

Sequoia Seeds

A Newspaper
for Kids about
Sequoia & Kings
Canyon National
Parks

Look Inside!

Big Trees	page 2
Fire	page 3
Bears	page 4
Animals	page 5
Habitats	page 6-7
Ranger Jobs	page 8
Weather	page 9
People	page 10-11
Crossword	page 12

Visit our Website
www.nps.gov/seki

Join the Journey

Imagine yourself walking a trail surrounded by giant trees. The sunlight feels warm on your skin and the smell of wildflowers fills the air. You find a pine cone on the ground and shake it to see if it still holds seeds. The crack of a twig makes you look up and you see a deer running across the meadow. Can you imagine this scene? Would you like to join this journey?

You are personally invited to learn more about Sequoia and Kings Canyon National Parks. This newspaper will introduce you to the resources and the rich history found here. There are many interesting things to discover. Read on and have fun!



Two Big Parks

Sequoia and Kings Canyon are two different national parks located next to each other, in the state of California. The two parks together cover about 864,000 acres, which is bigger than the whole state of Rhode Island! Surprised?

The parks are part of the Sierra Nevada, which is a large mountain range. Hiking trails cross these wild lands but there are very few roads.

This area is known for its BIG things: the deepest canyon, the tallest peak in the United States outside of Alaska, and especially the biggest trees on earth, the giant sequoias! Can you find these three things on the map to the right?

Why Have National Parks?

In 1872, the national park idea was born in the United States with the establishment of Yellowstone National Park in Wyoming. Today, the U.S. has hundreds of park sites. Other countries have set aside land for protection, too.

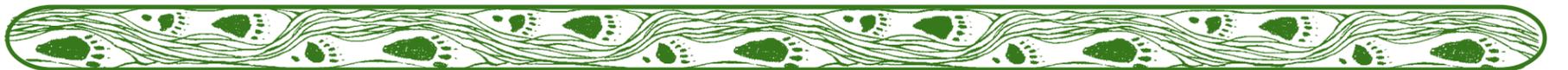
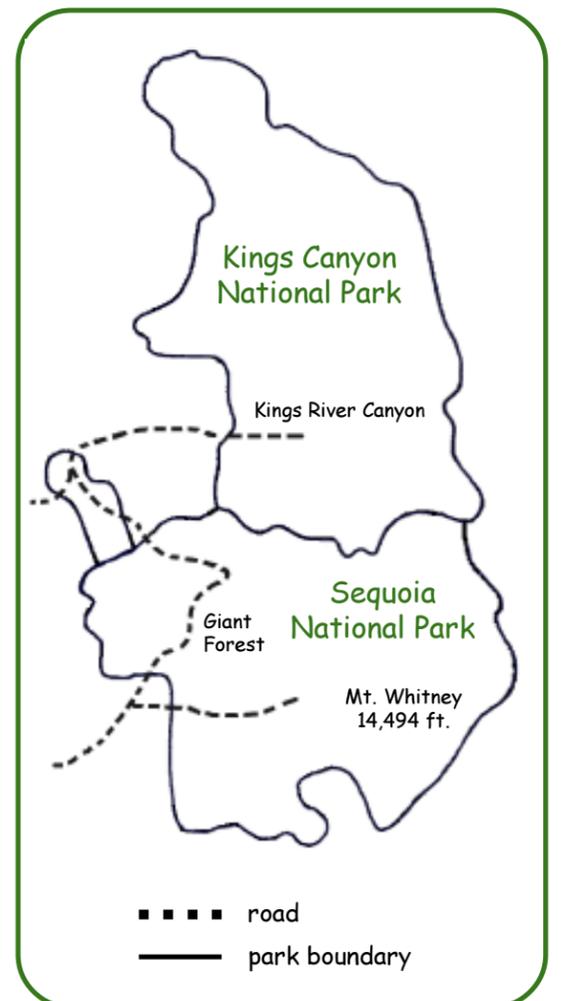
Why do we need to protect land? As the population of our planet grows,

more and more land is used up for cities and roads. While these things are important for humans to live, we also need to save space for the natural world. National parks offer a connection to nature and the past. Imagine a world where you could not see trees or walk on a trail.

It is important to know how to act in a national park so you do not harm it. You should never litter, feed the animals, or take natural things you find here home as souvenirs. If every visitor took a small flower, the park would look very different to people that come in the future. Think of a park as an outdoor, living museum. Plants and animals live in the parks, but they aren't exhibits. They're real – and very wild.

National parks are different from city parks near your home. In city parks, you find jungle gyms and swings. In national parks, we use the land gently to learn, have fun, and simply enjoy the peace and quiet we need in our busy, noisy lives.

Preserving something doesn't mean preventing change. Parks protect natural processes which are always changing. Some trees get taller and wider, while others die. Mountain lions hunt deer to feed their new-born kittens. There is a constant cycle of birth and death that makes the parks new and exciting every time you visit. What will you discover when you come to the parks?



Really Big Trees

Giant Sequoias

By volume, giant sequoias are the biggest trees on earth! That doesn't mean that they are the tallest or the widest trees. Coast redwoods are the tallest. Tule cypresses, from Mexico, have the biggest trunks. But if you consider both how tall sequoias are, along with how big around they get, giant sequoias are the overall winners.

How big are these trees? The largest giant sequoia, named the General Sherman Tree, is 275 feet tall. Its circumference, the measurement around the trunk, is 103 feet. Think of it this way: the Sherman Tree is a little taller than a 27-story building and wider than three lanes of traffic. Now can you imagine its size?

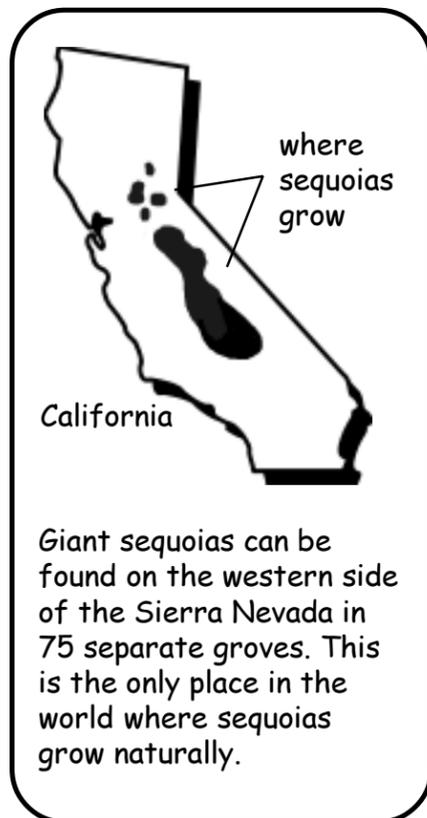
The seeds that start these trees are really small. They're no bigger than a flake of oatmeal. Two hundred of these seeds are found in sequoia cones which are shaped like chicken eggs.

