

LESSON 1

Healthy Forests, Healthy Planet



This lesson can be completed in the classroom or at home. Your teacher will explain to you how to participate in assignments and group discussions if you are completing the lesson at home.

Today's Topic: Healthy Forests, Healthy Planet

Introduction to Our Forests

Watch the video, [Healthy Forests, Healthy Planet](#), to start your exploration of California's forests. As you watch, think about the different types of areas you see in the forest. Also make note of all the living things you see. Discuss with your class forests you have seen in real life, in movies, and on television. Finally, discuss with your class the characteristics that make an area of land a forest.

Read and Respond

Read the passages below about forests, then discuss with your group what you learned. Follow your teacher's instructions about how to be part of these group discussions.

Our Forests

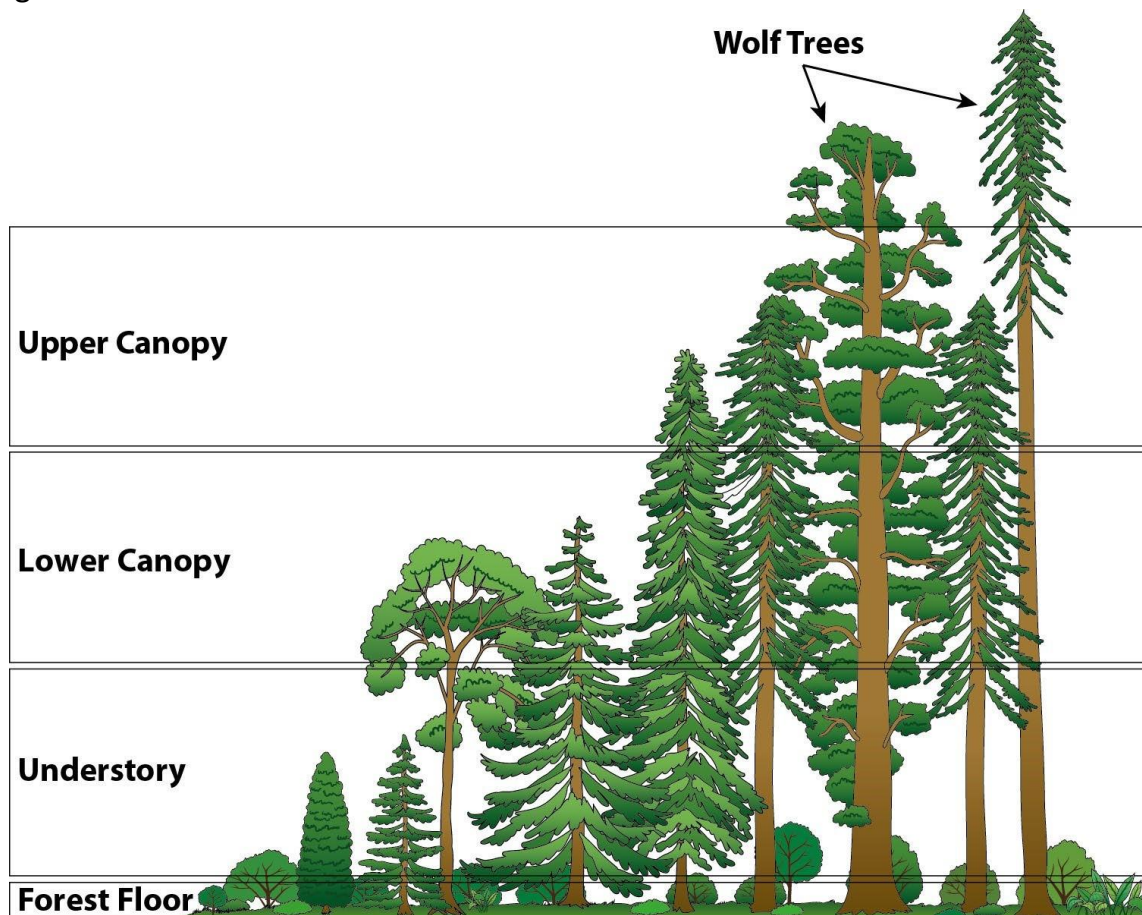
What is a forest? The first thing that you may think of is trees. Forests have many types of trees that come in lots of different sizes. Trees can grow very large as they get older. California is home to the largest trees in the world. Trees are not the only plants that grow in a forest. The forest is an ideal habitat for smaller plants and wildflowers too!

