streams. The spawning areas have to remain free of too much sediment or the fish eggs can smother.

FISH & WILDLIFE WORD SEARCH

Ρ	R	Е	R	А	S	L	R	Y	S	F	Ν	S	Е	Т
R	F	R	Е	Q	Ρ	Е	S	Μ	J	Ζ	G	Ρ	С	Ν
Е	F	0	S	Ν	D	W	Т	Ρ	F	Ρ	Ν	А	0	Е
D	0	V	0	D	Κ	R	L	W	Х	Μ	Ν	W	S	Μ
А	G	Ι	Ρ	R	Е	S	Ι	D	Е	Ν	Т	Ν	Y	Ι
Т	В	Ν	Μ	Н	Е	R	В	Ι	V	0	R	Е	S	D
0	Н	Μ	0	Ι	Е	I	L	G	Q	Q	Т	В	Т	Е
R	Е	0	С	С	G	В	G	G	С	W	U	А	Е	S
Y	С	А	Е	А	D	F	L	U	V	I	А	L	Μ	Н
Ν	D	Y	D	Ρ	0	0	Y	Y	Y	R	Е	F	Q	А
С	А	R	Ν	Ι	V	0	R	Е	Μ	V	Μ	W	Ν	В
0	G	L	А	Ι	V	U	L	F	Ι	Ρ	0	С	Ζ	Т
Ρ	G	I	0	Ρ	Н	С	Т	Т	Е	Н	С	I	Ν	Т
Ν	F	0	W	V	Q	Т	А	I	Ν	L	S	R	Κ	А
Ν	Q	R	G	Μ	Ν	Ν	Ζ	Q	W	Q	R	Х	Т	Т

ADFLUVIAL	HABITAT	PREDATOR
CARNIVORE	HERBIVORE	REDD
DECOMPOSER	NATIVE	RESIDENT
ECOSYSTEM	NICHE	SEDIMENT
FLUVIAL	OMNIVORE	SPAWN

Glossary Terms

adfluvial fish fish that were born in small streams, then swim downstream in larger rivers to a lake where they live for 1 to 4 years, after with they return to the small stream to spawn.

amphibians animals (such as a frog) that usually lives in the water when they are born, breathing through gills, and lives on land as an adult, breathing through lungs and moist skin.

carnivores animals that kill other animals for food.

decomposers organisms that feed on dead material and cause its mechanical or chemical breakdown.

fluvial fish fish that were born in small streams and swim downstream to a larger stream or river to spend most of their lives.

fungi an organism that is neither plant or animal, does not contain chlorophyll, and decomposes organic matter for food.

habitat the place an animal lives, providing food, water, shelter and space.

harvesting the gathering of plants, animals and other renewable natural resources.

herbivores animals that eat plants.

mammals warm-blooded, vertebrate (having a backbone) animals, with fur or hair, females nurse young.

niche the role or function played by an organism in an ecosystem, the organisms food preferences, shelter requirements and special behaviors.

omnivores animals that eat both plants and animals.

pollinate the transfer of pollen from the male part of the plant (anther) to the female portion of the plant (stigma).

predators animals that kill and eat other animals.

prey animals that are killed or eaten by other animals.

redd a pit in a streambed created by a female fish as a place to lay her eggs.

reptiles animals (such as a snake) that breathe air and are covered in scales.

resident fish fish that live their entire lives in a short section of stream.

sediments material suspended in water or that settles to the bottom of water.

spawn the process of depositing eggs for fertilization in order to produce offspring.

MY NOTES & DRAWINGS



Forest Streams

t 28-miles long, Flathead Lake is the largest natural body of fresh water between the Mississippi River and the Pacific Ocean. Flathead Lake is located in the heart of the Flathead Valley. It is part of the 6-million-acre Flathead <u>watershed</u>.

The North, Middle, and South forks of the Flathead River are the major <u>tributaries</u> that flow into Flathead Lake. The Stillwater River, the Whitefish River, and the Swan River are also important tributaries.

