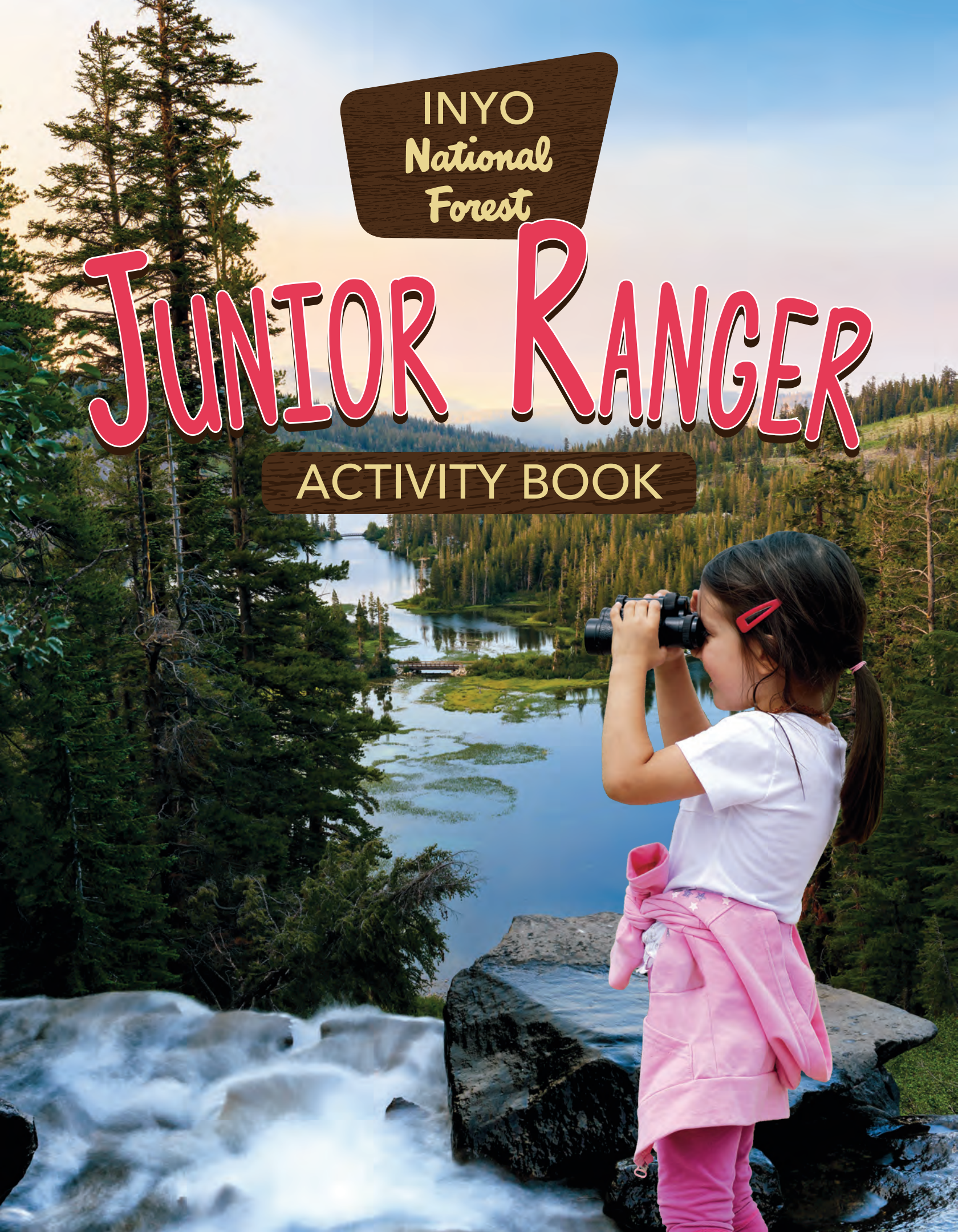

INYO
National
Forest
JUNIOR RANGER
ACTIVITY BOOK

TABLE OF CONTENTS

MONO LAKE

Wilson's Phalarope

Eared Grebe

California Gull

Osprey

Mono Lake is for the Birds!

Mono Lake and the surrounding area serve as an important stop for millions of birds every year. Birds come to Mono Lake for many reasons. Some birds like the phalaropes and grebes come to Mono Lake to eat brine shrimp to "fuel-up" so they can finish their migrations. Other birds, like the California gull, come to lay eggs on the two islands which are safe from predators who might make their eggs into a snack. Another bird that you can find using Mono Lake is the osprey. Despite it's lack of fish, Mono Lake's offshore Tufa towers make great nesting spots for osprey, who fly great distances to find fish in freshwater lakes and streams.

Alkali Flies

Alkali flies are found along the shores of Mono Lake eating tiny pieces of algae that have washed ashore. However, these are not you typical house fly. These flies spend much of their lives underwater.

Adult flies have a special adaptation that allows them to trap a bubble of air between their body, and their waxy body hair. They use this air bubble like a tiny submarine to dive underwater and lay their eggs. They can trap enough air in their bubble to stay underwater for up to 15 minutes.

A few days after the eggs are laid, the eggs hatch and fly larvae emerge. The fly larvae have been an important source of food to the native people who live around Mono Lake. The natives used to harvest the fly larvae to eat and trade with other tribes. The natives that live around Mono Lake are called Kutzadika'a which means "fly-larvae eaters". When the larvae finds a good spot to hang on, it will enter the next stage of its life as a pupae, where it transforms into an adult fly.