In California forests, some trees grow higher than the rest. These trees stick out over the other trees. These trees are called the **wolf trees**. These trees are usually larger than other trees in the same area. The smaller trees are newer in the forest. The layer of tree tops that the wolf trees stick out above is called the **canopy**. This layer is where the tops of most of the oldest

and tallest trees are found. Trees in the canopy get the most sunlight and provide shade to all the other parts of the forest.

The layer beneath the canopy is called the **understory**. Here, the tops of plants and new, younger trees can be found.

The lowest layer of the forest is the **forest floor**. The forest floor is where dead plants, leaves, and other decaying matter are found. It is also where plants, bushes, and flowers grow and where many animals roam. The forest floor also has rich soil perfect for new trees to start growing!



The Layers of a Forest

The forest is home to many types of animals. There are birds, lizards, deer, elk, bears, and many others. Bugs and insects also live in forests. **Fungi** are another important part of the forest. They are a different type of living thing. Mushrooms and mold are types of fungi. Fungi break down dead things to help make the soil rich with nutrients. Fungi can grow on the forest floor or on the trunks of trees. All of these types of living things rely on resources the forest provides.

Forests provide a number of things people need including water, wood, food, and shelter. Other less obvious things made with wood products are nail polish and LCD screens! You can learn more about wood in our lesson “Wonderful Wood – Nature’s most Adaptable Renewable Resource.”

Forests are also important to the environment. Forest trees act as natural filters to remove harmful pollutants from the air and water. Trees and plants help clean the air by taking in carbon dioxide. This helps reduce the impact of greenhouse gases on the planet. Trees also produce oxygen, which people and animals need to breathe.

How Forests Are Managed

California has many forested areas. People are very protective of these areas. After all, most people living in the state use the forests in one way or another every day. Forests provide over half of the available fresh water for the state. Most of the rivers and streams that people use start in the forests. The forests provide places for wildlife to live. Forests also help clean the air. They do this by removing large amounts of carbon dioxide out of the air. They also provide the oxygen that people breathe.

To protect the forests, California lawmakers have put in place laws and action plans to properly manage the forests. These laws try to reduce the impact of wildfires, habitat destruction, and changes in climate. The action plans have details about how to restore areas that have been burned or cleared. When forests are cleared the trees are cut down. The population in California continues to grow. People cut down trees to make space for houses and other buildings. California grows more trees than it cuts down. Close to 75% of all wood needed in California comes from other areas like Oregon, Washington, and Canada. This helps to keep the forests in the state growing strong.

