THE SECRETS OF TREE RINGS

Trees can be found all over planet Earth. They are an important part of the **ecosystem**, which is all the living things within a certain area, including plants and animals. It includes how these living things interact with each other and the environment. Trees take in carbon dioxide and breathe out oxygen. That's important because all animal life depends on oxygen. Trees also help to stabilize soil, filter rainwater, and they provide shade, food, and shelter for other organisms.

Do you enjoy hiking among the beautiful trees in the Sierra Nevada? If so, you have probably seen trees that have fallen or that have been cut down for some reason. The next time you see a fallen tree, look carefully. These trees can tell you many secrets!

Fallen trees

Tree rings

The rings inside a tree trunk are full of information! They can tell you the age of the tree and what the **weather** was like during the years that tree was alive. Very old trees can tell what the **climate** was like even before there were measurements available to record this. **Weather** is the day to day state of the atmosphere over a short period of time and includes things like rainfall, humidity, temperature, wind, and visibility. **Climate** is the average weather in a certain area place over the course of years. Note that there is an important difference between these two terms regarding time.

<u>Understanding the secrets of tree rings</u>**:**

As trees grow, they add wood in rings, in the same way that you grow and get bigger every year. Light colored rings indicate wood that grew during the spring and early summer. The dark rings indicate the wood that grew in late summer and fall. Taken together, a light and dark ring represent one year of a tree's life.

A dark scar within a tree ring may show that the tree survived a forest fire.

Rings grow wider apart in years when the weather is wet and warm. They can grow a lot in ideal conditions! Rings will look thinner and closer together if the year has been difficult, maybe too hot, too wet, too dry or too cold.

A tree that has experienced stress, as in a **drought**, which is a shortage of precipitation (fog, rain, or snow) over a long period of time, may barely grow at all.

Trees that grow in tropical climates grow year-round at a fairly constant rate. They do not show the same light and dark growth patterns.

ACTIVITY

<u>You will need to take a hike into the forest with a grownup and these supplies:</u>

- Magnifying glass
- Sketch pad or notebook
- Pencil, pen, or crayons
- Camera

1. Find a fallen tree.
2. Be careful and make sure that you're not disturbing any wildlife (snakes, spiders, etc.) that might live beneath, in, or on the fallen tree!
3. Examine the cut or broken end of the trunk closely, using the magnifying glass to get a better look at the tree rings.
4. Sketch or take pictures of what you see.
5. Count the tree rings.

What did you observe?

About how old is the tree? Remember that each pair of light and dark rings equals one year. Count backward from the bark inward.

Were there years when the tree grew quickly?

Does it look like the tree survived any years of drought?

Is there damage within any of the rings that may show the tree survived a fire?

Do you see any evidence of slow growth? Was it for a short period of time, or for many years? Years with poor growth can also be due to an infestation of insects.

The name of the science that studies tree ring data is **dendrochronology.** Scientists who analyze tree rings include **archaeologists** (who study objects that people made, used, and left behind in order to understand what people of the past were like and how they lived), **chemists**, **tree scientists**, and **climate scientists**.

Trees do not have to be cut down for scientists to study them. Scientists use a coring tool called an **increment borer** to remove a core sample from the tree. It is a hollow tube, a bit like an apple corer, that is screwed into the tree trunk until it reaches the center. When taken out, it brings with it a long slender sample of the tree that will show the growth rings. This does not harm the tree.

Increment borer

Rings of a living pine tree taken with an increment tree borer

Always keep your eyes wide open in the great outdoors. You never know what you might find or what secrets may be revealed to those who are observant!

ADDITIONAL RESOURCES

Websites

NASA's Jet Propulsion Laboratory/California Institute of Technology, Climate Kids
https://climatekids.nasa.gov/tree-rings/

Videos

Brigham Young University, Tree Stories: How Tree Rings Reveal Extreme Weather Cycles
https://www.youtube.com/watch?v=xmZO7aRgcW4

Sci Show kids, Life as a Tree! https://www.youtube.com/watch?v=MwNJC-IRgPE

The University of Arizona, College of Science, Laboratory of Tree-Ring Research
https://ltrr.arizona.edu/content/recent-videos

Books available from the Washoe County Library System

Are Trees Alive? By Debbie S. Miller and Stacey Schuett

Healthy Trees, Healthy Planet by Anne Flounders

The Magic and Mystery of Trees by Jen Green and Claire McElfatrick

Peterson First Guide to Trees by George A. Petrides'

Trees: a Rooted History by Piotr Socha, Wojciech Grajkowski, and Anna Burgess (translator)