BLACK BEARS

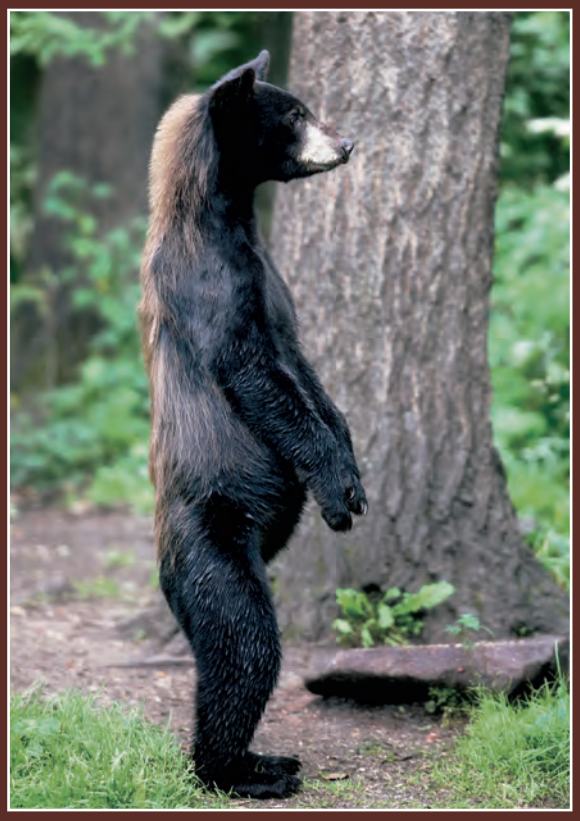
The Inyo National Forest is the home of many American black bears (Ursus americanus), and while they typically like to eat what they find in the forest, if given the opportunity they will eat human food. If the bears keep coming back to places where people are to find food, it becomes unsafe for the bears and the people in that area. Those habituated bears have to be euthanized, sadly. By being "bear aware" and storing your food in bear-resistant containers, you can ensure the safety and wildness of the bear and protect your food.

BEAR BOX

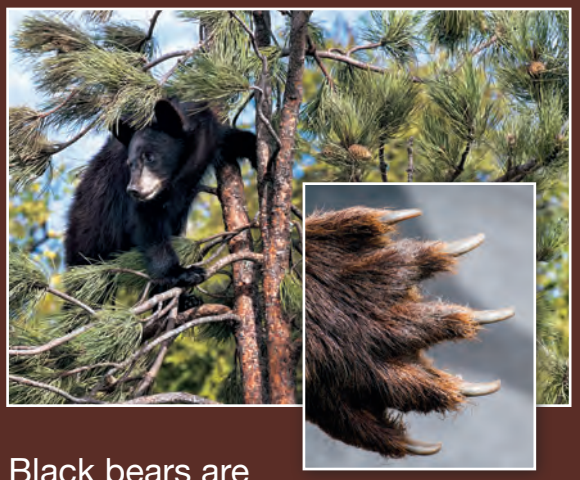
G	J	C	O	O	L	E	R	E	N
C	C	R	G	U	M	Y	L	D	V
T	R	A	S	H	W	I	K	S	K
J	R	Q	N	Y	A	C	J	K	N
J	M	W	X	D	O	F	Y	Q	E
P	R	W	O	L	Y	Z	Y	S	T
K	B	S	B	Q	Y	L	L	E	E
N	T	N	Y	B	C	M	L	G	P
W	U	O	Y	N	X	C	F	E	Q
S	T	E	A	F	O	O	D	B	T

Below is a list of items you should store in a bear safe storage container, see if you can find them all in the word search.

SODA	CANDY	
TRASH	GUM	SUNBLOCK
FOOD	COOLER	



Black bears are very curious creatures. They often stand up so that they can see, hear, and smell better. The additional height they gain from standing helps the black bear make better decisions about food, mates, and potential threats.



Black bears are very skilled climbers. Their claws are curved like hooks which give them excellent grip and leverage when they make their way up a tree.

THE ROLE OF FIRE IN THE FOREST

Read the following paragraph to discover the important role fire plays in our forest. Fill in the blanks with words from the word bank, at right, as you read.

Fire plays a _____ role in forests, just like the wind, rain and snow. In the years following a fire, wildflowers and other plants _____. Plants receive more _____ in the open spaces created by the fire. Wildlife is then drawn to the abundant food sources.

Many plants and animals live with and even take _____ of fires. Jeffrey pines have a fire resistant bark that helps them _____ frequent, small fires and they thrive in open, sunny forests created by fires.

Jeffrey Pine bark before/after burn.


Black-backed woodpeckers make their homes in fire-charred trees.

Animals can survive these frequent fires: birds fly _____, rodents go _____, and bears and deer simply leave the area. Fires create _____ areas and food sources for many birds and rodents. The fire-blackened tree looks like _____ to a black-backed woodpecker.

US Forest Service firefighters use fire as an important _____. Prescribed fires are started under specific weather conditions by trained firefighters. These fires safely reduce vegetation near communities, recycle nutrients and _____ wildlife habitat. Any fire that threatens life or property is put _____.

What steps do you take to make sure that your campfire is out?

_____

_____

Word Bank:

thrive
natural
out
sunlight
away
advantage
underground
survive
nesting
home
tool
improve

A Fire Triangle, like the one pictured above, shows all the elements that are required for a fire to burn. If you remove any side of the triangle, the fire will be prevented or extinguished.