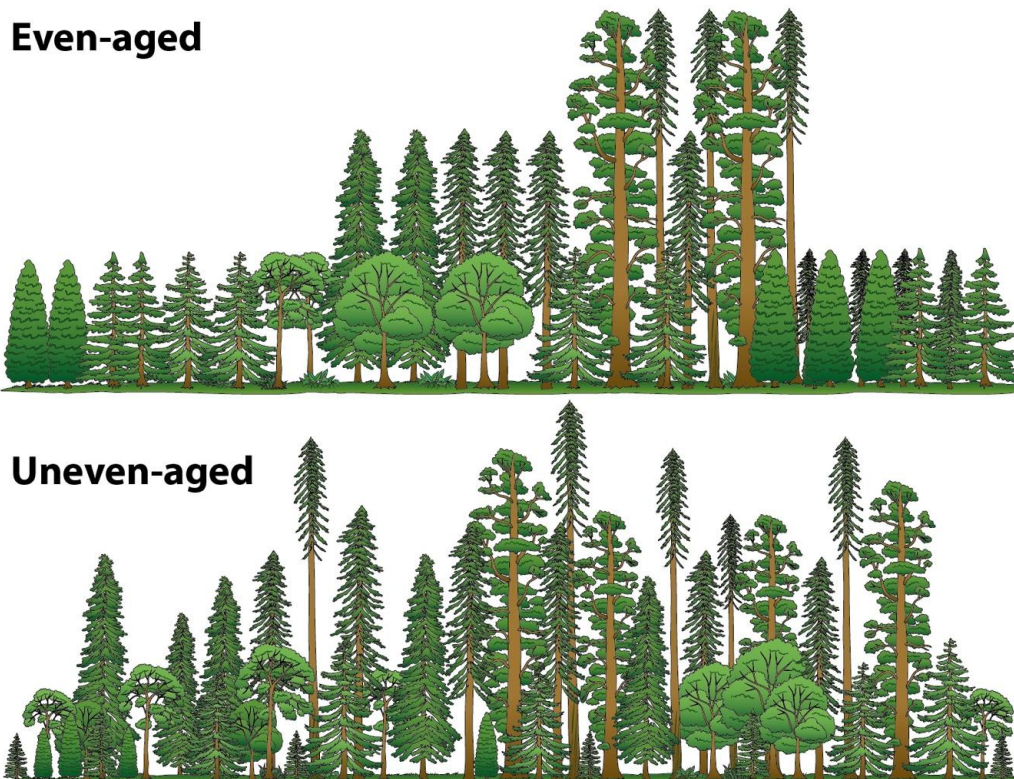
Protecting the soil in forests is extremely important. Forests help prevent **soil erosion**. Soil erosion is when the top layers of soil are washed away by rain or wind. The top layers of soil are where most of the nutrients are found that plants and trees need to grow. When a forest is managed well, soil erosion is more controlled.

Wildfires are also a problem in California. Less rainfall and warmer temperatures have made fires stronger and happen more often. Large areas of forests can get destroyed during a wildfire. One way that people try to prevent large and uncontrolled wildfires is to use **controlled burns**. This is when areas of the forests are burned on purpose to help keep the forest healthy and prevent larger wildfires. These controlled fires burn away the dry brush on the forest floor that can easily catch on fire. Using controlled burns to remove the brush on purpose makes it less likely for large fires to be as destructive.

Another way that forest managers prevent forest fires is by maintaining low **forest density**. Forest density is the number of trees that are found in a certain area of land. Forests that have high density have a lot of trees. A forest's density can be maintained by cutting down some trees to reduce how many trees are in an area.

Cutting down trees may seem like a bad idea, but this process actually helps to keep the forests healthy when it is done properly. **Harvesting**, or cutting down trees, helps to remove dead trees and reduce fuel in case of future wildfires. Forest managers must be careful when selecting trees for harvesting to prevent **deforestation**. Deforestation happens when too many trees are harvested by people or are removed by natural events such as wildfires. **Reforestation** is the process of replacing trees and plants in areas where they were harvested or destroyed in some way. As part of the forest management process, reforestation takes place within 12 months. This helps the forest grow and stay healthy.

Forest managers use harvesting methods to manage forests. Trees can be harvested individually or in groups. **Even-aged forests** have trees that are all similar in age. When trees are harvested in this type of forest they are cut down in the same area at the same time. Another type of forest is called an **uneven-aged forest**. Uneven-aged forests have trees that are different ages. Trees are harvested individually throughout the forest instead of in certain areas. How the forest is managed depends on the forest owner's goals.



Even-aged and Uneven-aged Forests

Everyone can help protect forests from fires by being careful when using fire near or in forests. Visitors to a forest should be extra careful when lighting a campfire and be sure to put it out before leaving. You can learn more about the impact of fires in the lesson “Fire and California Forests.”

