



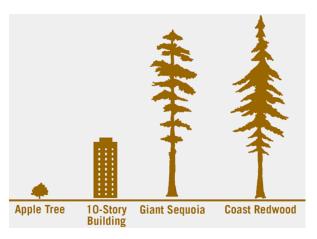
The biggest tree on earth LaCuKnoS Language Booster

Trees grow in height and in **diameter**. As they get taller, they also get wider. Have you noticed that trees in your neighborhood have a variety of sizes and shapes?



Some tree species, such as the **paper birch**, tend to be short. They grow to a height of about 70 feet (21 m) and have a trunk that is about 1 foot (30 cm) in diameter. Other species, such as firs, tend to be tall. A **Douglas-fir** in Oregon can reach up to 250 feet (76 m) tall with a trunk 5 to 7 feet (150 cm to 200 cm) wide.

But the largest trees in the world are the three species of sequoias. One of these is the Coast Redwood (Sequoia sempervirens) that lives on the coast of northern California and southern Oregon. These trees got their name from



the reddish-brown color of the **heartwood**. The tallest sequoia is 380 ft (115 m). It is as tall as a 37-story building. And the widest tree is 29.2 feet (8.9 m), or as wide as two cars, end to end.

Sequoias grow so large because they live a very long time and grow quickly. The coast redwoods can live as long as 2,000 years, and some giant sequoias (*Sequoiadendron giganteum*) can live to be more than 3,000 years old. Some of these trees living today were alive during the time of the ancient Roman Empire.

Like all trees, sequoias keep a record of Earth's climate and fire history in their trunks. Because they live so long, sequoias can tell us about climate and fire patterns from thousands of years ago. A tree trunk grows in layers as it gets older. The cross-section of a tree trunk shows these layers as rings. Each year, a tree adds to its circumference, adding a new layer, or tree ring. The shape and width of the annual rings will change from year to year depending on the growth conditions during that year. For example, trees grow faster during a humid year, so they will produce a wider ring. Conversely, a tree will make a narrow ring during a drought or a colder-than-average winter that slows its growth.

The study of tree rings is **dendrochronology** (which literally means "the study of tree time"). This helps managers and scientists better understand the relationships of climate, fire, and the trees' life cycles.

Watch this video to learn about tree rings: <u>Forest Fact Break: Tree Biology</u> (https://www.youtube.com/watch?v=VDSFck-h8D4)

Photo from *Oregon Coast and Redwood Forest*—*Capture the MomentCapture the Moment*. (n.d.). Retrieved December 28, 2021, from http://www.letscapturethemoment.com/destinations/oregon-coast-redwood-forest/





Talk with your partner about these questions, then write your answers.

1. What do you think a 2000 year old tree could tell us if it could talk? What would you want to ask it? Why?

2. Why do trees get wider as they get taller? What would happen if they did not?





How old is the tree? LaCuKnoS Science Investigation



In the following investigation you will examine tree rings to determine the age of the tree when it was cut. You will also learn to interpret the climate conditions the tree experienced during its lifetime.

Tree cookies are the name for cross section slices of tree trunks that we can use to explore how trees grow. Tree cookies reveal the many different layers that make up a tree (tree rings). Each layer can tell us something about the tree's life and the climate in which it grew.

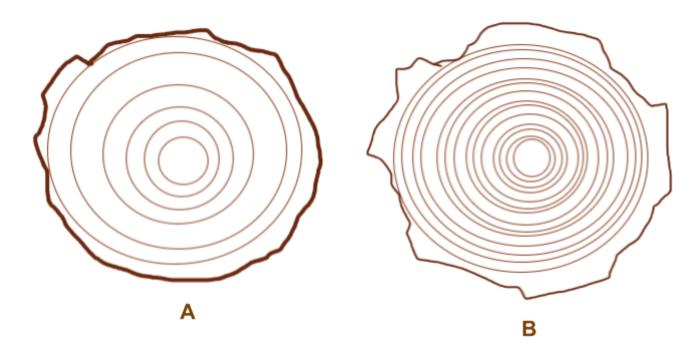
Watch the first 1:45 of this video for a good description of how tree rings grow. Project Learning Tree – Tree Cookies video -

Materials:

- Tree cookies
- Tree cookie pictures on student page

Procedure:

1. Look at the tree cookie pictures below and talk with a partner about what might have happened to these trees.







2.	Comp a.	are and contrast the tree cookies A and B. Answer the following questions with your partner: The tree cookies are close to the same size. Are they the same age? Why or why not?
	b.	Which tree grew more wood each year? How do you know?
	C.	Which tree grew more slowly than the other? How do you know?
	d.	Why can two trees be the same size, but not the same age?
3.	Using a.	the tree cookie image on the student page, answer the following questions with your partner: Estimate how old this tree was when it was cut. What is your evidence?





How old is the tree?