ANSWERS: 1. natural 2. thrive 3. sunlight 4. advantage 5. survive 6. away 7. underground 8. nesting 9. home 10. tool 11. improve 12. out

Follow the trail to the lake and along the way read how you can practice Leave No Trace and reduce your impact in the Inyo National Forest!

Leave No Trace™
Center for Outdoor Ethics | LNT.org

1. Know before you go

Be prepared. Pack clothes to protect you from the cold, heat or rain. Always carry a map and know how to read it.

2. Choose the right path

Stay on trails to protect the forest and yourself. If you are camping, make sure you camp on a durable surface like dirt or snow, instead of in meadows. Camp at least 200 feet from water and trail.

3. Trash your trash

Pack it in and pack it out. Keep the Inyo National Forest beautiful by picking up litter and disposing of it in trash cans or recycle bins.

4. Leave what you find

Take only pictures and memories. Leave plants, rocks, and historic items where you find them.

5. Be careful with fire

If you are allowed to build a fire, only use existing fire rings. Keep your fire small and make sure it is out and cold before you leave.

6. Respect wildlife

Keep wildlife wild: do not feed the animals and store your food properly.

7. Be kind to other visitors

Remember you share the forest with other people.

Three ways you have practiced Leave No Trace during your stay in the Inyo National Forest:

1. _____
2. _____
3. _____

Animal Adaptations

A
Mountain Lion

B
Bighorn Sheep

C
Coyote

D
Mule Deer

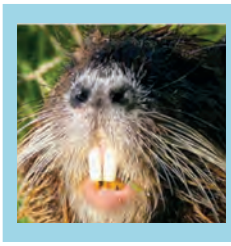
E
Pika

F
Beaver

The Inyo National Forest is home to many mammals, but living here is not easy. The animals that live here have many ADAPTATIONS, or traits that make it easier for them to live in their environment. See if you can match the adaptations that help each animal survive by putting the letter of each animal in the right box.

Like dogs, this animal has a very strong sense of smell to sniff out it's prey. Its eyesight and hearing are also sharp helping make them effective hunters.

This animal's hooves are equiped to handle steep terrain, allowing it to escape to places predators dare not go. Despite its horns, it would rather run to safety than fight off a predator.



Because this animal likes to chew on wood, its teeth have to keep growing so they don't get worn all the way down. This animal also has webbed feet to help it swim better.

This animal sheds and regrows antlers every year. A new tine, or "branch" of antler, will be gained every time the antlers are regrown.

This animal's long tail helps it balance when moving swiftly through tough terrain. It also has large paws that help stabalize it when it jumps and lands.

This cold loving, mountain dwelling animal doesn't hibernate during the winter so it has to spend all summer gathering food for the winter and then drying its food out in these "haystacks."

ANSWERS: C, F, A, B, D, E

BRISTLECONE PINES

The oldest trees in the world can be found in the Ancient Bristlecone Pine Forest, right here in the Inyo National Forest! In 1953, Dr. Edmund Schulman (pitctured left) came to the White Mountains and started to explore this bristlecone pine forest. After four years of studying these trees Dr. Schulman found “Methuselah” a bristlecone pine that is more than 4,800 years old!

Rings can tell us age!

Every year that a tree lives, it adds a layer or “ring” of new growth. You can find out how old a tree is by counting the number of rings inside its trunk. Bristlecone pines live for a long time and grow very slowly. Often, it takes over one hundred years of growing – 100 rings – to add just one inch of width. Using a microscope, Schulman counted almost 4,800 rings from the Methuselah Tree.

Pictured on the right are tree rings from a bristlecone pine (top) and a Jeffrey pine (bottom). Because the bristlecone pines grow so slowly you have to use a microscope to be able to count the rings.

The bristlecone pine gets it name from the bristles on the outside of its cone.

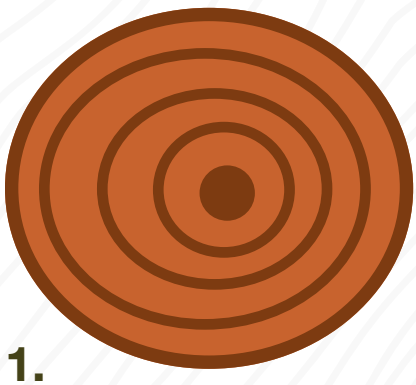
Rings can also tell us about the weather!

Bristlecone tree rings can tell us what weather was like in the past. By looking at how wide the tree rings are scientists can determine if a certain year was wet with rain or dry with little rain. In a wet and rainy year, the trees grow a wide ring. In a dry year with little rain, the tree ring is going to be narrow. If there are a large number of rings close together it means that there was once a period of dry weather, called a drought.

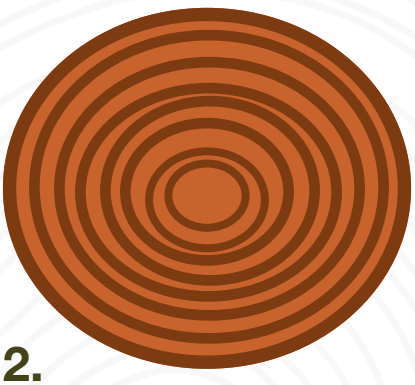
CIRCLE what weather condition you think make the tree ring patterns below. Circle the cloud for rainy or sun for dry. Maybe the right answer is both!

