

Self- Guided School Tour

Welcome to the North Grove of Giant Sequoias at Calaveras Big Trees State Park. Please use this guide anyway you chose. This guide was created specifically for school tours to give you some information about the giant sequoia trees and the human impact on this area. We have eliminated some stops and condensed the information to meet time and students interests. The phrases in bold are questions or activities that help demonstrate concepts or add interest for students. This guide can be used going forward or backward on the trail.

The Trail

The trail through the North Grove is a gentle, well-marked loop about 1.5 miles long. Look for the numbered trail markers that correspond to the numbers in this guide. Allow one and a half to two hours for your walk through this magnificent, historically significant grove.

Before you start share this information with your students.

On this trail you will be walking among the world's largest living trees. Since the beauty of the North Grove is enjoyed by thousands of people every year, your help is needed to protect the Big Trees and their environment in these ways:

- Stay on the established trails and boardwalks. This protects the shallow sequoia root system from erosion and soil compaction.
- Do not climb on the trees. The protective bark is easily damaged.
- Leave all natural objects where they are found. Seeds from pine cones are an important food source for squirrels, and even a twig is important in returning nutrients to the soil.
- Take all litter with you. Litter is not only ugly, it also is harmful to wildlife.

As you begin the trail you can tell the story of the Discovery Tree. (Stop by the sequoia tree next to the amphitheater to tell the Gus Dowd story)

In the spring of 1852, a backwoods hunter named Gus Dowd was chasing a wounded grizzly bear in an unfamiliar forest. Suddenly he was stopped in his tracks by an astonishing sight, a tree of monstrous proportions that was easily three times larger than any he had ever seen. After spending the rest of the day exploring the area he returned to Murphys where he told his friends of this wonderful discovery. Gus was a colorful character and his story of the big trees was not immediately believed, but he finally coaxed a group of men to make the trip to see the tree for themselves. Almost immediately visitors began traveling up the rough trail to what became known as the Calaveras Grove.

What do you think the discovery tree looks like now? Let's walk on and see.

At the Big Stump

In 1853, the year after Gus's discovery the very tree he had first seen was stripped of its bark and felled by ambitious speculators. Since no saw was large enough, the tree was felled with other tools of the era -- long handled pump augers (drills) and wedges. You can see the grooves made by the augers on the fallen part of the tree. It took five men 22 days to drill all the holes, but the perfectly symmetrical tree did not fall for several days. The bark was assembled into the original form of the tree for a traveling exhibit, but was destroyed by fire one year later.

The stump was smoothed and served as a dance platform. A two-lane bowling alley was built on the fallen trunk. When its rings were counted the Discovery Tree was found to be 1244 years old when it was cut down, relatively young for such a large sequoia. **How do you feel when you think about people cutting down this amazing tree?**

From the top of the Big Stump look at the large sugar pine that is growing between the stump and the huge piece of the tree we call the chip - **How could the Discovery Tree have fallen and left that big sugar pine still standing?**

As you continue on the trail look at the fallen log to right, it is where the two-lane bowling alley was built. **As you walk beside the log count how many steps long the log is (you can compare the steps to your classroom or playground when you get back to school).**

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Giant sequoias (also known as Sierra redwoods) are the largest trees in volume in the world. They have a number of special adaptations that help them grow so large and live so long. We will look at a number of those adaptations as we walk.

After you pass stop #2 be sure to stay to the left on the North Grove Trail

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Falling over is one of the few things that can kill a giant sequoia tree. If the trunk is weakened by a large burn scar or if the root system has been affected by erosion, insects or fungus, a tree can topple in a heavy wind. One of the sequoia trees special adaptations is its roots which extend only three to six feet under the ground and can grow as long as a football field in every direction. The roots intertwine with the roots of other trees and this helps give the tree stability. The smaller feeder roots collect water and nutrients from the rich Sierra soil to support the growth of these huge trees. These trees' roots were possibly damaged by water erosion or fungus because this area of the grove is very damp. **Look back at tree #3** Giant sequoias are very well balanced as you can see by looking at this symmetrical, straight tree. Their trunks have wide bases to give them even more stability. **Try standing with your legs together. What would happen if someone pushed you? Now try standing with your legs slightly apart, would you still be as unstable** (The wide trunks help stabilize the trees like standing with your legs spread apart gives you more stability).