How does a seed that is no bigger than a flake of oatmeal grow a tree as big as the General Sherman? Sunshine is important. Young sequoias grow best in open spots in the woods, so the sun can shine down on them. They also grow well in soil that is moist from rain and melting snow. Bare soil is also good for the tiny seeds. If the seeds fall on thick clumps of needles and twigs, they can't reach the soil and moisture below.

That's why fire is important for sequoias. Fire burns away dead leaves, twigs, and wood from the ground leaving ash which is full of nutrients. After the fire has passed, sequoia seeds fall from the cones onto the newly cleared soil. When the sequoia seeds start to sprout, they absorb the nutrients through their roots.

Growing the world's largest trees isn't easy. It takes sunshine, water, and soil cleared by fires. It also takes patience—up to 3,000 years of it—but the results are incredible! Giant sequoias are some of the most amazing trees on earth. To learn more, try these fun activities:

1. Cut a 103-foot piece of string. Lay it in a circle to show the circumference of the Sherman Tree. Get students from your class to stand around this circle, holding hands. How many students does it take to complete the circle?
2. Lay out a 275-foot piece of string and walk its length. That's how tall the Sherman Tree is!
3. Look up the height of the Statue of Liberty. Is the statue taller or shorter than the General Sherman? By how much?
4. Check out Sequoia & Kings Canyon National Parks' website at www.nps.gov/seki.



Cone Quiz

There are many types of trees in the parks. Learning to identify trees can be fun when you know what to look for. Pine trees have needles which are very thin leaves. Depending on the type of pine tree, needles come in bundles of one to five. Lodgepole pines are the only trees found here with needles in bundles of two. So if you observe a tree with needles that come in pairs, you know you have found a Lodgepole pine. Bend one needle down and make an "L" for Lodgepole with them.

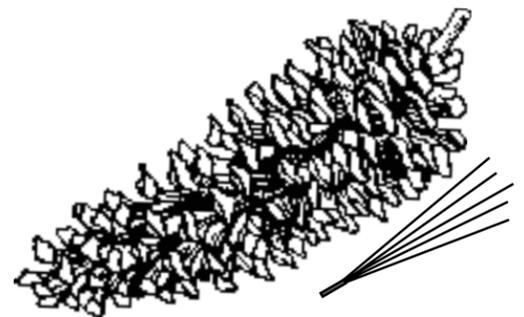
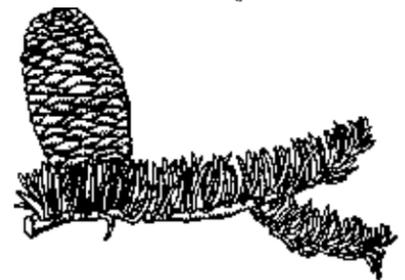
Studying cones is another way to identify trees. Cones come in many shapes and sizes. Try the game below and learn some new cones.

Game: Draw a line between the descriptions and the correct cones.

Sugar pines have very long cones (some are two feet in length); their needles are in bundles of five (like the word "sugar" has five letters).

Sequoia cones are the shape and size of a chicken egg; the needles of the tree look like ropes.

Cones on white fir trees sit upright on their branches; their needles are short.



Sequoia or Redwood?

Which tree is which? Many people confuse giant sequoias with coast redwoods because they are both very big and are closely related. Giant sequoias grow on the western side of the Sierra Nevada where snow falls in the winter. Redwoods live along the coast of California and Oregon where fog provides moisture to the growing trees. Besides living in different areas, how else can you tell these trees apart?

Size is an important difference between the two trees. Coast redwoods grow much taller than giant sequoias. Sometimes they reach nearly 370 feet tall. Giant sequoias rarely top 300 feet.

The opposite is true when you talk about circumference. Giant sequoia trunks are thicker. Why? First, giant sequoia bark can be up to 24 inches thick, twice as thick as redwood bark. Second, giant sequoias live longer than coast redwoods. All trees add a layer of wood around their trunks every year that they are alive. Since giant sequoias may live to be over 3,000 years old, it is no wonder that they are thicker than the 2,000 year-old redwoods.

Now can you tell which tree is which? Circle the giant sequoia.



FIRE: Learning About Burning

Fuel and Flame

When you picture a forest fire in your mind, what does it look like? Do you think all fires look the same? You might be surprised to know they do not!

Helpful Fires – Fires have been an important part of the environment in Sequoia and Kings Canyon for thousands of years. Lightning started many fires every year. These fires burned the dead wood, or fuel, on the ground, and usually stayed small. Because they occurred regularly, the amount of fuel didn't build up.

Heat from these fires dried out pinecones and released seeds. Fires also helped create sunny openings in the forest where these seeds began growing free from the shade of other trees.

Today, lightning fires still occur in the forest. In places where there is a natural amount of fuel, lightning fires are helpful like the fires of the past. In places where fuels have gotten thick, lightning fires become wildfires.

What is a wildfire? Why do fuels build up in the forest?

Wildfires – Fires that both happen unexpectedly and burn out of control are called wildfires. Wildfires can burn up buildings and hurt people. These fires may be started by lightning but are usually started by careless people. They come as a surprise and putting them out is dangerous, expensive work. Nobody wants a wildfire near their house or in the park.

Wildfires get big when there is a lot of fuel in our forests. For the last 100 years, people thought all fire was bad and put out every fire that they could. People did not understand that small fires prevent bigger ones by getting rid of fuel. Because there was less fire, the dead trees, sticks, and needles that fell on the ground didn't get cleaned up. Scientists say that today's forests have "heavy fuel levels."

Fixing the Fuels – Sequoia and Kings Canyon need fires to burn naturally like they used to, before fuels were too heavy. How do we do this?

With fire! In some areas, park fire crews light special fires called



The Big Picture

We won't see "the big picture" about fire if we focus only on trees. The story is much larger than this. Everything in an ecosystem is connected. What happens to the forest affects all the living things there.

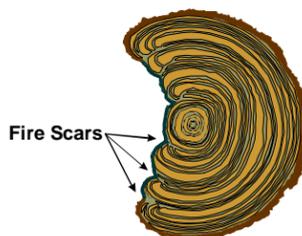
Animals live with fire, too. Some animals not only survive fires, but actually need them to sustain their food source and the habitat conditions they live in.

Fire stimulates new plant growth that gives animals a nutritious food source. Standing dead trees killed by fire, called snags, provide nest sites for woodpeckers, hawks and owls.

Some people wonder what happens to wildlife when fire comes near their homes. Large mammals usually have time to walk away from flames, birds fly away, and burrowing animals escape fires by crawling in holes underground.

Fires in the national parks do not benefit any one particular plant or animal. They help all parts of the system to exist together and function as a natural process. Fire is one of the best tools for keeping Sequoia & Kings Canyon National Parks wild and healthy!

Stories in Wood



prescribed burns. Prescribed burns are planned, so fire crews can light them only when weather conditions are right. Mild temperatures and calm winds help us to control the burns. Fire crews are trained to light the fires with a tool called a drip torch that squirts ignited diesel fuel onto the ground.