DRY

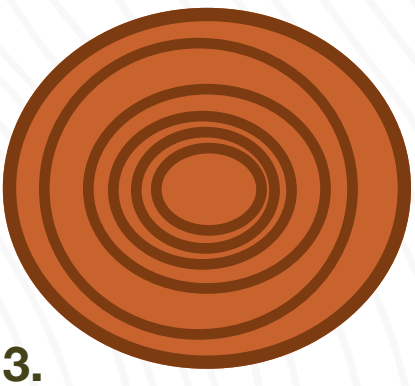
RAINY



1.



2.



3.

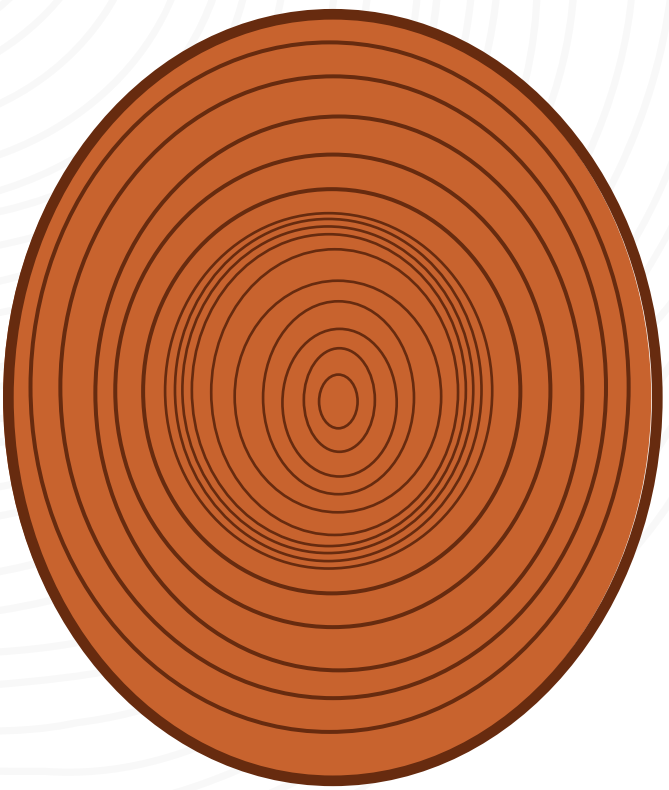
If a tree grows a new ring every year, that means every ring that you see represents one year of growth. In order to tell how old a tree is, start with the outermost ring and count towards the center. Let's say that the outmost ring is from this year. See if can you answer the following questions.

1. **How old** is this tree?

2. **Put an "X"** on the first growth year of the tree.

3. **How long ago** was the drought?

4. **How many years** did the drought last?

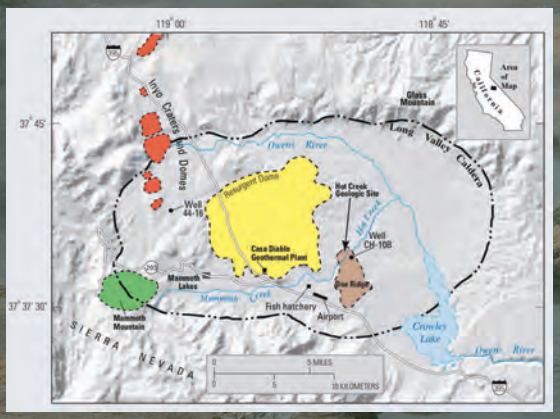


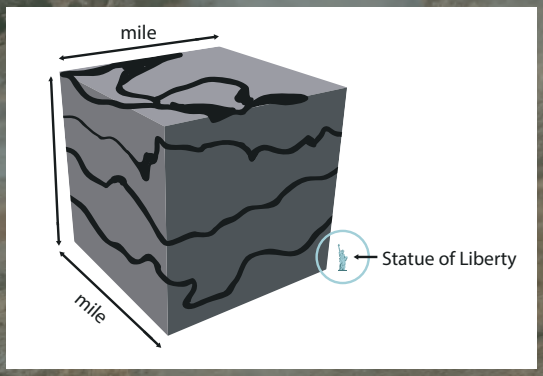
ANSWERS: 1. Rainy 2. Dry 3. Both, 1. 16 years old 2. Middle of the tree- first ring 3. 6 years ago 4. 4 years

MAMMOTH VOLCANOES

Volcanoes have played a large role in helping shape the Inyo National Forest. From lava flows, to the formation of islands at Mono Lake, volcanoes have left their mark on the landscape. Mammoth Lakes presents an excellent example of volcanic activity.

