Wood

Earth & Space Science | Lesson Guide

3rd Grade

Photo Description

This picture shows many tree logs that have been cut into round pieces called cross-sections. You can see the different colored rings inside each log piece. Some rings are light brown and others are darker brown, making circle patterns from the center to the outside edge of each tree trunk.

Scientific Phenomena

The Anchoring Phenomenon this image represents is tree ring formation and growth patterns. Trees grow by adding new layers of wood each year, creating visible rings in their trunks. This happens because trees grow faster in spring and summer when there's more sunlight and water, creating lighter colored wood. In fall and winter, growth slows down, making darker, denser wood. Each ring represents one year of the tree's life, and scientists can count these rings to determine how old a tree was when it was cut down.

Core Science Concepts

1. Annual Growth Cycles: Trees add one new ring of wood each year, with each ring showing different growing conditions during that year.

2. Environmental Response: Ring thickness and color variations show how trees respond to changes in weather, water availability, and sunlight from year to year.

3. Life Cycles and Aging: Tree rings provide evidence of how long organisms live and grow, demonstrating that living things change over time.

4. Pattern Recognition: The circular ring patterns help scientists understand past environmental conditions and make predictions about future growth.

Pedagogical Tip:

Have students bring in tree cookies or cross-sections from different sized branches to compare ring patterns. This hands-on exploration helps them discover that thicker rings often indicate years with better growing conditions.

UDL Suggestions:

Provide multiple ways for students to explore tree rings: visual examination with magnifying glasses, tactile exploration by running fingers over the rings, and kinesthetic activities like creating human "tree rings" where students form circles representing different years of growth.

Zoom In / Zoom Out

1. Zoom In: At the cellular level, tree rings form when specialized cells called cambium create new wood cells. In spring, these cells are larger and have thinner walls, while summer cells are smaller with thicker walls, creating the visible ring pattern.

2. Zoom Out: Tree ring data connects to larger climate systems and forest ecosystems. Scientists study tree rings from forests around the world to understand long-term climate changes, drought patterns, and how entire ecosystems respond to environmental shifts over decades or centuries.

Discussion Questions

1. What do you think would happen to tree rings during a year with very little rain? (Bloom's: Analyze | DOK: 3)
2. How could counting tree rings help us learn about what happened in the past? (Bloom's: Evaluate | DOK: 3)
3. Why might some rings be thicker than others in the same tree? (Bloom's: Analyze | DOK: 2)
4. What patterns do you notice when comparing rings from different trees? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: Students may think trees only grow taller, not wider.
   Clarification: Trees grow both up and out, adding new wood around their entire trunk each year.

2. Misconception: All trees have the same number of rings regardless of age.
   Clarification: Each ring represents one year, so older trees have more rings than younger trees.

3. Misconception: Tree rings are just decorative patterns with no meaning.
   Clarification: Each ring tells a story about what the weather and growing conditions were like during that year of the tree's life.

NGSS Connections

- Performance Expectation: 3-LS1-1 - Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- Disciplinary Core Ideas: 3-LS1.B - Growth and Development of Organisms
- Crosscutting Concepts: Patterns and Scale, Proportion, and Quantity

Science Vocabulary

* Tree rings: The circular patterns inside tree trunks that show how the tree grew each year.
* Cross-section: A slice cut straight across something to show what's inside.
* Growth: When a living thing gets bigger or changes over time.
* Annual: Something that happens once every year.
* Pattern: Things that repeat in a regular way.
* Cambium: The special layer inside trees that makes new wood each year.

External Resources

Children's Books:

- Tell Me, Tree: All About Trees for Kids by Gail Gibbons
- The Great Kapok Tree by Lynne Cherry
- A Tree Is Nice by Janice May Udry

YouTube Videos:
- "How Do Trees Grow? | Science for Kids" - Simple explanation of tree growth and ring formation: https://www.youtube.com/watch?v=g2XVAuSk7Rg
- "Tree Rings Tell Stories | SciShow Kids" - Engaging video about what tree rings reveal about the past: https://www.youtube.com/watch?v=1qOZaJUWCbE