A prescribed burn is sort of like a doctor's prescription. It is a remedy for an unhealthy forest. Prescribed burns help to keep natural cycles working, and they reduce the chance of dangerous wildfires that can harm people and property. In wild places like national parks, fires are not just something that happens; they are an important part of the forest.

How did park managers figure out that fire has always been a part of Sequoia and Kings Canyon? They asked the trees!

Trees grow and add on a ring of wood just under their bark every year. If a fire is hot enough, its heat will penetrate the bark and burn these rings, leaving a scar. These scars show up as black, warped lines and they are easy to spot in a cross-section of a tree. Because of the scars, tree rings have a lot of information etched in their wood.

Tony Caprio is a scientist who studies trees and their annual rings. Tony says, "I like to study tree rings because they tell me stories about the past from before there were written records."

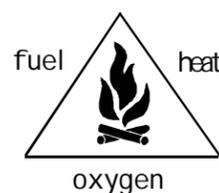
The fire scars found in giant sequoias tell about frequent fires that the trees survived. These 3,000-year-old trees have lived with fires every 5 to 15 years!

Read the article *Fuel and Flame*, then unscramble the following letters. HINT: This is the name given to a planned fire. These fires can help make a forest more healthy and make it safer to live near the woods.

SBRPREDEIC RNUB

Can you list two reasons why fire is important for some trees?

What makes a fire burn?



Imagine a 2,178 year old tree that experienced a fire every 11 years of its life. How many fire scars could we count?



one hundred ninety-eight



Bears, Bears, Bears

A Wish for Summer

It was a cool night but the wind that blew over the park whispered of summer. Stars pierced the velvety blackness of the sky, and an occasional sequoia cone dropped to the ground with a thump. Ranger Jill, who was hiding inside a large hollowed-out tree, crossed the fingers on her left hand. Her right hand held a tranquilizer gun.

A big cinnamon-brown bear ambled past her and began to claw apart a rotting log. A tiny cub followed behind, snuffing at the exposed ants that scurried about. Jill sighed happily. The bears were looking for ants and dried up berries, not human food. What a relief!

When the mother bear turned, Jill looked for a bright yellow tag on its ear. "No tag" she whispered to herself. "Good. This isn't the problem bear I trapped and tagged a few months ago." She lowered her dart gun.

Jill shook her head and wondered why people weren't more careful with their food. There were bear warning signs posted in all of the campgrounds. One of the first signs in the park told people about not feeding the bears, or any wildlife. The message was printed in the park's newspaper and rangers mentioned it often in the visitor centers. And still, people were careless.

Ranger Jill sometimes got discouraged. She knew that human food ruins bears' lives from the moment they try it. It tastes so good and is easier to find than searching for ants. She knew that when bears get human food it makes them forget their fear of people. Instead of eating their natural diet of acorns, insects, berries and grasses, bears will sneak around camp-

grounds at night looking for garbage or ice chests. Sometimes they get aggressive looking for this food. Not long ago, some campers had told Jill about a bear who used its claws to rip open the trunk of a car to get a bag of potato chips...a bag of chips

that should have been stored in the bear-proof food-storage locker sitting less than ten feet from the car.

That was the bear she was looking for tonight. Bear #165, which she had tagged with a bright yellow ear tag was probably going to lose its life. And why? Because people didn't store their food correctly.

It was really hard for Jill to understand. Her boot tapped angrily on the ground. She loved bears. The last thing she wanted to do was to kill a park animal. But once a bear loses its fear of people, more bear and human encounters happen which is dangerous for all involved.

Jill had tried moving bears to a new location. This strategy didn't work because they were too smart. In a few days, they would find their way back, looking for food in buildings, trash cans, and cars.

A shuffling noise snapped Jill's attention back to the present. She peered out from her hiding spot. A camper was throwing some garbage into a bear-proof can. The rusty lid creaked as it swung back and forth. The last thing Jill saw was the baby bear's bottom scooting up the nearest fir tree. It had been frightened by the person and the noise.

"At least these bears are wild," she thought. A warm glow spread over her. Jill uncrossed her fingers and grinned. Her summer wish had come true, at least for tonight.

How big is a black bear's foot?

On average, the back paw is 3.5 inches wide and 7 inches long. Trace your foot. What are the measurements? How does your foot compare to a black bear's?



A Bear's Life

Learn more about bears by visiting www.nps.gov/seki

In Sequoia and Kings Canyon, there is only one type of bear: the black bear (*Ursus americanus*). While grizzly bears used to be common in California (and are shown on the state flag), the last one was shot in 1922.

Since then black bears, who are smaller than grizzlies, have been mostly without enemies except for humans. Even though their name says "black", their fur may also be tan, brown, or cinnamon.

Black bears do not all act alike. Some bears will sleep during the winter while others choose to move down to the warmer foothills and remain active. Small plants and ripe acorns from foothill oak trees provide food for active bears throughout the winter.

Bears that do sleep in winter need to prepare. During the fall, they eat up to 20,000 calories a day, or eight times what some people eat. While sleeping through the winter, the same bear may burn 4,000 calories a day just to keep warm.

In addition to putting on fat, a bear needs to find a den. Hollowed logs and rock overhangs provide shelter from cold, snowy weather. Most of these rock and tree dens are in the middle elevations of the parks, in the mixed-conifer forest. Sleepy bears usually crawl into one of these dens around mid-November and remain for roughly 3 1/2 months.

Bears' winter sleep is not the same as deep hibernation in animals like squirrels and marmots. True hibernators cannot be woken up, and their breathing and blood flow slows almost to a stop. For bears, these changes are not as drastic but are just as amazing. Their heart rate slows down to 8-10 beats per minute. They don't eat, drink or even go to the bathroom.

If a female black bear is pregnant, she will definitely den that winter. In January, she gives birth to 1-4 bear cubs in her sleep. Each cub is born about 8 inches long and weighs nearly the same as a half can of soup, or 8 to 10 oz. Baby bears are blind and helpless at first, but they find their way to their mother's milk so they can feed and grow.

By mid-March, baby bears weigh 4 lbs. and have a thick pelt of fur. Their eyes are also open by this time, making them ready to and greet the mothers teach find food. The their mothers half years be-off on their

leave their den spring. Outside, the cubs stay with for one-and-a-fore they go own.



Tracking Animals

Where are the Frogs?

Croooooak. Croooooak. If you visit these parks, you may hear the croaking of the common tree frogs. Unfortunately, you will not hear the underwater twill of the yellow-legged frogs. These and other frogs are disappearing from the parks. Frog populations, in general, are dropping world-wide.

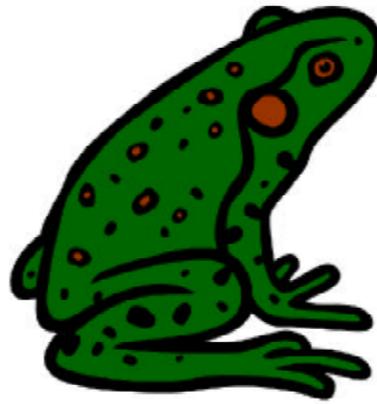
There are two kinds of yellow-legged frogs. The mountain frogs live in high-elevation lakes and the foothills frogs exist in low-elevation streams. Both species used to be abundant. Today, the mountain species only survives in isolated areas. The foothills species has disappeared from the parks completely. What's happening to these colorful creatures?