RIPARIAN AREAS

The land next to a stream is called the <u>riparian area</u>. The riparian area extends from the water's edge to the upland. The water-loving plants that grow within the riparian area may include willow, alder and birch. Water floods out onto the riparian area when there is more water than

the stream can hold. The ground soaks up the excess water like a sponge. Some of the water moves back to the stream through the soil. This water helps keep streams flowing all year-round.

Rain and snow bring water to Northwest Montana forests. In the winter, water is stored as snow. When spring arrives and the days become warmer, the snow melts and flows in streams. Small, tributary streams flow together to make larger streams and rivers. The streams



work as a system to move water across the land. The land and water together form a watershed.

Floods trigger new plant life, moving and depositing seeds that sprout in the wet, nutrient-rich soil. Most plants that live in riparian areas need lots of water to survive. Plants that need the

most water grow close to the stream, and plants that need less water grow further away. The roots of the plants hold the soil in place so it doesn't wash away in a flood. Preventing <u>erosion</u> keeps soil out of the water and protects the quality of the water.

Another way plants naturally prevent soil erosion is by slowing down the flow of water. Decaying leaves and twigs build up on the ground around plants. This layer of decomposing debris is called litter or <u>duff</u>. When water flowing downhill meets the layer of duff, it slows down. The duff also acts as a filter for any <u>pollutants</u> the water may contain. As the water soaks into the soil, the pollutants and materials it carried are trapped by the duff.

Many different species of trees like to grow in riparian areas. The trees shade the water and keep it cool. This is good for fish for many reasons. Bugs fall off the tree branches into the water to feed fish. Sometimes parts of the tree fall into the water and provide a good place for fish and other aquatic animals to hide. The water slows down when it has to flow around a log. Slow-moving water does not erode the soil as much as fast-moving water, so the water stays cleaner. Fish and other aquatic creatures like clean water. So do people!

With so many plants growing in a riparian area, it is a good place for wildlife. There is plenty to eat and drink and many places to hide. Riparian areas are often cool and shady during the hottest part of the year, providing a comfortable place for wildlife to stay cool on a hot day.



List three reasons why plants and trees growing in riparian Zones are important.

2	 	
3	 	

Foresters and land managers work together to protect riparian areas from harmful impacts of human activities. When working near streams and rivers, they follow guidelines and laws created to protect the riparian plants and prevent soil erosion.

Here are some ways land managers and people working in the forest can protect riparian areas and keep our forest streams clean:

- Avoid operating machinery or falling logs into wetlands and along stream and river bottoms that provide habitat for birds, fish, reptiles and amphibians.
- When building roads or harvesting trees, be careful that disturbed soil won't run into streams during spring snow melt.

What would happen if a wildfire burned all of the riparian Vegetation? What are some things forest managers Could do to limit soil erosion and protect water quality if this happened?

AQUATIC INSECTS

Spending time exploring the shores of a stream or lake in Northwest Montana can be a lot of fun. You never know what you might see. A fish darting through the water, a deer taking a cool drink of water, or more likely...aquatic insects!

Mayflies, caddisflies and stoneflies are three of the more commonly found aquatic insects in Northwest Montana. They are an important source of food for fish and birds. Seeing these

aquatic insects in or near your favorite stream is a good sign! They rely on clean, healthy water for survival, so their presence is an indicator of good water quality.

You will learn more about mayflies, caddisflies and stoneflies at the fisheries station at the Forestry Expo.





Mayfly nymph

Mayfly adult

Caddisfly adult

Stonefly nymph

Stonefly adult



Glossary Terms

duff (or litter) the layer of partially decomposed organic matter on the forest floor.

erosion a process by which wind and water remove earth or rock from a land surface.

pollutants harmful substances released to the air, water or land that cause the environment to become dirty, impure or unhealthy.

riparian area the area along the banks of a river, stream or lake.

tributaries streams or rivers flowing into other streams or rivers.

watershed an area of land that drains water into a stream, river or lake.