A healthy forest is an ecosystem. Healthy forests are able to grow and resist diseases and damage from pests like insects. **Resiliency** is a word used to describe how forests are able to recover from fires, clearing, and other damaging events. Resiliency means being able to recover after a disturbance. Forests with a high resiliency are able to recover quicker and stronger than forests with a low resiliency. Forests are managed to be able to keep providing resources and habitats for one generation of people and living things to the next.

Types of California Forests

Scientists group trees in many different ways. One way they can be grouped is **coniferous** or **non-coniferous**. Coniferous trees are trees that make cones. Pine, fir, and cedar trees are some types of coniferous trees. Non-coniferous trees, such as oak trees, lose their leaves in the fall.

Scientists also group trees as **deciduous** or **non-deciduous**. Deciduous trees lose their leaves, which are often flat and wide, all at once, leaving the tree bare. Oak and sycamore trees are some types of deciduous trees. **Non-deciduous** trees, such as the California pepper tree and southern magnolia, keep their leaves year-round.

Coniferous trees are sometimes called **softwood** trees. The leaves on softwood trees often look like needles. Pine, fir, and cedar trees are both coniferous and softwood trees. **Hardwood** trees, on the other hand, produce flowers. Oak, maple, and walnut trees are some examples of hardwood trees.



Softwood Leaves



Hardwood Leaf

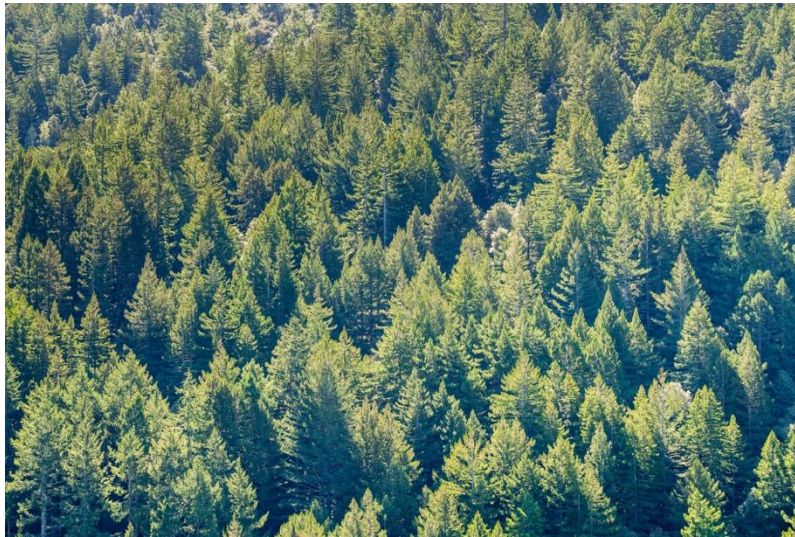
These plants can be found in the five main types of California forests. These are coast redwood, Douglas-fir, mixed conifer, oak woodland, and true fir. There is a sixth type of treed ecosystem in California called **chaparral**. This area is not technically a type of forest. Instead, it can have a combination of trees, shrubs, and grasslands.

Redwood Forests: The coast redwood forests are probably the most famous in the state. This is because these trees are some of the tallest in the world! They can grow to be more than 100 meters tall and can live to be around 3,000 years old! The trees found in the redwood forests include the redwoods and the Giant Sequoias, which are the largest trees in the world. The wood of these trees resists rotting and can even take moisture out of the air.