Frogs, like other amphibians, live part of their lives on land and part in water. That means that they require several types of habitat in order to survive. Scientists believe frogs' homes, or habitats, are being destroyed in a number of ways.

First, non-native fish are now sharing space with frogs. Before people moved into the area, most lakes in the Sierra were fishless. In order to create good fishing holes, backcountry lakes were stocked with fish, without thought for how it would affect the animals that already lived there. Frogs cannot reproduce in lakes with fish because the fish eat their tadpoles. Bullfrogs, also introduced by people, eat native frogs.

Second, pesticides and other chemicals that are in the air may be soaked up through a frog's thin skin, causing it health problems. Many of these chemicals originate in the valley west of the parks, but prevailing winds blow the chemicals in this direction. Frog populations on the opposite side of the valley – away from the winds – do not seem to be declining as drastically, leading scientists to believe chemicals are a factor. Some scientists are also studying the effects of ultraviolet radiation from the sun.

Disappearing frogs are no joke. They are sad examples of how we must take better care of our planet or we could lose other animals and habitats, too.



Peregrine Falcons

Imagine a steep cliff overlooking miles of jagged mountains. A dead tree and a few scraggy bushes stick out from the rocky ledge. Someone lives up here....

A movement catches the resident's sharp eye. Its head swivels. It drops like a dive-bomber from its branch. With talons knotted into tight fists, the peregrine falcon swoops through the wispy clouds. In mid-air, it catches a swallow and within minutes brings its prey back to the rocky ledge where a fuzzy nestling is chirping to be fed. A successful hunt!

Peregrine falcons are endangered birds that can be found in the parks. Their nesting sites, called aeries (sounds like air-eez), are located on some of the parks' granite domes. Seeing a nesting pair is a very rare event. Just watching a peregrine is difficult, since they are the fastest flying birds in the world.

Though peregrine populations are recovering in some parts of the country, they are not doing as well in California and Oregon. One reason might be pollution. Chemicals in the environment contribute to thin-shelled eggs. These thin shells break when the



Can you match these animal names with the tracks to the right?

1. Mountain lion
2. Raccoon
3. Quail
4. Mule Deer
5. Frog

A.

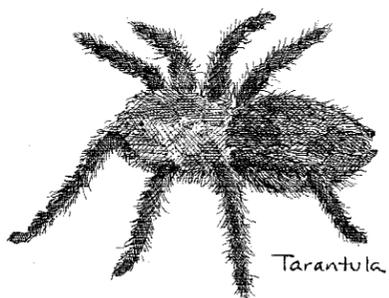
B.

C.

D.

E.

Answers: 1) B 2) E 3) D 4) C 5) A



Tarantulas

Tarantulas are hairy spiders that live in these parks. Female tarantulas may live to be 25 years old. Baby spiders, called spiderlings, are born from tiny eggs. As they get older, these spiders may be seen wandering across park roads in search of food or mates.

Tarantulas are not dangerous to humans but they can bite. Because of their scary appearance, people sometimes kill tarantulas out of fear. It's important to remember that all animals, including spiders, are protected in national parks.

Which Cat is That?

Over the years, mountain lions have been called many different names. There are about 40 English words for mountain lion, and roughly 60 more in Spanish and Indian languages. In Mexico, this large, wild cat is called a puma or leon. In the Eastern United States, they're called panthers or catamounts (the word "catamount" comes from "cat of the mountain"). In the west, they may be called cougars.

Native Americans described these cats well when they called them "ghosts of the wilderness" or "ghostwalkers." That's because mountain lions are very secretive and quiet. A mountain lion will see and hear you long before you ever catch a glimpse of it. This is why very few people get to see them.

Mountain lions are carnivores, or meat-eaters. To eat, lions must hunt other animals for food. They feed on deer and small mammals. Does this mean that mountain lions are dangerous? They can be. Like all park animals, the cats are wild. However, you are not likely to even see one. When provided enough space to roam and hunt for food, most cougars are happy to keep their distance.

Animals are classified into groups according to their characteristics, such as mammals, birds, reptiles, amphibians, and arthropods. Look up these words in the dictionary. Which of these groups of animals is not featured in an article on this page?

Answer: reptiles



From the Valley to the Mountains...

Life Zones

Squoia and Kings Canyon are large, mountainous national parks. Elevations range from 1,500 feet above sea level to 14,494 feet on the top of Mount Whitney. Because of this steep landscape, there are three different life zones in the parks: foothills, mixed-conifer, and alpine.

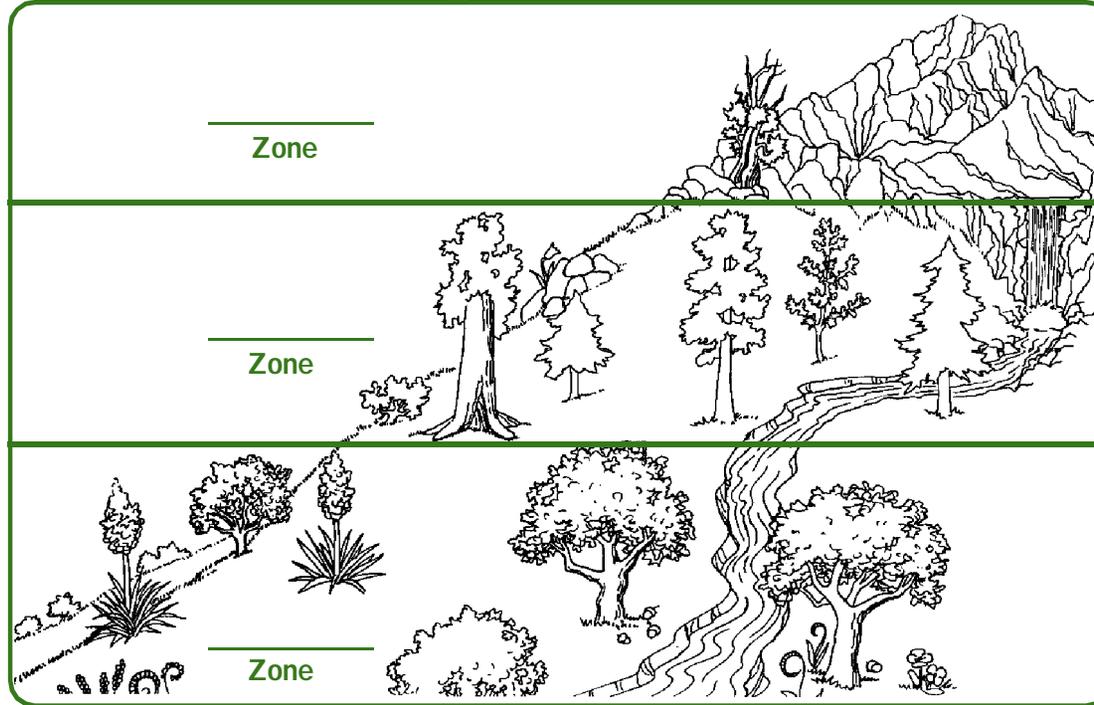
Elevation affects the temperature in these zones. In the foothills, summers are really hot. But on Mount Whitney, you might shiver from the cold in the middle of a summer day. In between the lowest hills and the highest mountains, the weather is less extreme.