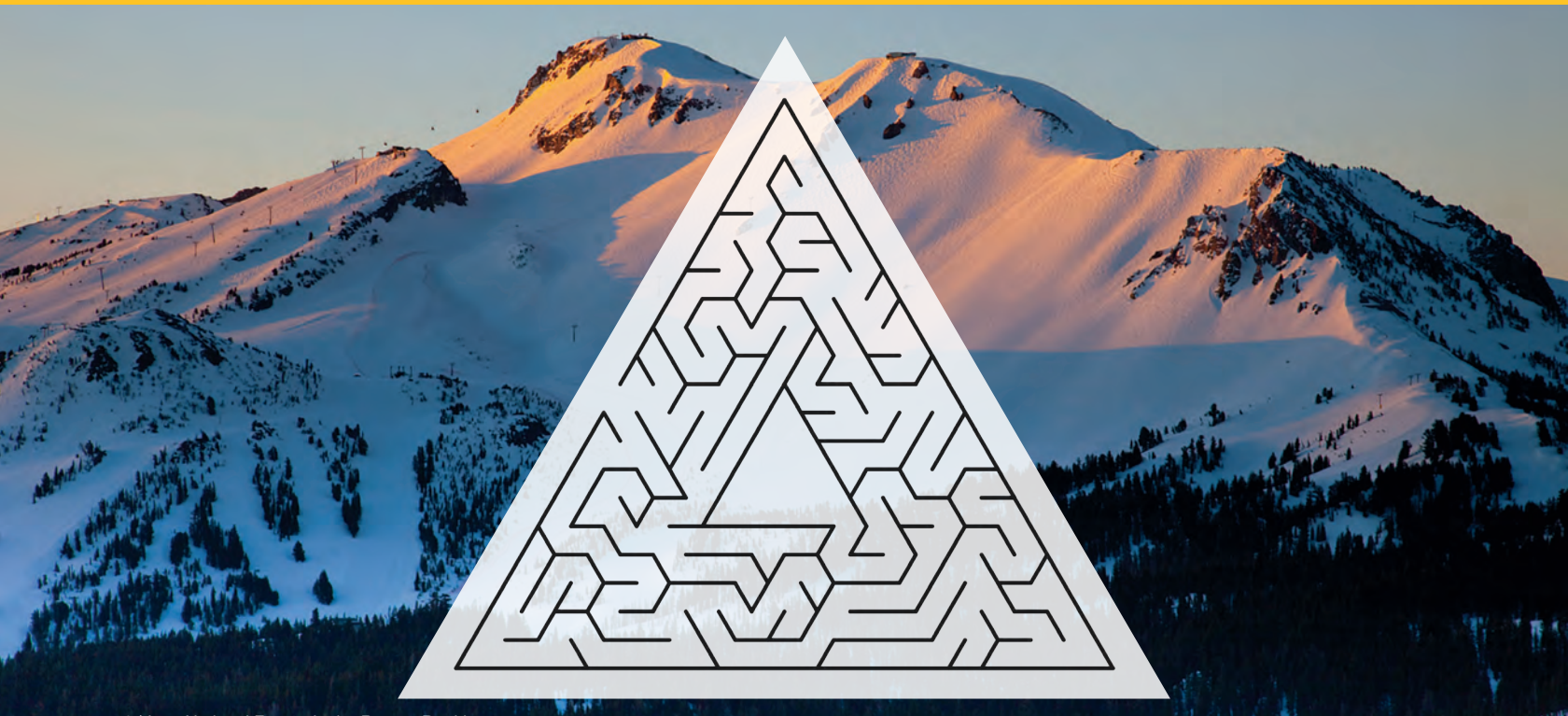
The Town of Mammoth Lakes itself sits in the Long Valley Caldera, an ancient super volcano that erupted around 760,000 thousand years ago. This eruption was massive and last for about 6 days and sent more than 140 cubic miles of gas-rich magma into the air. This huge eruption caused the roof of the volcano to sink, leaving behind a caldera, or large bowl shape hole in the ground 10 miles long and 20 miles wide.





All volcanoes are capable of being destructive. However, for much of a volcano's life, it is not. It can be active (including earthquakes and degassing), dormant, or extinct. In fact, one of the more popular places for outdoor recreation in the Inyo National Forest is on and around a huge volcano known as Mammoth Mountain. Here you can find people hiking, mountain biking, fishing, and camping in the summer and skiing in the winter all on an active volcano.

See if you can find your way down this active volcano known as Mammoth Mountain.



WATER is essential to LIFE

The Inyo National Forest was established to protect the Owens and Mono watersheds, which supply the City of Los Angeles with much of its water. Watersheds are areas of land that drain all the rain and snow to the same place. Gravity moves water from the ridgeline, or highest point, to the lowest point. Depending on which side of the ridgeline water falls determines into which watershed it will flow. Water drains both through the soil and above the ground. Creeks meet and form rivers. Rivers flow into other rivers, lakes, or oceans.

The plants and animals of the forest are dependent on the water from rain and snow that falls in the Sierra Nevada and the Inyo and White Mountains. This snow and rain historically flowed into lakes with no surface outlets; creating the saline (salty) Mono and Owens Lakes.

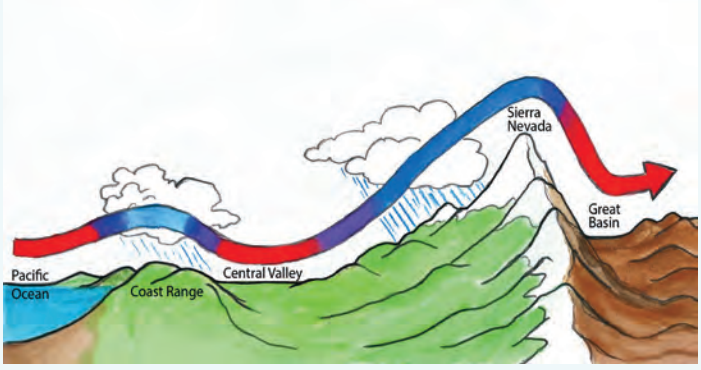
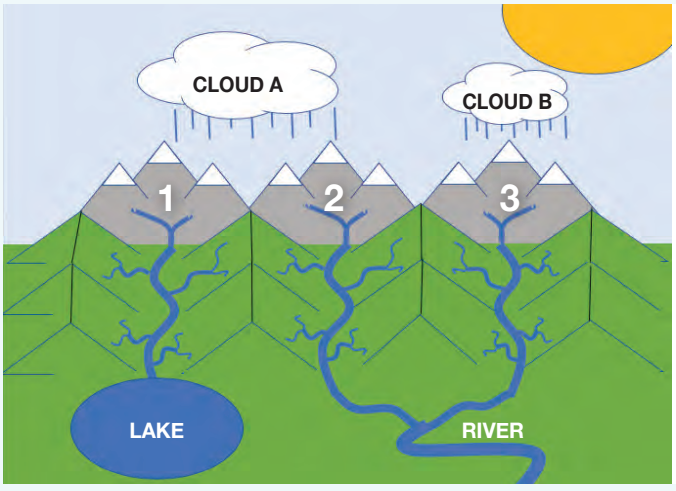