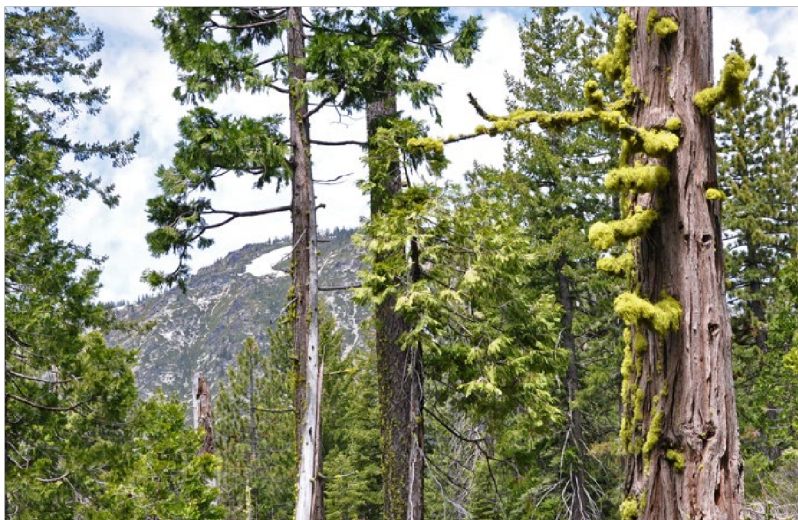
Redwood Forest

Douglas-fir Forests: The Douglas-fir forests are found along the coastal areas of California up to Canada. These trees can grow to be 76 meters tall. The Douglas-fir is an **evergreen** tree. This means that these trees are green all year long and do not lose their leaves in the winter.



Douglas-fir Forest

Mixed Conifer Forests: The mixed conifer forests are a collection of different types of coniferous and other hardwood trees. These trees can be between 30 and 60 meters tall. The specific trees that make up the mixed conifer forest include white fir, Douglas-fir, Ponderosa pine, sugar pine, incense-cedar, and California black oak.



Mixed Conifer Forest

Oak Woodland Forests: The oak woodland forests cover a large amount of land in the coastal mountains and Sierra foothills. These forests are found between grasslands and the mixed conifer forests that grow at higher elevations. Woodlands are smaller and tend to have more open space than forests. Oak woodland areas have mostly deciduous trees. California has 19 different species of oak. There are 9 species of oak that are trees and 10 species that are shrubs. These areas also have other small plants that live on the forest floor.



Oak Woodland Forest

True Fir Forests: There are several species of **true firs** that live in many California forests. Firs are considered “true” if their cones do not fall off in one piece. Instead, the scales fall off a few at a time. True firs can be easily identified by the way their cones sit on the very top branches.



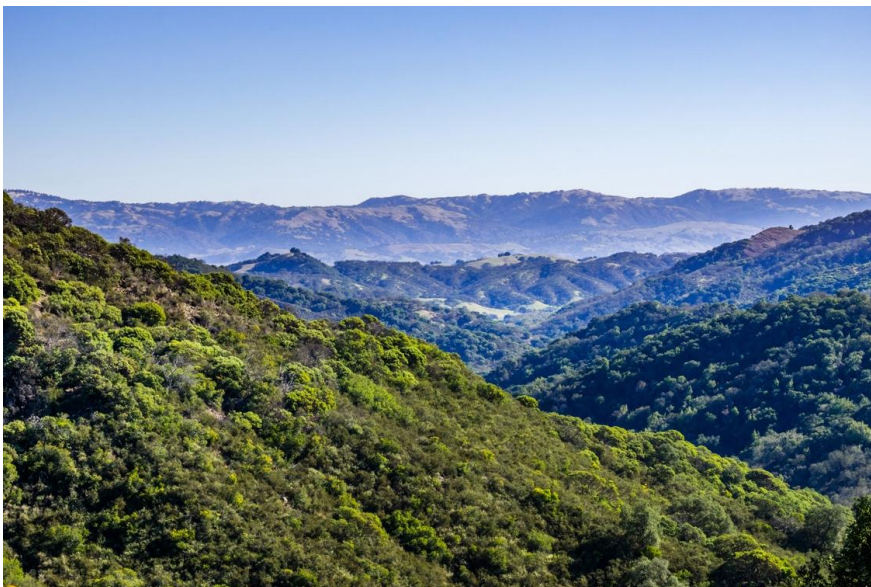
True Fir Cone

True firs include grand fir, Pacific silver fir, California red fir, and white fir. This forest type is separated from Douglas-fir forests because Douglas-firs are not true firs.