Since hot air rises, why isn't it warmer as you go up the mountain? It is true that hot air rises, but as it goes up it gets thinner. When it thins out, it cools off quickly. Once it cools, it stays cold because it is a long way from the earth's surface, which holds warmth from the sun.

Precipitation (rain and snow fall) and vegetation (plants and trees) change with elevation, too. The foothills, between 500 and 5,000 feet in elevation, have mild, wet winters and dry, hot summers. The sun's rays in the summer make this area feel like a desert. Sometimes no rain falls for 6 months between May and October! When temperatures cool in the winter, roughly 26 inches of rain fall over this area. Most foothill plants are short and shrubby, except for the large blue and live oaks.

Above the foothills, between 5,000 and 9,000 feet, is the mixed-conifer zone. Conifers are trees that produce cones. Pine trees, firs, and sequoias are examples of cone-producing trees. This zone is located higher up the mountain where the air is cooler than in the foothill zone. Cooler air also means more rain and snow. Clouds often drop much of their moisture at this level. On average, 44 inches of rain and snow fall in this zone per year. Trees growing in this area are shaped to shed snow from their branches. Have you noticed their triangular shape?

The chilly alpine zone lies above the mixed-conifer zone. It covers the highest area of the park, between 9,000 and 14,494 feet. Rangers estimate that this zone receives 60 inches of rain and snow per year. Winter snow and ice melt slowly there and it's very windy. Harsh weather makes it difficult for many trees to survive because there is a short growing season. The ones that do survive are mostly small and oddly shaped. Once you get high enough, above 11,000 feet, even the smallest trees disappear. Only a few plants grow above this "tree line." Those that do are very short. They hug the ground so they can absorb what little warmth there is.



1 Color the life zone drawing as if it is late spring. HINT: Both the foothills and mixed-conifer are very green at this time.

2 Read the article below, *Where Do I Live?* Draw each plant and animal in its correct life zone above.

3 Read the article to the left, *Life Zones*, then label the three zones that are shown in the picture.

4 Unscramble: POATANTDA. This word is a feature of characteristic that helps a plant survive.

5 Draw weather symbols such as snowflakes, sunny faces, rain drops, or windy clouds, in each zone. Which symbol(s) fit best?

6 Which life zone would you most like to visit? On another piece of paper, write a poem about that area.

The Secret Lives of Plants

Plants need to be able to survive the harsh climates that exist in these parks. How do they do it? They adapt, or change slowly, to the conditions around them. "Adaptations" are the actual features or characteristics that help a plant survive. These adaptations might be in their size, shape, or color and they happen over generations. While we can see some adaptations with our eyes, we need a microscope to see others.

Without the right adaptations to a certain area, plants cannot survive there. Think of it this way: What if you took a plant from the ocean, like kelp, and transplanted it to the desert? Would it survive? No, because it does not have the right adaptations for such a different place.

What sorts of adaptations are necessary in Sequoia and Kings Canyon National Parks? Let's look into the secret lives of plants!

California Buckeyes

Buckeye trees live in the foothills zone. When it's really hot, their big leaves dry up and drop off the trees. Why? Broad leaves lose too much moisture in the hot foothills sun. Also, if the trees didn't drop these soft leaves, they would get scorched and die. In the winter when it is cooler, the trees grow their leaves back. There's also more moisture in the ground at this time to replace any that the sun evaporates.

Blue Oaks

Blue oak trees have small, thick leaves. Because they are small, there's less area exposed to the drying powers of the sun. These small leaves are also coated with a waxy layer. This wax helps to hold in moisture. Because of this, these oaks don't drop their leaves all at once. Blue oaks and buckeyes live in the same area, but they have two different adaptations for surviving the hot weather.

Evergreens

Evergreens live in the mixed-conifer zone. The name "evergreen" means just that—the needles stay green year-round. In a cold climate, where the growing season is short, being green all the time is important. Plants make their own food with the green cells in their needles and leaves. Since evergreens never lose all their needles, they can make food all year round.

Snow Plants

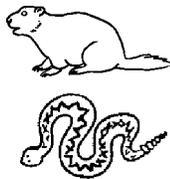
Snow plants aren't green or white. They're red! Without the chlorophyll of green plants that lets them make their own food, snow plants are parasites that take nutrients from other plants. They obtain this food with the help of a fungus that grows underground. Snow plants grow beneath the trees of the mixed-conifer zone at the very end of snow season.

Sierra Primrose

This flower, which grows in the alpine zone of the Sierra Nevada, has a large circle of leaves at its base. The leaves lie close to the ground to absorb warmth. They are also spread out so they can capture sunshine. Since the alpine areas have such short summers, this is necessary to help the plant make "fast food." Making food in a hurry is important when winter is lurking just a short time away.

Where Do I Live? – Animals

Yellow-Bellied Marmot
I'm furry and about the size of a house cat. I prefer cold weather. I can live in two zones so long as there are some plants to eat. Rocks are my home. I perch on them to get warm and sleep between their cracks at night. During the winters, I snooze in a cozy den.



Western Rattlesnake
Hot, sunny spots thrill me! Since I'm a reptile, I rely on the weather to keep me warm. I don't like to travel up too high. That is not to say that I don't get around. If the weather suits me and I can find food, I might cross from one life zone into the next.

Where Do I Live? – Plants

Common Madia
Grass and other flowers are my springtime friends. We like the winter rains that fall over our home. The summer sun is too hot for me. By the time it arrives, my flowers have dried up and all my seeds are scattered across the "low lands."



Blue Oak
I have broad leaves and I lose them in the winter when it gets cold. I do not have a waxy layer to protect me from the sun so I need more moisture than the blue oaks in the foothills. Large pines are my neighbors, but I don't like that freezing alpine zone!

Habitat

Habitat is the area where plants and animals find the food, water, shelter, and space they need. Plants and animals inhabit the life zone that provides the best environment for them.

Many birds live in the foothills where the weather is mild and there are lots of seeds. But pine martens, who live in old logs, are found in the mixed-conifer zone. Plants with the ability to conserve water can survive the heat of the foothills, while trees that can endure harsh winters are able to survive in an alpine habitat.

Preserving many different kinds of habitats is the best way we can help lots of wild animals and plants survive.





Who Protects the Parks?

Think of something that is very special to you and your family. What is it? Where did it come from? Do you lock it up for safety, or do you take it out and enjoy it?

Just like you, our country has treasures that it tries to protect.



Some of these places are large wilderness areas like Sequoia and Kings Canyon National Parks. Others are historical sites, like the Lincoln Memorial in Washington D.C., that help us remember the past. In all cases, we need to protect these places for the future while letting people enjoy them today. Who does this?