MY NOTES & DRAWINGS



Forest Products

Products that come from forests are important to people all around the world. In Montana, many people rely on the forest for products and experiences, including wood products, recreation opportunities, wildlife, and wilderness. Forest products supply many people with jobs and help fuel the Flathead Valley's economy.

Put a Check mark next to each of the things in this list that are considered forest products:

Lumber	Pencils	Venison steak	Clean air
Christmas Trees	Wax	Plastic	Paper
Medicine	Cork	Fuel	Huckleberries
Glue	Plywood	Firewood	Drinking water

You might be surprised to learn that every item in the list is considered a forest product! When foresters and loggers cut a tree, they try to use as much of the tree as possible. This is called "whole tree utilization." The trunk is used for products such as lumber and plywood. Tree bark is chipped into pieces and used as fuel instead of gas or oil to heat buildings. Did you know that wood is used to help heat Glacier High School? Chipped wood is used in the school's special heating system. Bark is also used to manufacture of plastics, glues, waxes, and cork. Branches and small pieces of wood are used to make paper and particleboard. Leaves and needles are usually left in the forest to decay and return nutrients to the soil.

CONVERTING TREES TO WOOD PRODUCTS



Clean water is also an important forest product. Forests are like giant sponges, capturing rain and snow and slowing releasing it to rivers and streams or storing it in vast underground reservoirs.

Forests play an important role in preventing unhealthy buildups of carbon dioxide in our atmosphere. Too much carbon dioxide in the atmosphere can trap heat from the sun, contributing to climate change. Through photosynthesis, growing plants take in carbon dioxide that animals (including people) breathe out and convert it into sugars. Some of the sugars are used as building blocks needed for the plant to grow. As the plant grows, it releases some of the carbon into the atmosphere through respiration and keeps some of the carbon in its cells. Carbon atoms can be stored in a tree trunk for hundreds of years. When the tree dies and decomposes, microorganisms in the soil lock much of the carbon into the soil.

Forests provide habitat to wildlife, which in turn provide many people with food. People hunt deer, elk, moose, grouse and other animals. They also enjoy fishing in the lakes and rivers of our forests.

In addition to products, forests give us valuable experiences, including recreational and spiritual. Many people enjoy hiking, skiing, snowmobiling, mountain biking, picking huckleberries, camping, picnicking and other activities in the forest. People go to the forest to experience solitude and beauty. Have you ever paused beside a forest stream, sat quietly and just looked and listened? The natural beauty of forests inspires people everywhere.

What do you like to do in the forest?

Glossary Terms

wood products items made from the wood of a tree.

MY NOTES & DRAWINGS



Forest Management

orests are always changing. Sometimes the changes occur gradually as each plant goes
 through its natural life cycle. Sometimes the changes occur rapidly due to fire, insects, disease or human activities.

In simple terms, <u>forest management</u> is what people do to the forest. Foresters manage forests through different activities. When deciding how to manage the forest, foresters consider many factors, including the desires of the landowner and the purpose of the forest. For example, in a <u>wilderness area</u> where the goal is to keep the land wild, foresters may do very little. But in a forest surrounded by people's homes, foresters may remove trees to reduce fuels and protect the homes from wildfire.

Foresters use many techniques to manage a forest, including thinning, harvesting, burning and planting. They choose management actions carefully using **Best Management Practices**, which are guidelines forest managers follow to minimize harmful impacts of human activities on the land. For example, Best Management Practices require foresters to work carefully around streams to protect water quality and to build roads away from important wildlife areas.

Forests are <u>renewable resources</u>. When foresters use Best Management Practices, forests will continue to provide products, fish and wildlife habitat, clean water, clean air, wilderness and recreational opportunities.

If you were a forest manager, what would you do to minimize harmful impacts on the land?