True Fir Forest

Chaparral: A unique type of woodland area found in California is **chaparral**. Chaparral is a thicket of brush-like plants that are typically less than 2 meters tall, and can include bushes and short trees. These plants can easily catch on fire during **droughts**. A drought is when there is a long period of time with little to no rainfall. Chaparral is found high up in the mountain areas of the state, usually higher than 1,520 meters above sea level. Chaparral grows in a Mediterranean climate. This means they are hot and dry in the summer and rainy in the winter. Plants living here include oak trees and shrubs. This area gets less rainfall than other forest and woodland areas. The trees and shrubs here have special leaves that help them to hold more water.



Chaparral

Research

Who Owns and Manages California's Forests?

More than 30% of California's land is forested. California forests may be managed by the federal government, like Sequoia National Park, but they may also be run by the state, other public entities, or private organizations. There are many forests in California owned by Native American tribes. Some forests are even owned by individual people. Use the data or websites provided by your teacher to fill in how much of California's forests are owned by each group.

- _____ % of California forests are national forests.
- _____ % of California forests belong to the State of California.
- _____ % of California forests belong to Native American Tribes.
- _____ % of California forests belong to industry (businesses).
- _____ % of California forests belong to individual people.

National forests belong to everyone—including you! People most often use these areas for recreational activities. Hunting, hiking, fishing, and camping are all activities that people can enjoy in national forests. One-third of the national forests are designated as timberland available for harvesting. Harvesting can improve the health and resiliency of our watersheds. We remove some trees so the ones we leave can thrive. The types and number of trees that can be removed at one time is something that is controlled by the federal government. National forests are managed by the laws and practices set by Congress to “provide the greatest good, for the greatest number (of people), for the long run.”¹

California state-owned forests belong to the State of California. As with national forests, the state uses its forests to provide recreational activities like hunting, hiking, bird watching, camping, fishing, and canoeing. Harvesting can also happen in state-owned forests.

There are several Native American tribes that own and manage California forests. Some of these include the Klamath, Yurok, Karuk, and Hoopa. The ancestors of these indigenous peoples used forests as a source of food and shelter. They would also work to manage the forests to keep them healthy. They would set fires on purpose to promote new shoots on shrubs. This also kept the forest floor clear to reduce surprise attacks from other tribes. The forests remain an important part of Native American tribal heritage and culture. Today, Native American tribes continue to manage the forests using controlled burning.

Some California forests are owned by large companies. The management of these areas is up to the company. Most of the time, management of the forests is done by the owner or a board

of directors. A board of directors is a group of people who help make decisions for a company. The company still has to follow rules about how they can use a forest. The California State Board of Forestry sets the rules. These rules state that companies using their forests must have a plan to make sure they do not overuse the forest resources. There are other groups that decide whether or not companies are using their forests responsibly. Companies that own forests usually manage their land for wood products, habitat conservation, water quality, and other activities.

Lastly, some of California's forests are owned by individual people. These people own the land that has the forest on it and may even choose to build their homes there. Many people use their forests for hunting, hiking, camping, and other recreational activities. Forest owners must be aware of local and state laws that say how the land can be used. Because these areas are privately owned, they are not under the same rules as those owned by large companies.