In 1916, the government created a group called the National Park Service (NPS) to work in these special places and protect them everyday. In Sequoia and Kings Canyon, about 175 people work all year and 200 more work just during the summer. Many of these employees wear a green and gray uniform with a flat hat that is easy to recognize.

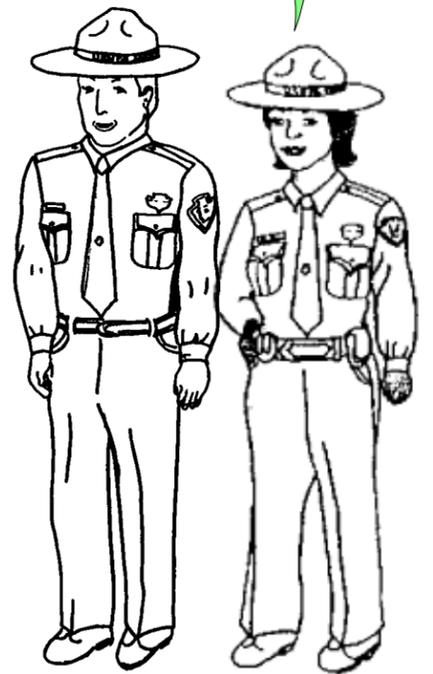
While many employees are called rangers, they all do different jobs. Naturalist rangers are like

teachers who give information to visitors. Visitor protection rangers are like police officers; they enforce the rules. Scientists study the resources of the park such as wildlife, plants, caves, water, fire and air quality so that we can learn how to best protect them. Maintenance employees collect trash from campgrounds so the parks remain beautiful. They also fix roads, buildings, and trails.

Some employees work at park headquarters handling the budget and buying supplies. The leader is the superintendent who makes decisions about how to manage the parks. The park also has partners that help run hotels, give tours, and sell educational books.

Everybody works together to protect the parks and help visitors enjoy them safely.

We help protect Sequoia & Kings Canyon National Parks!



Rangers Work in Far-Out Places

Quiet Wilderness

by Erika Jostad, Backcountry Ranger

During the summers, I work as a backcountry ranger near Mount Whitney, the highest mountain in the United States outside of Alaska.

To reach my ranger station, I walk on a mountainous trail for two days. I live at 10,500 feet above sea level. I have no electricity or telephone at my cabin. I use a bucket to get my drinking and bathing water from a stream. Before I can drink it, I must filter or boil it to kill harmful bacteria that might make me sick. Because I have no refrigerator, I eat food that does not need to be cold, like rice and beans.

Wild animals live near my cabin. Deer, eagles, coyotes, snakes, and marmots are my neighbors. Sometimes bears try to come inside my cabin when I am not home. To keep the bears from eating my food, I store it inside strong metal boxes.

The area I patrol is 100 square miles. That's the size of 60,000 football fields. Patrolling an area this big with no car or horse keeps me very busy. I never get bored.

Sometimes, I have to cut trees that have fallen onto the trails. When hikers get hurt or lost, I help them. If campfires escape, I

put them out.

I also keep track of where some animals live. Park scientists are very interested in frogs so I record how many I see and where I find them, as well as places where they should live but are gone.



To do my job, I must be able to read a map and use a compass. I also had to learn how to treat injured people. First-aid skills are important in the woods because there are no doctors nearby.

I grew up hiking with my family in national parks like Sequoia. That's when I first met and learned about rangers. They encouraged me to study ecology in college, so I could become a ranger one day.

It's an exciting job and that's why I like living and working in a national park.

Buried Caves

by Joel Despain, Cave Specialist

As the park's cave specialist, I work to protect the 200 caves that have been discovered in Sequoia and Kings Canyon. You could say that I first got into this when I was 13 years old and visited Wind Cave National Park in South Dakota. My brother and I found a small hole near our campground that led to a new cave. We told the park rangers about it so they came and explored the cavern with us. This experience made me want to know more about caves.

Caves are not scary places for me; instead they are exciting. They are just another habitat in nature waiting to be studied and understood. They occur where water has dissolved rock underground to leave tunnels and passageways. Dripping water inside caves creates fascinating formations called stalactites and stalagmites. Most of the "wildlife" that lives in caves are small insects and spiders that adapt to their cool, dark home.

Visitors that come to the parks can explore one place called Crystal Cave with a guide. You can walk all the way through this cave. Lights have been installed so you can see everything. In most caves, you must be ready to crawl

on the ground and even slither on your stomach. When I go exploring, I use special equipment such as ropes, a helmet, and a headlamp (a flashlight that attaches to my head). I also wear special booties so that I don't track dirt from outside into the cave. Such dirt could damage the slow-growing formations.

As part of my job, I visit the caves regularly to make sure that they are protected and that people are safe from the dangers inside. People mistakenly harm caves by touching delicate formations while others purposely break and steal them. Inexperienced cavers may easily become lost inside a cave without a guide. So, to prevent these things from happening, I install metal gates at the entrances to keep people from going into them alone. These gates are built carefully to keep people out, but allow animals such as bats and bugs to come and go freely.

I also make maps of caves. We suspect that many caves in the parks have passages that have not been fully explored. This is my favorite part of the job. It is exciting to explore a place where no one else has been. Not many people have jobs like mine!



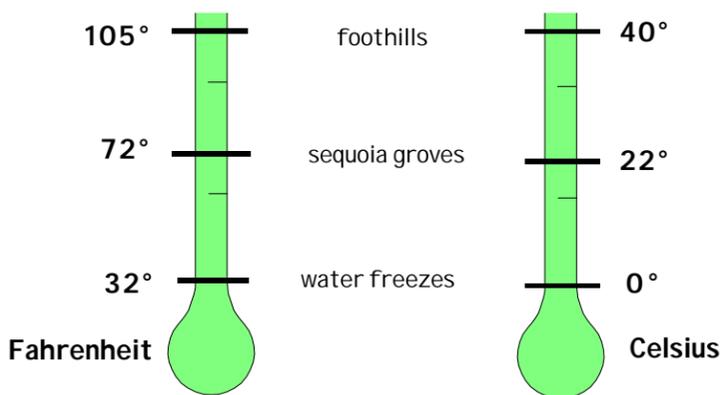
Eye to the Sky

Two Thermometers

In the United States, temperatures are measured on a scale called Fahrenheit. Most other countries use a scale called Celsius. Imagine that the thermometers below are both measuring temperatures in the parks on the same day. One gives temperatures in Fahrenheit (F), the other in Celsius (C).

In the sequoia groves, if it is 72°F, what is the temperature in Celsius?

In the foothills, if it is 40°C, what is the temperature in Fahrenheit?



Weather – High & Low

Why is it important to have t-shirts AND jackets on a visit to Sequoia and Kings Canyon National Parks? Because weather in the Sierra varies depending on elevation. You could start your summer day down in the foothills where it is 105° Fahrenheit and drive up to the giant sequoia trees where it is only 72°. That's a 33° change in a one-hour car trip! During spring, the sequoias usually have snow on the ground, while the foothills have wildflowers and green grass.