COMMON FOREST MANAGEMENT PRACTICES

Thinning is a natural process that occurs in every forest, and it is a good thing that it does! Can you imagine if every seed that dropped onto the ground grew into a mature tree? There wouldn't be enough room! Fortunately, nature doesn't let this happen. In nature, only a few of the seeds that fall take root and grow into seedlings. Of these seedlings, only a few will grow into saplings, and only a few of the saplings will grow into mature trees.

Can you think of reasons why some seedlings don't survive?

If you listed predators such as wildlife and insects or lack of food, sunlight and water, you are right! You may also have correctly guessed harsh weather, including too hot or too cold conditions. Just as you need food, shelter and clothing to survive, small seedlings need sunlight, moisture, nutrients, protection from animals and protection from extreme temperatures in order to grow into healthy trees. Of course a seed can't choose where it falls... it just falls! Once on the ground, it has to make the best of the situation. If it lands on a top of a rock or in the middle of a stream, it's not going to grow.

Earlier in this book, you learned about the tree species Lodgepole pine. Lodgepole pine forests undergo a natural thinning process about every 80 years when the trees become old and weak. Bark beetles are able to detect that the trees are weak, and they burrow under the bark to lay their eggs. When enough beetles burrow into the bark, the tree dies.

Sometimes forest managers help nature along by thinning the forest. When foresters remove some trees, they allow other trees to get more sunlight, water and nutrients. Thinning can also

be an effective tool in reducing wildfire risk by removing excess fuels in the forest. Think back to the Lodgepole pine forest that has been attacked by bark beetles. Acres of dead trees can be a fire hazard. Forest managers may choose to remove the dead trees before fire strikes.



Foresters may thin a stand of trees

more than once over time. The first thinning is likely to occur when the limbs of the trees begin to touch one another, perhaps when the trees are about 10 to 15 years old and from five to 15

feet tall. The trees are too small to be made into lumber products, so they may either be chipped into small pieces or left to decay and return important nutrients to the soil. The second thinning may occur when the <u>crowns</u> or tops of the trees begin to touch one another, and the trees are between 30 and 50 years old. These trees are big enough to be used to make posts or paper.

HARVESTING

As the trees in a forest grow older and larger, the competition for water, sunlight and nutrients becomes greater, and the trees begin to grow more slowly. The older, slower growing trees can be at risk of a disease or insect attack. The branches of individual trees begin to grow together with those of neighboring trees, and less sunlight reaches the forest floor. The tree <u>canopy</u> can be so dense that it is almost dark in the <u>understory</u>. If the forest is being managed to produce

lumber products, forest managers may recommend a regeneration harvest.

Regeneration means to renew or restore, so in a regeneration harvest, most of the trees are cut and turned into products. The land is then prepared for a new forest to grow. The new trees will either be planted or sprout from seeds of any healthy trees that were left



uncut for that purpose. A regeneration harvest is one way to create openings in the forest for use by elk and deer.



TYPES OF REGENERATION HARVEST

Clearcutting

- All or most of the mature trees are removed
- Land is prepared for a new forest
- Most often occurs in Lodgepole pine or spruce/fir forests
- Trees are left around streams to protect water quality
- Patches of young trees and snags are left for birds and other wildlife

Seed tree harvest

- A few large healthy trees are left uncut to provide seed for the new forest
- Five to 15 trees per acre are left uncut
- Ponderosa pine, Western larch and Douglas-fir are often left as seed trees
- Most often occurs in forests with mixed tree species
- Trees are left around streams to protect water quality
- Patches of young trees and snags are left for birds and other wildlife

Shelterwood harvest

- Fifteen to 30 trees are left uncut per acre
- Most often occurs in dry, harsh conditions where young trees would have a difficult time growing without some shade
- Trees are left around streams to protect water quality
- Patches of young trees and snags are left for birds and other wildlife

Imagine each rectangle represents one acre of land. Draw what the forest might look like after each type of harvest is performed.

