Want to learn about your climate's past? Check out a tree stump

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Image 1. The light and dark rings of a tree. Photo by: Ildiko Baranyi/Getty Images

If you take a peek out the window, you can see whether it's rainy or sunny. But the weather doesn't say much about the climate in your region. Climate is the average weather patterns over 30 years or more. The real expert is the tree outside your window. It has a detailed climate record hidden deep inside its bark.

Trees can live for hundreds—and sometimes even thousands—of years. Over this long lifetime, a tree will experience many environmental conditions: wet years, dry years, cold years, hot years. An early frost might slow down a tree's growth for a few months. A tree that is exposed to a forest fire might have a scar, hidden in its bark.

Trees keep track of this information and scientists make sense of it.

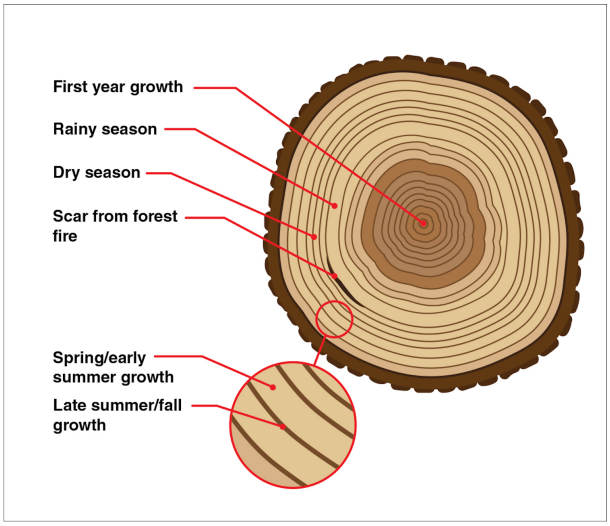
Pattern Of Rings Reveals Age And Weather History

If you've ever looked at the top of a tree stump, you might have seen a pattern of rings. Each ring sits inside the other. The rings can tell us how old the tree is. They also tell us what the weather

was like during each year of the tree's life.

The light-colored rings tell us about the tree's growth in the spring and early summer. The dark rings show how it grew in the late summer and fall. One light ring plus one dark ring tell us about one year of the tree's life.

Trees are very sensitive to conditions like rain and temperature. When these conditions change, it affects how trees grow. Tree rings are a record of this growth over a long period of time. The rings grow wide in warm, wet years. They are much thinner in years when it is cold and dry.



Scientists can compare these records with local measurements of temperature and rain. Weather stations in the United States have kept these records since 1891.

Comparing tree rings with older climate data is more challenging. There is usually no reliable written record of weather patterns long ago. But very old trees can offer clues about what the climate was like back then. The field of science that studies past climates is called paleoclimatology.

We can't go back in time to learn about past climates. So these scientists use examples from the natural world. Tree rings provide data that can go back hundreds of years. Sediments collected from the bottoms of lakes and oceans can also be of help. Some scientists even drill holes into ice sheets in Antarctica. The deepest ice samples can tell us about what the climate was like hundreds of thousands of years ago.

These sources of information are a substitute for modern measurements. They are called proxies. They can extend our knowledge of weather and climate from hundreds to millions of years.

Climate Models

With modern and historic information, scientists create climate models. These models help them understand big changes in climate in the past. How did the temperature change, and how long did it take? Was there more rainfall, or less? These questions help us understand past ice ages, and times when the Earth got warmer.

Understanding climate events of the past through data is important. They help us make predictions about what climate patterns to expect in the future.

Quiz

1 Read the section "Pattern Of Rings Reveals Age And Weather History."

Which sentence from the section shows why scientists study tree stumps?

(A) They also tell us what the weather was like during each year of the tree's life.

(B) Trees are very sensitive to conditions like rain and temperature.

(C) Comparing tree rings with older climate data is more challenging.

(D) The field of science that studies past climates is called paleoclimatology.

2 Read the section "Climate Models."

Select the sentence from the section that shows why studying the climate is important?

(A) With modern and historic information, scientists create climate models.

(B) How did the temperature change, and how long did it take?

(C) Was there more rainfall, or less?

(D) They help us make predictions about what climate patterns to expect in the future.

3 Use the two images and the information in the article to select the TRUE statement.

(A) Light-colored rings show how a tree grew during spring and summer.

(B) Tree rings grow wider in years when the weather is cold and dry.

(C) Very old trees don't have as many rings as younger trees.

(D) Older tree rings are lighter in color than younger rings.

4 Look at the image in the section "Pattern Of Rings Reveals Age And Weather History" and read the following selection.

> *If you've ever looked at the top of a tree stump, you might have seen a pattern of rings. Each ring sits inside the other. The rings can tell us how old the tree is. They also tell us what the weather was like during each year of the tree's life.*

How does the image support the information in the selection above?

(A) The image describes how scientists compare tree rings with other data.

(B) The image proves that older trees have light-colored rings.

(C) The image illustrates what different types of rings tell scientists about weather.

(D) The image explains why studying the climate is important.