Diagram by Abby Dziegiel

The mountains of the Inyo National Forest get more rain and snow than the valleys. This is because they create a **rain shadow**, which is formed when prevailing winds get blocked by high mountains. Water in the air is pushed up and over the west slope of the Sierra Nevada, condenses, and forms clouds. Clouds drop rain and snow as they move up and over the mountains and high passes (low points in the mountains). Death Valley is east of a mountain crest with very high passes and is example of where the rain shadow is strong. Vegetation like sage grow in these areas. Where there are lower passes, the rain shadow effect is less because these passes allow more water in the air to get across the Sierra Nevada. The area around Mammoth Lakes, where there is an abundance of trees such as Jeffrey pine, is an example of a weaker rain shadow.



See if you can figure out where the water is going drain in the activity below! Circle the correct answer!

1. The rain from "Cloud B" drains in the _____.
A. River **B. Lake**

2. The water from the snow melt on top of the mountains in "Watershed 1" will drain to the _____.
A. River **B. Lake**

3. Which two watersheds feed into "The River"?
A. 1 & 2 **B. 2 & 3** **C. 1 & 3**

4. The rain from "Cloud A" will drain in to which body of water?
A. River **B. Lake** **C. Both River & Lake**

ANSWERS: 1. A. River 2. B. Lake 3. B. 2 & 3 4. C. Both River & Lake

TAKE A HIKE

Hiking is one of the most popular activities in the Inyo National Forest. When you go for a hike it is very important to take a map with you. Knowing how to read and properly use a map is a skill all hikers should know! Below you will learn how to use each of the map elements.

Use the map at right to answer the following questions:

1. If you hiked to the lake, which trail would be more steep?
   Trail A **Trail B**

2. About how many miles is the campground away from the trailhead?
   2 Miles **3 Miles** **4 Miles** **6 Miles**

3. If each contour line is a change of 200 ft. in elevation, what is the approximate elevation gain from the trailhead to the peak?
   2,800 ft. **3,600 ft.** **4,000 ft.** **5,000 ft.**

4. Which trail is the steepest?
   Trail A **Trail B** **Trail C** **Trail D**

5. Which direction is the lake from the trailhead?
   North **East** **South** **West**

When hiking, be prepared and make sure an adult is with you.
Here are a few things that you should pack!