Clearcutting	Seed tree harvest	Shelterwood harvest

REFORESTATION

When a conifer forest loses trees from a fire, wind, insect attack, or harvest, how does it grow back? In nature, conifers reproduce almost entirely from seeds that grow in cones high in the tops of the trees. In late summer, the cones open and scatter their seeds across the ground. The seeds lay in the soil over winter. If the conditions are right in the spring, many of the seeds will germinate and begin to grow.

Nature furnishes seedbeds (places for seeds to grow) through events like fire and windstorms that reduce shade and expose bare soil. If the timing is right between when the soil is exposed and the seeds are released, a new forest will begin to grow.

Glossary Terms

Best Management Practices guideless that land managers follow for road building, timber harvesting and other operations to minimize harmful impacts of these activities on water quality.

canopy the forest layer formed by leaves and branches of trees or shrubs. There may be several canopy layers.

crowns the tops of trees, where most of the leaves and above-ground buds are formed.

forest management the practical application of scientific and other principles in a forest to accomplish desired results.

germinate to begin to grow, to sprout.

regeneration renewal of a tree crop by natural or human means.

renewable resources naturally occurring raw materials or forms of energy with the capacity to replenish themselves through ecological cycles. The sun, wind and trees are examples of renewable resources.

thinning to reduce the number of trees in a forest using natural or human means.

understory the plants and shrubs growing underneath the main canopy of a forest.

wilderness area an area established by the U.S. government to be managed and preserved in an essentially untouched condition. Wilderness areas are open to some recreation activities. Mining, logging and many other activities are not generally allowed.

MY NOTES & DRAWINGS



Forest Recreation

Deople of all ages enjoy playing and recreating in the forest. Of course, just as with food preferences, different people enjoy different forest activities. Fortunately, our forests

provide a variety of opportunities for outdoor recreational activities. Hunting, hiking, swimming, camping, fishing, motorcycling, picnicking, cutting firewood, picking huckleberries, riding bicycles, bird watching, backpacking, star gazing, rafting, horseback riding, snowmobiling, skiing... the list of possible activities goes on and on!



Earlier we learned about Best Management

Practices that forest managers follow to minimize the harmful impacts of human activities on the land. When we play in the forest, we must also follow guidelines for protecting the forest from damage. The Leave No Trace Seven Principles is set of seven things that everyone can do to minimize our impacts on the forest.

THE LEAVE NO TRACE SEVEN PRINCIPLES

 $\ensuremath{\mathbb{C}}$ 1999 by the Leave No Trace Center for Outdoor Ethics: www.LNT.org.

- Plan Ahead and Prepare
- Travel and Camp on Durable Surfaces
- Dispose of Waste Properly
- Leave What You Find
- Minimize Campfire Impacts
- Respect Wildlife
- Be Considerate of Other Visitors

Here are some stories about a family that follows Leave No Trace principles when recreating in the forest:

PLANNING FOR ADVENTURE

"Jenn!" I stopped and turned as Jamie ran to catch up. "I had fun today," she said, still out of breath from running. "Yeah, I'm glad Ms. Robin took our class to the Forestry Expo." We had spent the day learning about forests, and now I was headed home. Dad, Mom, my brother David and I were getting together before dinner to talk about our family vacations. Dad was excited to explore the forests around the Flathead Valley.

"Ok, gang," Dad announced. "The maps, brochures and trail guides came in the mail today. Let's take a look." Mom always collected travel information to help us prepare for our adventures. At the Expo, we learned it was important to plan our trip ahead. Jamie told me about how her family once drove three hours to a campground, and when they arrived it was closed for repairs.

Our family met in the living room every night for a week and planned our trips. We mapped out different activities and experiences that we would enjoy during each season. Our year's schedule included a spring picnic, summer motorcycle rides with our cousins, a river raft trip, a wilderness horse pack trip, a fall hunting trip and a winter weekend at Gran and Grandpa's cabin.

Which Leave No Trace principle is the family following?

POP CAN, WATERMELON PICNIC

The day after school let out for the summer, we began our forest discovery with a picnic and a walk along a nature trail. I pointed out the glacier lilies and other wildflowers to Mom. Flowers weren't the only things we found along the trail. I picked up an old soda pop can and put it into my pack to bring back to the car. We made sure all of our trash was picked up, including David's watermelon rind that he wanted to leave for the squirrels.