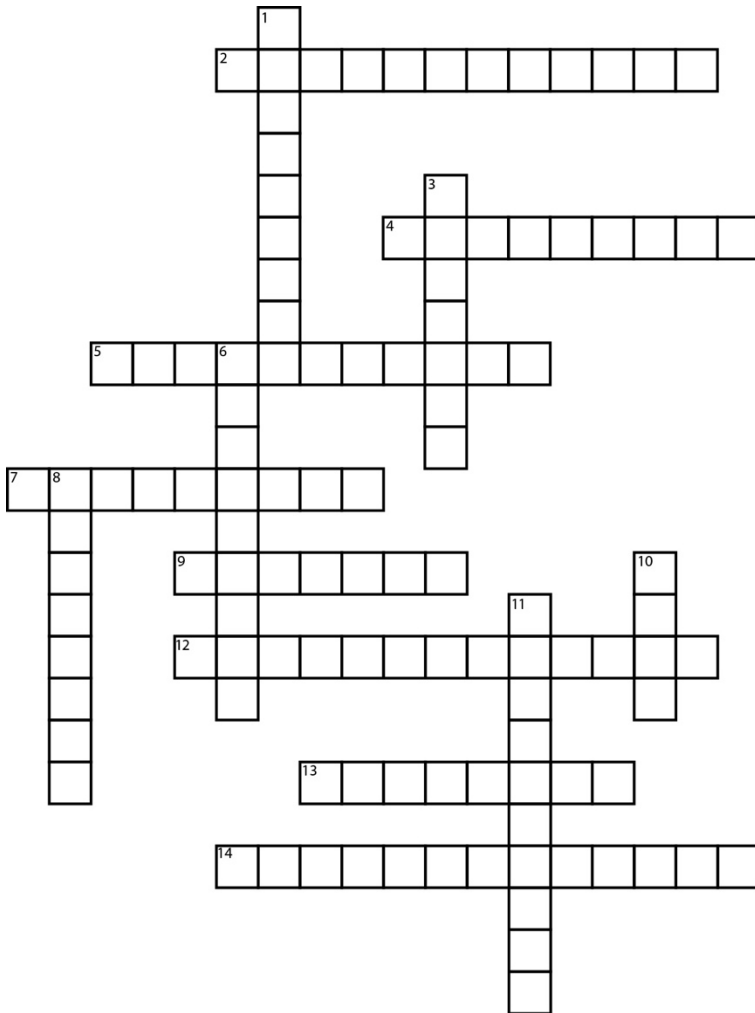
The Forests and You

Forest managers and volunteers can plant new trees to help forests regrow faster after deforestation. Watch the video [Crystal Lake Tree Planting—It's All Yours](#) from the U.S. Forest Service to learn about what foresters do and the ways that people can volunteer in our forests.

Then, follow your teacher's instructions for researching other ways people and volunteers help maintain California's forests.

Healthy Forests, Healthy Planet Crossword Puzzle

Answer the clues to fill out the crossword puzzle.



Down:

1. These are the oldest trees in a forest that stick out above the rest.
3. This is the largest type of tree in the world.
6. These trees have green leaves all year round.
8. This type of tree produces flowers.
10. This product of forests can be used to build homes.
11. This is one term for cutting down trees and then using their wood.

Across:

2. These trees do not lose their leaves all at once.
4. This type of tree loses its leaves all at once.
5. This layer of the forest is where small plants and animals can be found.
7. This grows in a Mediterranean climate.
9. These trees can be identified by their upright cones.
12. This is the planting of trees to regrow a forest.
13. These types of trees have cones.
14. This is the removal of trees so that people can use the land for other purposes.

What Did You Learn?

Answer the following questions to test your knowledge.

1. Why can it be good to remove trees from overgrown forests by cutting them down?
 - a. to make space for new buildings
 - b. to maintain desired forest density
 - c. to provide wood products for societal use
 - d. to start growing new forests
2. Which term or phrase is used to describe how well forests are able to recover from damaging events?
 - a. forest density
 - b. resiliency
 - c. even-aged forest
 - d. reforestation
3. Who owns the national forests found in California?
 - a. the federal government
 - b. the State of California
 - c. all people in the United States
 - d. private companies and individuals
4. How are controlled burns helpful in managing California forests?
 - a. by removing brush to prevent large wildfires
 - b. by removing all the trees before they can catch on fire
 - c. by clearing the land so new trees can replace old ones
 - d. by making more space for people to build homes
5. Which type of forest has rules on how owners can manage and remove trees?
 - a. national forests
 - b. California state forests
 - c. forests owned by companies
 - d. all of the above

Apply to World

Group Activity: Discussion

Your teacher will assign you to a group to work on your activity.

¹ <https://www.fs.fed.us/greatestgood/press/mediakit/facts/pinchot.shtml>