Map and Compass

Plenty of Water

Layers of Clothing

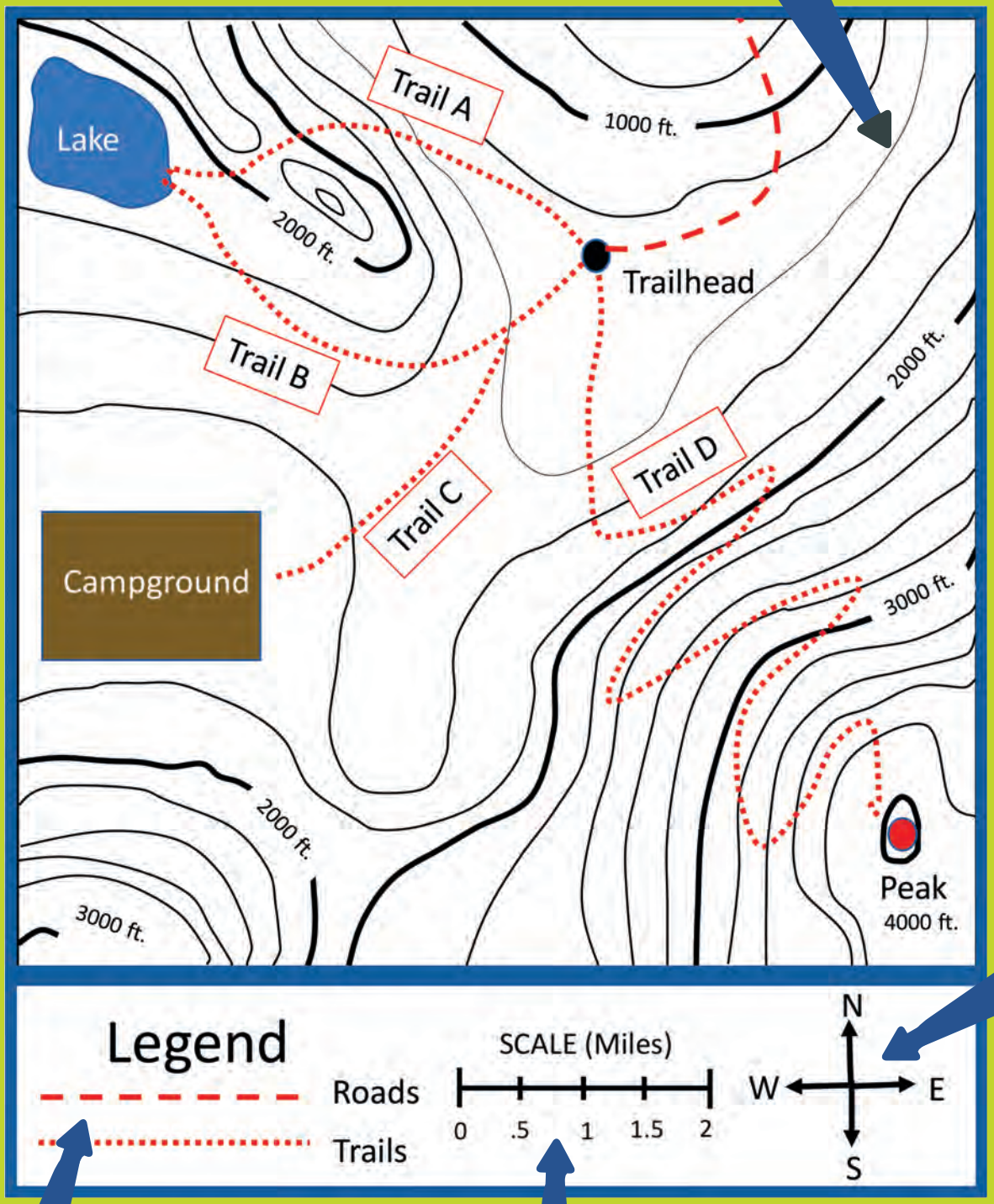
Food

ANSWERS: 1. Trail A 2. 4 miles 3. 2,800 ft. 4. Trail D 5. West

HOW TO USE A MAP

CONTOUR LINES are the squiggly lines on the map. These special lines tell us the elevation or how high the ground is above sea level. Each contour line represents a specific elevation, meaning that no matter where you stand on that line, you will be at the same elevation. These lines can help you determine how steep slopes are depending on how close the lines are to each other.

Lines that are closer together = STEEP LINES, Lines that are farther apart = NOT AS STEEP



AN ORIENTATION ARROW shows you where each direction --north, east, south and west --is. On most maps North will be towards the the top of the map.

A LEGEND is a guide that tells you what the different symbols and lines represent on a map.

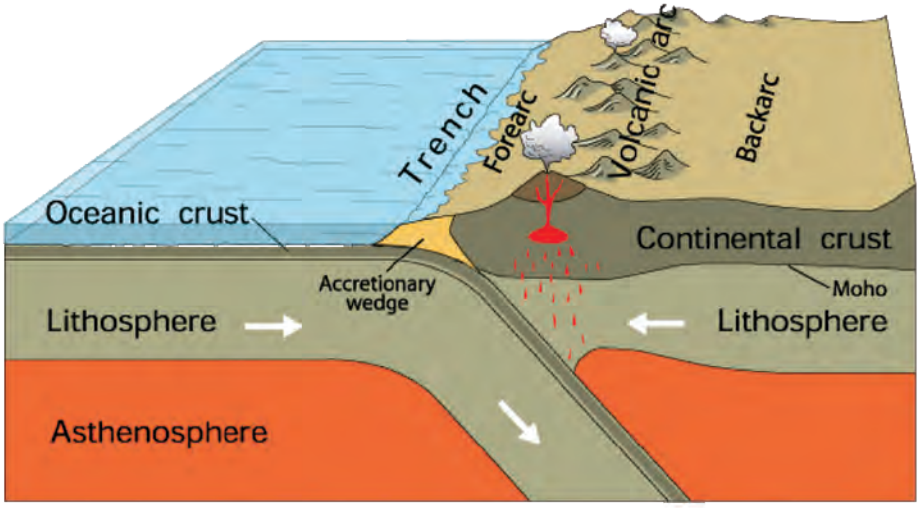
A SCALE allows map readers to measure distance. You can use your finger to measure the scale and determine the distance of a trail. If your trail is windy and turns a lot, you can use a piece of string and lay it on top of trail, then you can straighten it out measure it out using the scale bar.

GEOLOGY OF THE SIERRA NEVADA

Geology is the study of the Earth's processes, formations, and rocks and the Inyo National Forest is a geologist's wonderland. It is home to two of the tallest mountain ranges in the United States, the Sierra Nevada to the west and the White Mountains to the east. Both have peaks that soar over 14,000 feet. Between these huge mountains you can also find many volcanoes, hot springs, earthquake scars, as well as some unique rock formations.

The story of the Sierra Nevada starts with ***tectonic plates***, or giant pieces of the Earth's crust that float on top of Earth's heated interior. The tectonic plates collide with each other and are the most common cause for earthquakes. In certain places, when two plates collide, one plate will slide under the other plate. This is called ***subduction***. When the tectonic plate goes under another one it melts in the Earth's hot interior and turns into ***magma***, or melted rock that is under ground. This magma rises toward the surface where it will erupt in a volcano or became a ***magma chamber*** when the magma pools up.

Granite



Over millions of years these magma chambers started to cool off and turn back into solid rock, or ***plutons***. These plutons, which consist mainly of ***granite*** rock, make up the Sierra Nevada that you see today. Over the course of millions of more years, the mountain started to lift and exposed the granite plutons to the surface. Over thousands of years, ***erosion*** (or the gradual removal of material caused by rain, snow, wind or glaciers) helped give the mountain their shape.