LaCuKnoS Investigation Summary Practice: Construct an argument from evidence

What observations helped you determine the tree's age? How confident are you in your answer?	What observations helped you determine other things about the life of the tree?	Based on the size, shape and color of the rings in your tree cookie, discuss what you think your tree's life has been like.			
Use your own words to describe what you learned about the age of trees in this investigation.					
Use language a dendrochronologist would use to describe how they study the age of trees.					





How Old Is a Tree Concept Mapping Activity

In the last part of this activity, you will work with a partner to create a concept map to show your understanding of the following topic: *What can tree rings tell us about trees and climate?*

Step 1—Partner discussion. Start by discussing the following questions with your partner:

- What are the main ideas we should include in our concept map about what tree rings can tell us? List your main ideas below. The list already has a few concepts you may want to include. What other ones should you add?
- What are the relationships between these main ideas? How are they connected?

List of main ideas for our concept map	Notes on how these ideas are connected	
 Tree ring Climate Growth Dendrochronology 	 Tree rings show annual growth of a tree Dendrochronology is the study of tree rings . 	

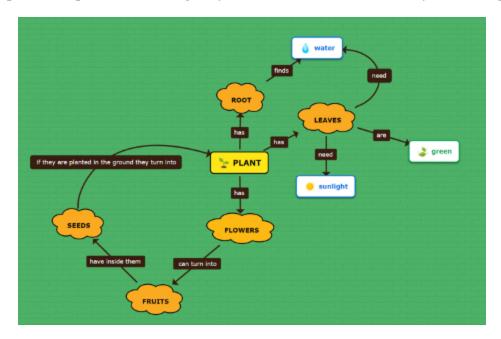




Step 2—Create your own individual concept map. After your partner discussion, use a blank sheet of paper to create your own concept map about what tree rings can tell us. Be sure to include the main ideas you listed and how these ideas are connected to each other.

Feeling stuck? These questions might help you get started.

- What is the most important idea that should go in the middle of your concept map?
- Do trees grow at the same rate every year? Why or why not?
- Can tree cookies tell us about the climate in the past?
- Below is an example of what a concept map can look like. This one is about the parts of a plant but it can give you ideas about how to draw your concept map.



Step 3— Share and discuss your concept maps with a partner. After you finish your individual concept map, share and discuss your map with your partner or small group. Look for similarities and differences between your concept map and theirs. Why do you think your maps are not exactly the same? If you want to, you can use a second color to make changes or additions to your concept map.

Step 4— Put your name on your concept map and turn it in to your teacher.





Resources

- Project Learning Tree Tree Cookies video Watch the first 1:45 of this video for a good description of how tree rings grow.
- Tree cookies. Idaho Forest Products Commision https://www.idahoforests.org/content-item/tree-cookies/





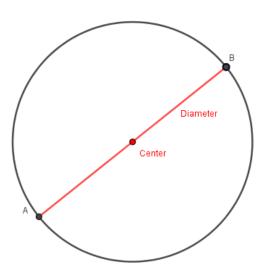
How old is the tree? LaCuKnoS Concept Cards

Concept Card

diameter/diámetro

It is any straight line segment that passes through the center of the circle

Es cualquier segmento de línea recta que pasa por el centro del círculo



The diameter of a tree is sometimes called the width.





Paper birch/ Abedul de papel

Paper birch (*Betula papyrifera*) is a medium to fast growing deciduous tree.

El abedul de papel (*Betula papyrifera*) es un árbol caducifolio de crecimiento medio a rápido.



The paper birch is considered native from eastern Oregon to Alaska





Douglas-fir/Abeto de Douglas

The Douglas-fir (*Pseudotsuga menziesii*) is an evergreen conifer species in the pine family.

El abeto de Douglas (*Pseudotsuga menziesii*) es una especie de conífera de hoja perenne de la familia de los pinos.



Millions of Douglas-fir Christmas trees are exported from Oregon each year.





heartwood/duramen

Heartwood, also called duramen, is the dead, central wood of trees. Its cells usually contain tannins or other substances that make it dark in color and sometimes aromatic.

El duramen es la madera central muerta de los árboles. Sus células suelen contener taninos u otras sustancias que lo hacen de color oscuro y en ocasiones aromático.



The heartwood is made up of dense dead wood.

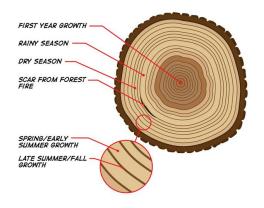




dendrochronology/ dendrocronología

Dendrochronology is the scientific study of tree-ring growth and the data that can be gleaned from it.

La dendrocronología es el estudio científico del crecimiento de los anillos de los árboles y los datos que se pueden extraer de él.



Using dendrochronology, a scientist can estimate climate variation through the comparison of successive annual growth rings





Student page

Kind of tree: Douglas-Fir Height: 105 -110 ft (32-33 m) Width: 20 in (50 cm)