HILLSIDE SHORTCUT

Later in the summer, my Aunt Tracy and cousins John and Amy brought their motorcycles for us to use one weekend. John gave us lessons on how to properly use the machines and made sure we wore safety gear, like helmets and gloves. We took the motorcycles to a riding area open to motorcycle use and rode to the top of a ridge. We stopped to look at Flathead Lake far below us. What a view!

"Amy, watch out!" John hollered at Amy as a motorcyclist zoomed past her, cutting sharply off the trail and riding up the steep hillside. The tire tracks left deep ruts in the soft dirt on the hillside. "That's a good example of what NOT to do," John said. "Look at all the plants the motorcycle tore up. If everyone takes that new shortcut, pretty soon there won't be any plants on the hill and water will wash the soil away." I had heard about soil erosion at the Forestry Expo. "That's called soil erosion, right?" I asked John. "Yes," he said.



Which Leave No Trace principle is the motorcyclist not following?

WET AND WILD RIDE

Brrrrr! The water was cold! David threw a bucket of water on me as our raft floated along a calm stretch of water. Our river guide yelled, "Everyone hang on! We're coming to the Bonecrusher rapids!" Whoosh! Water sprayed in our faces. Once out of the rapids, we floated by cottonwood trees and rock walls, then stopped on a sandbar to eat lunch. Our guide took a portable stove from the raft to heat water for cocoa. She pointed out an old campfire ring on the shore with a half-burned aluminum can. Black rocks and charred wood left a scar on the sandbar. Our guide took apart the fire pit, tossing the rocks in the water and scattering the wood in the bushes. She placed the aluminum can into a bag with our trash. She explained that using the stove was easier and cleaner than building a fire and leaving our trash in the campfire ring. This would help us not leave any signs after our visit to the sandbar.

When we were done with our lunch, the guided used the leftover hot water to wash our dirty cups and silverware. David asked why she didn't just wash everything in the river. I rolled my eyes and said, "Because we don't want to pollute the river!" I told David about using <u>biodegradable</u> soap and washing items away from the river to protect the fish and other animals that use the water, including us.



Which Leave No Trace Principles are the family and river guide following?

BACKCOUNTRY WILDERNESS

"Whoa, Cinnamon!" I stopped my horse, slid out of the saddle and tied Cinnamon to the hitchline. I watched our outfitter, Ray, put up the line, which was tied between two trees. "I saw a hitchline being used at the Forestry Expo," I said. We learned that using the line is better than tying your horse to a tree.

Dad and I were spending a week horse packing in the Bob Marshall Wilderness. Wilderness areas are managed to keep the land in a natural state, much like it was in the time of the Lewis and Clark expedition. For this reason, there are no roads in wilderness areas. People explore wilderness areas on foot, horseback or canoe. Motorized vehicles and machines, including chainsaws and electric bikes, are not part of the wilderness experience.

While we were in the Bob, we saw only two other groups all week... two backpackers and a group using llamas to pack their gear. At night, Ray told us exciting stories about the early mountain explorers. We felt like explorers ourselves, discovering a new area before there were roads or computers.

"Jenn!" Dad called from the trail. It was hard to see him through the trees. As we got closer to the camp, Dad asked, "Do you want to go fishing?" "Sure!" I replied. We picked up our rods and headed to the lake. While finding a good place to throw in my line, I noticed an old campsite on the lakeshore with hardpacked soil and no plants. I could see where water and soil ran into the lake when it rained. I thought about the hillside shortcut the motorcyclist took.

On our last night in the wilderness, Ray pointed out a fresh grizzly bear track and a pile of scat. It was exciting to know the bear had walked down the trail ahead of us. Now I knew why Ray wouldn't let me keep my gum and candy in the tent. He kept all of our food, trash and horse pellets in bear resistant containers. This way, a bear or other animal could not get into our food. Bears that get into human food often have to be removed from their own forest home.