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Giant sequoias are the largest living things on earth. Though there may be taller trees in the North Grove this tree has the greatest mass. The diameter at the base is 30 feet and the tree could weigh as much as 18 blue whales. Another special adaptation of the sequoia that contributes to its long life span is its soft fibrous bark. The bark often grows to be two feet thick, lacks flammable pitch, and contains high amounts of the chemical tannin, thereby providing effective protection from fire and insects. Look up the trail to the next tree, notice how it twists to the right. Spiral growth is a common characteristic of trees, although bark patterns often hide this fact. Trees with spiral growth are more flexible, and therefore better able to withstand wind stress and snow loading. **Think about other places you see spiral growth in nature?** (sea shells)

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Turn around and look back down the trail and then up to see the tree standing on the hill. The massive gnarled branches tell us this tree is quite old. A giant sequoia keeps growing bigger around, and as it gets older, it doesn't have energy to support the growth of a top. The top of this tree has died and will eventually be knocked off by wind, lightning or snow leaving the mature tree with a rounded crown that looks a little like broccoli. The giant sequoia drops its lower branches as it gets taller because it only needs the branches at the top get sunlight to use in the photosynthesis process. The fact that the lower branches are dropped is also an adaptation that helps the sequoia to better withstand occasional fires because there are no branches that can form a fire ladder to top of the tree. **Notice how the woodpeckers have chosen a particular section of bark in which to drill their hole. If the sequoia bark is 12-24 inches thick why would a woodpecker try to find food in its bark, and why would the holes go in a line up the side of the tree?** (could be due to previous damage to the tree that has resulted in thin bark growing in this area)

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The display panel at this stop describes the variety of life that is found in the sequoia. Walk to the reclining bench and look at the two trees named the Mother and Son because of their difference in size. **Which of these trees is older? The mother (the big one) or the son (the small one).** They probably began life at about the same time. The mother has been more successful because it has grown where it receives more sun and as it is bigger its roots probably are larger and able to collect more water and nutrients. The son is in the mother's shadow most of the day and has also lost much of its top to wind or lightning. The growing conditions were better for the mother than the son. Look on the ground around the bench for giant sequoia cones. They are about the size and shape of an egg. Inside there are more than 200 seeds that look like flakes of oatmeal. After they mature, the cones can stay on the tree over 20 years until they are acted upon by some outside agent, such as fire, wind, snow, harvesting by chickarees (also called Douglas squirrels), or insect activity. A large tree may bear as many as 40,000 cones at once, opening about 1,500 each year.

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The Father of the Forest fell to earth hundreds of years ago when Native Americans were the only ones who had seen the giant sequoias. The process of decomposition occurs very slowly in sequoias because of the tannin in their heartwood. You can think of this tree as a huge time release vitamin capsule, slowly replenishing the soil. Like a giant planter box, it has made an excellent seed bed for mosses, shrubs, and dogwoods. **Walk inside the tree and see if you can figure out what caused it to be hollow. Then look at the fallen tree and see how many different plants are growing there**

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The large growths on these trees are called burls. They form in response to disease and injury. This group also has been affected by fire. Fuel often builds up between closely growing trees, causing large burn scars when ignited. The bark will grow over the fire scar and eventually cover it up. **As you walk forward on the trail look for a tree that might have a sad story.**

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This tree has a very sad story, but something good came out of it for giant sequoia trees and the modern environmental movement. The huge blackened snag that stands in front of you is a

symbol of greed and thoughtlessness and is the second tree you have seen in the grove that was severely harmed by human activity. In 1854 the "Mother of the Forest" - so named for its beauty and size--was stripped of its bark. **What do you think happened to it after the bark was stripped?** Since the inner bark carries manufactured sugars throughout the tree, the tree could not survive for long with this layer removed. Promoters schemed to ship the bark strips back east for reassembly at exhibitions in New York and London. Once there, the tree's outer trunk was displayed to the fascination of paying crowds that numbered in the thousands. While some were eager to see the bark as evidence of the Sierra Nevada big tree, others were outraged that trees were being killed. Many condemned the event as an act of sheer vandalism. It was through the Mother of the Forest's sacrifice that a heightened awareness about the need to protect these trees was born. Ultimately giant sequoias were saved and now there are 75 groves of protected giant sequoia trees, all on the western slope of the Sierra Nevada mountain range. **As you look at the tree what else do you think happened to it?** With the outer layer of protective bark gone, the tree lost all its resistance to fire, as can be seen by the wood charred in a fire that came through the grove in 1908. As we walk **Look at this tree, do you think fire is good or bad in the forest?**