Rangers take measurements at small weather stations located around the parks. They measure temperature, rainfall, and snow fall. This information is important in many ways.

If rangers know that not much snow has fallen in the mountains, they know that backpackers will be in the mountains earlier in spring because trails will be snow-free. Road crews also pay close attention to snow fall so they can keep the park road open and safe for visitors.

Many towns and farms outside of the park depend on melting snow to feed the rivers they use. Rangers inform towns in the valley below about the amount of snow, so that they can predict how much water they can expect from rivers the next summer.

Keeping an eye on the rainfall helps rangers to predict floods. Heavy rains can wash bridges away, causing roads and trails to close. Mud and rock slides may occur, too.

Rainfall information can also help rangers predict the chances of wildfires. A large amount of rain in the winter often means a busy fire season. Why? Rain makes the grass grow tall. Later, when temperatures get hot, these tall grasses dry out quickly and die. Plentiful dead grass allows unplanned fires to race up hillsides.

Rangers keep an eye to the sky so visitors can enjoy the parks safely. On your trip to the park, be ready for all kinds of weather!

What's that Junk in the Air?



Mountain views should be clear in a national park, right? That doesn't mean that they always are. There is a lot of "junk" in the air and the parks can't keep it out! What is this junk? It's pollution.

Car exhaust from cities causes 60% of the problem. When exhaust is exposed to sunlight, it goes through a chemical reaction and forms a poisonous gas called ozone. This ozone, caused by pollution, lies close to the surface of the earth where it can be very destructive. This is different from the natural ozone layer high up in our atmosphere, which helps protect us from the harmful rays of the sun.

Factory exhaust, power generators, and dust add to the car exhaust to make a brown haze in the air. This smoggy haze does not remain in one place. Wind can blow the smog inside the parks where it blocks mountain views and even damages plants. Studies show that nearly 40% of the Jeffrey and ponderosa pine trees in these parks have been hurt by the ozone found in smog. Sequoia seedlings are injured, too. The ozone injures plants and makes it harder for them to make their own food.

What does it do to us? Ozone can cause permanent damage to our lungs. It may cause our throat and eyes to sting and it can even make our chest hurt.

If you want to help plants and your own lungs, use less electricity and buy fewer things that require combustion to make. The more we buy, the more exhaust factories make. Recycle or reuse the things you do buy. Walk, ride your bike, or carpool whenever you can, whether you are in the parks or at home.

It's our air and it's our junk in it. Let's be responsible and do what we can to clean it up. We can make it better!

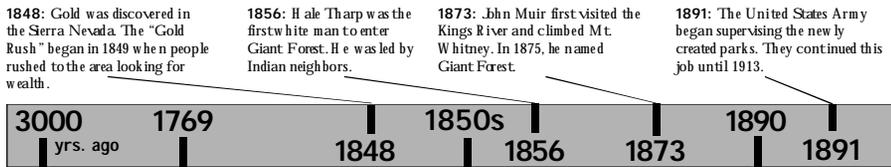
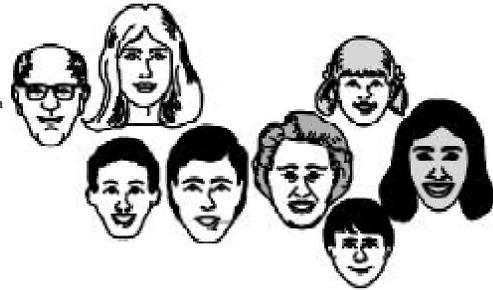


People: Yesterday...

The story of Sequoia and Kings Canyon National Parks includes many people with different customs, jobs, languages, and ideas. Over the centuries, Native Americans, Spanish explorers, and European-American settlers lived in or traveled through the Sierra Nevada. Within these groups, a few individuals stand out as important characters in the story: a Scottish conservationist, a local newspaper editor, an African-American army captain, and a park superintendent. This diversity, or variety, is what makes the history of these parks so rich. All of these people contributed their individual talents, which shaped the character of this region.

The National Park Service wants to remember this diversity and make sure it continues in the future. Today's students, including you, are the most important part of this goal. As you grow up, you have the power to become part of the parks' continuing story. First, use your skills as a detective to discover the wonders of the national parks. Visit and read about as many places as you can. Study subjects in school that you find interesting. Then, whether you are an American with ancestors from China, Mexico, England, or Kenya, you can be a ranger and help protect our country's special places.

Look at the time line below to understand the sequence of events at Sequoia and Kings Canyon National Parks. Read the stories in order to learn more about the special people that made the events happen. What events do you think will be added to the time line in the future? Will you be an important character in Sequoia and Kings Canyon's future story?



Native Americans

For at least 3,000 years before Europeans settled in the Sierra Nevada, Native American tribes made these mountains their home. In the foothills, groups from the Western Mono tribe, such as the Potwisha, Wakaschi and the Wobonuch, hunted and gathered food. Smooth, deeply carved holes in the rocks are grinding stations, called mortar holes, where women crushed acorns into flour for food. Rock paintings, called pictographs, also decorate the rocks.

Spanish Explorers

In the 1700s, the government of Spain claimed the land that is now the state of California. As a Christian country, Spain wanted to expose the Native Americans of the area to their religion. In 1769, they began building missions, or large churches, along the coast. Many Native Americans were forced to live and work in these missions. In 1772 and 1776, the Spanish colonists moved inland and explored the large central valley. Fray Pedro Font, one of these men, named the *Sierra Nevada*, which means snowy, jagged mountain range. More Spanish explorers in 1806, *founded rio de los santos reyes*, today known as the Kings River.



Exploiting the Land

Settlers moved to the Sierra Nevada in the 1850s looking for ways to make a living. Many of them did not realize, or did not care, how their activities would change this beautiful land. Sheepherders brought thousands of sheep to the mountains where they could eat grass in the meadows. Hale Tharp pastured cattle during the summers in the Giant Forest starting in 1861. Loggers rushed to cut down giant sequoias for timber.

Preservation

While most people were only concerned with business, a few people worried about protecting wilderness.

Captain Young

John Muir was born in Scotland in the 1800s and moved to Wisconsin with his family when he was eleven. Muir traveled widely, mostly on long hiking trips. It is "wanderings" gave him a great appreciation and love for nature from the east coast to Alaska. In California, he climbed mountains, observed plants, and visited glaciers. Muir was unhappy that people were cutting down giant sequoias and building dams in valleys. So he went into action. Using his knowledge about nature, he wrote articles for new newspapers that inspired folks everywhere. George Stewart was a local man who also educated people. For his newspaper, the *Visalia Times Delta*, Stewart wrote many articles about the mountains so close to their town. Since many people living in the Central Valley were farmers, Stewart made sure they knew that the water they needed for their crops came from those mountains. As a result of Stewart and Muir's hard work, Congress created Sequoia and General Grant (now called Kings Canyon) National Parks in 1890.