Which Leave No Trace principles are Jenn, Jenn's Dad and Ray following?

FALL HUNT

Mom and I enjoyed walking quietly through the forest, hunting for white-tailed deer. We walked through dense wooded forest and open meadow areas and enjoyed our lunch in a spot that had burned in a wildfire. We watched a woodpecker peck at a large dead tree, and we noticed deer beds and scat near the edge of the burned area. After lunch, I needed to use the bathroom. Mom handed me a trowel and toilet paper. At the Forestry Expo, I learned how to poop in the woods. I found a spot away from the trail and creek, and like my cat Max, I dug a hole with the trowel. In the hole went my toilet paper and waste. Good thing Mom remembered the TP!

Which Leave No Trace principle is Jenn following?

When Mom and I returned from our overnight hunting trip, we cleaned our camping gear. "Jenn, help me brush off our tent," Mom said. We made sure to pick off all the spotted knapweed seeds and flower parts that clung to our clothes and equipment. The purple non-native flowering plant was everywhere in our hunting spot. We reported the weeds to our local U.S. Forest Service office.



WINTER WEEKEND

Gran and Grandpa invited us to spend a winter weekend at their cabin in the woods. Grandpa and Dad made sure we had all the right safety gear in case of avalanches, including a shovel, probe pole and an <u>avalanche transceiver</u>. Before we left, they checked the Flathead Avalanche Center website for updates on avalanche, weather and snow conditions in the area we were planning to go. The Flathead Avalanche Center's education and information services help prevent people from getting injured or killed in avalanches. You can learn more about the Flathead Avalanche Center at flatheadavalanche.org.

"Hey, Dad! Hold up!" I started my snowmobile and headed out with Dad and David. We stopped now and then to check out fresh animal tracks. I brought along a guidebook and tried to match the tracks in the snow with what I saw in the book. I was putting the book in my pack when I noticed Dad ahead at the side of the trail talking with some cross-country skiers. The skiers had spotted an elk earlier in the day along this same trail. Ah ha! I was right! The tracks we saw were from an elk.

Once the skiers had passed, we restarted our machines and continued up the trail to a closed gate. We saw more elk tracks past the gate. David looked at the map to find another open snowmobile route. "Dad, why is there a gate here?" I asked. "The gate is there to help protect animals so we don't bother them. Remember how you felt when David jumped out of your closet and scared you? We don't want our machines to scare the elk. The snow makes it harder for them to get away from us," Dad explained. We turned around and headed to another route.

Which Leave No Trace principle is the family following?

Glossary Terms

avalanche transceiver an electronic device worn on the body to help find a person buried by an avalanche.

biodegradable a substance that can be broken down by microorganisms into simple compounds such as carbon dioxide and water.

MY NOTES & DRAWINGS

GLOSSARY

adfluvial fish fish that were born in small streams, then swim downstream in larger rivers to a lake where they live for 1 to 4 years, after with they return to the small stream to spawn.amphibians animals (such as a frog) that usually lives in the water when they are born, breathing through gills, and lives on land as an adult, breathing through lungs and moist skin.archaeology the study of the life and culture of ancient people.

artifacts objects of past human workmanship, typically a simple tool or ornament. **avalanche transceiver** an electronic device worn on the body to help find a person buried by an avalanche.