Use the information above to answer these questions:

1. What is it called in plate tectonics when one plate goes under another one? _ _ _ _ _ _ _ _ _ _
2. What rock mainly makes up the Sierra Nevada? _ _ _ _ _ _ _
3. What is melted rock that is under the ground called? _ _ _ _ _
4. What are giant pieces of earth's crust that float on the Earth's molten center? _ _ _ _ _ _ _ _ _ _ _ _ _ _
5. What is the gradual removal of material by rain, snow, wind or glaciers? _ _ _ _ _ _ _
6. What are magma chambers that cool off and turn into solid rock? _ _ _ _ _ _ _
7. When magma rises to the surface but doesn't erupt in a volcano and instead pools up? _ _ _ _ _ _ _ _ _ _ _

ANSWERS: 1. Subduction 2. Granite 3. Magma 4. Tectonic Plates 5. Erosion 6. Plutons 7. Magma Chamber

A GOLDEN TROUT

For a Golden State

Did you know our California State Fish is native to the cold waters of the Inyo National Forest? In 1947, the people of California loved the golden trout so much they made it the state fish.

The story of the golden trout begins much earlier, however. In 1893 David Starr Jordan, an Icthyologist (person who studies fish), first found the fish along the Kern River Plateau. This colorful fish became a traveller, making its first journey when Colonel Sherman Stevens put 13 goldens in a coffee pot to take them from the Kern Plateau to Cottonwood Creek. He wanted to fish for goldens near his sawmill. Traveling by mule, truck, and finally airplane, goldens have been moved into many more lakes and streams, providing a challenge to anglers throughout the Eastern Sierra.

California

Use the guide to add color to this golden trout- its characteristic stripes are missing!

The golden trout has a bright yellow belly, a red stripe down its middle and red on the gills. Once you see one, you will never forget them.

Mt. Whitney

Mt. Whitney is 14,494 feet above sea level, making it the highest mountain in the contiguous United States (the lower 48, not including Alaska and Hawaii). Every year thousands of people come to hike to the top of Mt. Whitney, making it the most hiked trail in the Inyo National Forest. It is so popular that people throughout the world apply via a lottery for a Mt. Whitney hiking permit.

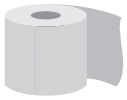
THE SIERRA NEVADA BIGHORN SHEEP is an endangered species whose population fell as low as 100 sheep. With the help of Sierra Nevada Bighorn Sheep Foundation and the California Department of Fish and Wildlife, the population is over 500 sheep and rising. Sierra Nevada Bighorn Sheep from the Mt. Whitney Ranger District were essential in repopulating other areas. Not all areas are repopulated.

THE HEIGHT of Mt. Whitney is amazing. It peak stands 14,494 feet above sea level. The Empire State Building, one of the most iconic sky scrapers in New York stands at 1,454 feet tall. It would take just shy of 10 Empire State Buildings stack one on top another to reach the peak of Mt. Whitney.

WHAT IS THE IMPACT?

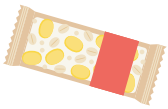
The hike to the summit of Mt. Whitney is 11 miles one way and gains over 6,000 feet in elevation. Despite the hike's challenges, Mt. Whitney is one of the most hiked trail in the Sierra Nevada. Because it is so popular, the US Forest Service has a system limiting the number of people allowed to hike the mountain each day and limits on what the hiker can do on the trail. Every year, more than 25,000 people hike the Mt. Whitney Trail. With that many people on a single trail, even the smallest impacts can add up to a big problem.

If each hiker did the following, draw or describe what the impact would be.



…Didn't pack out their human waste in a Wag Bag.

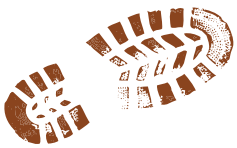
…Dropped a granola bar wrapper on the trail.



…Did not have strict control of their dog or pick up the waste.

Please note: the **summit** of Mt Whitney is in a National Park and dogs are not allowed.

…Left food in their car during the hike.



…Took a shortcut instead of following the trail.

ANSWERS: Toilet paper: Not practicing Leave No Trace principles, Granolar bar: Not practicing Leave No Trace principles, Dog: Tramples plants and goes off the trail + not practicing Leave No Trace principles, Car: Bears can damage car to get to food, Footstep: Trampling plants, causing erosion, stay on trails!

Forest JOURNAL

Use the space below to record your special memories, thoughts, and feelings about your trip to the Inyo National Forest.

Draw your favorite place, animal or flower you discovered in the Inyo National Forest!

Congratulations!

Now that you've completed the activities in this book, you are on your way to becoming an Official Junior Forest Ranger! Please fill out the Junior Forest Ranger Official Form below and send it to us at:

Junior Forest Ranger
Eastern Sierra Interpretive Association
190 E. Yaney St.
Bishop, CA 93514

Jr. Forest Ranger

OFFICIAL FORM

Parents- please snap a photo and email to **molly@esiaonline.org** or photocopy/cut and mail to the above address.

Your Name_____

Address _____

City_____**State**_____ **Zip** _____

Email_____**Age** _____

School Name _____

Parent/Family Member/Friend (Adult), please sign here:

I certify that_____**completed the activities in this book.**

Signed (name of adult) _____

Junior Ranger booklet brought to you by the US Forest Service, in partnership with the Eastern Sierra Interpretive Association (ESIA). ESIA is a non-profit 501 (c)3 organization whose mission is to educate and inspire people about Eastern Sierra public lands through high quality interpretive products, exhibits, and programs. To learn more and support ESIA visit www.esiaonline.org. Booklet design by www.sharpenddesigns.com.