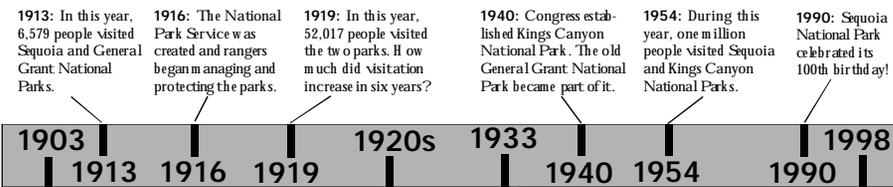


... Today & Tomorrow

Where did that name come from?

- | | |
|----------------------------|---|
| 1) Sierra Nevada | A) Native American word for small edible nutgrass |
| 2) Potwisha (campground) | B) Spanish phrase for "River of the Holy Kings" (Kings River) |
| 3) Rio de los Santos Reyes | C) Spanish for "snowy, jagged mountain range" |
| 4) Taboose (Pass) | D) Name of Paiute (Native American) chief |
| 5) Alta (Peak) | E) Spanish name for "Tall" |
| 6) Chagopah (Falls) | F) Name of a Western Mono (Native American) group |

- Q (9)
- E (5)
- V (7)
- B (8)
- J (2)
- C (1)



Captain Young

Before the National Park Service was created, the United States Army protected parks across the country. In Sequoia, one army captain really made a difference. Born in Kentucky during the Civil War, Charles Young was the third black man to graduate from West Point military academy. He is career progressed and he commanded a group of black soldiers called a cavalry company in San Francisco. In 1903, he was instructed to take his men to Sequoia National Park for the summer where he would be the acting superintendent. Young and his men arrived in Sequoia after a 16-day horse ride to find that their major assignment would be to finish building a wagon road to Giant Forest. Even though other military superintendents had tried, they had not made much progress on the road. With Young's determination, dirt and rock began to fly! By the end of the summer, the road was finished and even extended to Moro Rock. The road is still in use today.

More & More Visitors

With the completion of Captain Young's wagon road, more and more visitors were able to come to the parks. In the 1920s, after World War I, the economy in the United States was very strong and people had more time and money to travel. The growing popularity of automobiles made it easier to get around. In 1926, the first paved road for cars, the Generals Highway, was completed from the foothills to Giant Forest. Under the leadership of civilian park superintendent Colonel John Roberts White, the park built many new facilities underneath the sequoias in Giant Forest. While the campgrounds and hotels were very popular with all the new visitors, White started to worry about how the development would affect the Big Trees. White brought in scientists to study the problems and found that the roots of the trees are harmed by buildings and roads. Even though it was unpopular at the time, White suggested removing the buildings for the sake of the

The C.C.C.

After the prosperity of the 1920s, the United States entered a time called the Great Depression. Many people could not find jobs and could not afford to buy food for their families. The President at the time, Franklin Delano Roosevelt, wanted to help people so he created the Civilian Conservation Corps (CCC), which provided jobs to thousands of men. The men earned \$1/day building things that the country needed. Sequoia National Park, as well as other national parks, benefited from many CCC crews. They built trails, roads, and ranger stations. The famous sign at the entrance to Sequoia was also made by CCC workers.



Restoring Giant Forest

After almost 75 years, the National Park Service achieved former Superintendent White's dream—to remove all overnight facilities from Giant Forest. The grove, one of the main resources the park was set aside to protect, was taking second place to the small city that was built underneath it. Park employees and visitors both agreed that something needed to be done. It took many people to carry out the restoration. Demolition crews dismantled close to 300 buildings and ripped up asphalt parking lots. Workers replanted native plants in the disturbed areas. Plans were made for the old market to become a Giant Forest Museum. Now when you visit Giant Forest, you will be able to see what the grove looked like one hundred years ago. As you enjoy this special grove, think of the people who came before you and made a difference in these parks.





Yes, You Can Make a Difference!

People think rangers protect the parks just for them. Though rangers try to protect the parks for today's visitors, they must also look ahead and try to protect them for future generations. That's why everyone's help is needed if our national parks are to survive.

No matter where you live, you can lend a ranger a hand. Below, you'll find a list of projects you can do to help our environment.

You can start by remembering that we are all connected. The air that surrounds us is OUR air. The earth beneath our feet is OUR home. Water that flows in rivers is OUR water. Take pride in our resources. Conserving things at your own home is important, too.

Conservation is hard work. It takes time. It's also one of the best things you can do for our parks. So, if you're ready to pitch in at home, here's what you can do to be a park helper:



1. Start a recycling project at your school. Put out boxes for newspaper, white paper, aluminum cans, plastic, and glass. Use both sides of a piece of paper before you throw it in the box. Use lunch boxes and reusable containers instead of paper bags and soda cans. When the boxes are full, have your teacher deliver them to a recycling center near your school.
2. Help your parents recycle their newspapers. If we recycled 1/10 of all our newspapers each year in the United States, we could save 25 million trees! One ton of recycled papers also helps to save about 7,000 gallons of water, as water is used to make new paper.
3. Conserve energy at home. Americans use more energy than any other country in the world. Producing this energy creates pollution. To save energy, turn off lights. Hang your clothes to dry on a line outside instead of using the dryer. Close doors so heat doesn't creep outside. Wash your clothes in cold water because it takes energy to make water hot. Turn off the faucet while you brush your teeth.
4. Read "Earth Book for Kids" by Linda Schwartz or one of the other books available in the park visitor centers. They will give you even more conservation ideas.
5. Visit some of the more than 370 units of the national park system. When you are there, ask about being a Jr. Ranger. Many national parks have programs that allow you to participate in park activities, learn something fun, and earn a patch or badge to wear proudly at home.

One person can make a difference,
and that one person can be you!

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Word Search

Clues for the word search puzzle are found below. The words may be horizontal, vertical, diagonal or backwards! If you are stumped, read the articles again. How many answers do you know without looking back?

1. California _____ lose their leaves when it is hot.
2. Spanish name for mountain lion (begins with "P")
3. Little sequoia _____ are injured by ozone.
4. _____ do many different jobs in the parks.
5. Mount _____ is 14, 494 feet tall.
6. _____ is a poisonous gas that pollutes our air.
7. _____ Americans used grinding holes to prepare food.
8. Where an animal lives is called a _____.
9. Captain _____ and his men built the first wagon road to Giant Forest.
10. Plants must _____ to the environment that surrounds them.
11. _____ cones are the shape and size of a chicken egg.
12. _____ affects the temperature in an area.
13. Trees lose moisture through their _____.
14. Underground rooms where water has dissolved rock are called _____.
15. _____ sleep in dens during the winter.
16. _____ burns are planned by fire managers. They are lit to remove fuel and restore forest health.
17. Sequoias are the largest trees by _____, not by height.
18. Sequoia and Kings Canyon are _____ parks.
19. The _____ life zone has small oddly-shaped trees and long, cold winters.
20. _____ are jumpy critters that are disappearing around the world.



National Park Service
Sequoia & Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651



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