Best Management Practices guideless that land managers follow for road building, timber harvesting and other operations to minimize harmful impacts of these activities on water quality.

biodegradable a substance that can be broken down by microorganisms into simple compounds such as carbon dioxide and water.

bracts leaflike plant part usually found at the base of a flower or flowering part of a plant. **broadleaf** a plant with wide leaves such as an oak or maple.

canopy the forest layer formed by leaves and branches of trees or shrubs. There may be several canopy layers.

carnivores animals that kill other animals for food.

conifers plants that bear their seeds in cones.

crowns the tops of trees, where most of the leaves and above-ground buds are formed.

deciduous a plant that periodically loses all of its leaves, usually in the autumn. **decomposers** organisms that feed on dead material and cause its mechanical or chemical breakdown.

duff (or litter) the layer of partially decomposed organic matter on the forest floor.

ecosystem all living organisms in an area and their physical environment interacting. **environment** the total of all surroundings... air, water, vegetation, human elements and wildlife.

erosion a process by which wind and water remove earth or rock from a land surface. **evergreen** a plant that does not lose all of its leaves at one time.

fluvial fish fish that were born in small streams and swim downstream to a larger stream or river to spend most of their lives.

forester a person who studies and manages forests. Someone who is trained in forestry. **forest management** the practical application of scientific and other principles in a forest to accomplish desired results.

fuel the living and dead vegetation that can be burned in a wildland fire. Fuel includes dead

woody material, leaves of trees and shrubs, duff, grasses and other plants. **fungi** an organism that is neither plant or animal, does not contain chlorophyll, and decomposes organic matter for food.

germinate to begin to grow, to sprout.

habitat the place an animal lives, providing food, water, shelter and space.harvesting the gathering of plants, animals and other renewable natural resources.herbivores animals that eat plants.

interdependence when two or more species or organisms rely on each other for survival.

mammals warm-blooded, vertebrate (having a backbone) animals, with fur or hair, females nurse young.

native plant a plant that occurs naturally without any evidence of being brought to an area by humans.

nomadic a member of a group of people who have no fixed home and move with the seasons to find food and water.

non-native plants plants that have been brought to an area from somewhere else.

niche the role or function played by an organism in an ecosystem, the organisms food preferences, shelter requirements and special behaviors.

nutrients in forestry, this refers to the minerals in the soil that help provide food for plants to grow.

omnivores animals that eat both plants and animals. **organism** a living thing.

photosynthesis "to put together with light," a process where plants use sunlight for energy to produce food from water, carbon dioxide and chlorophyll.

plant succession the orderly, gradual and continuous replacement of one plant by another. **pollinate** the transfer of pollen from the male part of the plant (anther) to the female portion of the plant (stigma).

pollutants harmful substances released to the air, water or land that cause the environment to become dirty, impure or unhealthy.

predators animals that kill and eat other animals.

prescribed fire a land management technique where fire is deliberately set and controlled to a specific area.

prey animals that are killed or eaten by other animals.

redd a pit in a streambed created by a female fish as a place to lay her eggs.

regeneration renewal of a tree crop by natural or human means.

renewable resources naturally occurring raw materials or forms of energy with the capacity to replenish themselves through ecological cycles. The sun, wind and trees are examples of

renewable resources.

reptiles animals (such as a snake) that breathe air and are covered in scales.

resident fish fish that live their entire lives in a short section of stream.

resin a semi-solid substance secreted in the sap of some plants and trees.

resources portions of the environment upon which people see as being valuable for human use.

riparian area the area along the banks of a river, stream or lake.

saplings young trees.

sediments material suspended in water or that settles to the bottom of water.

seedbed a bed of soil prepared for planting seeds.

snags standing dead trees from which most of the leaves and branches have fallen.
spawn the process of depositing eggs for fertilization in order to produce offspring.
species a population of individuals that are more or less alike and that are able to breed and

produce fertile offspring.

thinning to reduce the number of trees in a forest using natural or human means. **nomadic** a member of a group of people who have no fixed home and move with the seasons to find food and water.

tributaries streams or rivers flowing into other streams or rivers.

understory the plants and shrubs growing underneath the main canopy of a forest.

watershed an area of land that drains water into a stream, river or lake.

wilderness area an area established by the U.S. government to be managed and preserved in an essentially untouched condition. Wilderness areas are open to some recreation activities. Mining, logging and many other activities are not generally allowed.

wildfires fires that are not intentionally set as controlled or prescribed fires, often started by lightning or human carelessness.

wood products items made from the wood of a tree.