16 (If time permits you can follow the arrow on 16 around to look at the younger sequoias) You are now in an area that was burned in the 1908 fire. The fire created ideal growing conditions for giant sequoia seedling and today there is a healthy stand of young sequoias here. Many of these trees are the result of natural regeneration that happens after a fire. Giant sequoias evolved in the presence of fire; they have not only adapted to it, but depend on it in several ways. Heat from fire causes cones to open and release their seeds. Fire clears the ground of duff, litter, and brush, so the tiny seeds can reach mineral soil and receive plenty of sunshine. At one time, before Euro-Americans came here, fire went through the forest every 20-30 years and the forests were healthier. **Now do you think fire is good or bad for the forest?** (Both forests need small fires to clear out duff, brush and small trees, but big catastrophic fire are very dangerous) As you walk look for the reddish bark and feathery juniper like foliage of the young giant sequoias.

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This old road is a side route of the Carson - Emigrant Trail. Snowshoe Thompson sometimes used this route during the 20 years of carrying mail from Murphys to Carson City. During the winters of 1856-1876, he regularly skied 90 miles over the Sierra Crest carrying 60 lbs. of mail and little else. **Do you think you could do that?** This is also called the old Camel Trail, as a group of nine Bactrian camels imported from Mongolia passed through in 1861 on their way to Walker Nevada. **What do you think people thought when they saw camels walking through the forest.**

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The display panel shows the three different types of redwood trees. From here you have a view into the heart of the grove. Some of these trees have been here for thousands of years. **How many giant sequoias can you see from here?** The fossil record of ancestors of redwoods dates back 180 million years to the age of dinosaurs. **Imagine what a forest like this would look like with dinosaurs walking around.**

21. This fallen tree is the third tree in this grove impacted by Euro-Americans. The Calaveras North Grove was a popular destination for tourists starting as early as the late 1850s. When the Wawona Tunnel Tree in Yosemite was carved out in the 1880s, the owners of the North Grove responded by doing the same to this tree in hopes of increasing the number of visitors. The Pioneer Cabin Tree chosen, because of its extremely wide base and large fire scar. It is the tree that most people ask about when they visit the park and has been alive since the 1880's. Until the winter of 2017 one branch was keeping the tree alive.

On January 8, 2017, heavy rain caused the soil at the base of the tree to liquefy. The roots pulled up and the Pioneer Cabin Tree fell and shattered. The tree will be left where it is. **Why do you think the state park leaves fallen trees instead of clearing them?** It will decay and return its nutrients to the soil, completing the tree's life cycle and providing nourishment for new trees. Fallen trees provide food and shelter for many forest animals.

26.

The platform was built near this group of sequoias so you can have a close-up view of these ancient trees. **Can you remember some of the special adaptations that the giant sequoia has that help it live so long?** As you walk on the ramp, gently touch the bark. **What words would you use to describe how the bark feels?** Then touch the tree at the bottom of the ramp. **Do they feel different?**

We hope you enjoyed your visit to this amazing place and we would like you to take some thoughts home with you.

- In the nineteenth century when these trees were discovered people viewed nature as vast and unending. They didn't worry about how they treated our natural resources or the impact of that treatment on future generations. **Is that how we in the twenty-first century should look at nature? How do we really feel about nature and the exquisite beauty it offers us?**
- The Native Americans (Miwok, Washoe) lived here for 12,000 years and had very little impact on the giant sequoias. Euro-Americans have known about the giant sequoias for only 160 years and have impacted them greatly. **What can you do to ensure that these trees are still here for your children and grandchildren to enjoy?**

Things to Look For as You Walk

Chickarees - a small energetic squirrel. Giant sequoia cones, not the seeds are a major food source for the squirrels, which either eat them while on the tree or harvest and store for later use. An active squirrel was once observed chewing off 538 cones from a single tree in 31 minutes.

Bane berries- are red berries you see in the summer and early fall. They are said to be poisonous. The miwok's had a variety of medicinal uses for the roots and berries.

Pacific Yew - is a medium size evergreen tree. You can see one at stop 9. The bark of this tree contains a chemical called Taxol which has been used in the treatment of cancer.

The large cone you see is the cone of the sugar pine. It has a very sticky sap so its best not to pick one up