Grab 'N Go Kit
Tree Cookies

Tree Cookies Overview:

One of the best ways to learn about a tree is to look at its annual rings. Tree rings show patterns of change in the tree's life as well as changes in the area where it grows. In this activity, students will trace environmental and historical changes using a cross section of a tree trunk, or "tree cookie".

Items in kit:

- America's History Poster laminated
- Directions
- 25 tree cookies
- 25 magnifiers
- 5 Tree Cookie Student Pages laminated
- 5 Tree Rings Student Pages laminated

This activity is from Project Learning Tree's Pre K-8 Activity Guide, Activity #76

Tree Cookies

By counting a tree's growth rings, you can tell the age of that part of the tree at the time it was cut. Every growth season, a tree adds a new layer of wood to its trunk and limbs. Each ring has two parts: a wide, light part (early wood) and a narrow, dark part (late wood). The early wood grows during the wet, spring growing season. During the transition from the drier summer to fall and winter, growth slows and the late wood forms. The rings provide clues about the climate, or weather, of the area over time and evidence of disturbance to and around the tree, such as fires and floods.

The shape and width of the annual rings often differ from year to year because of varying annual growth conditions. During a moist growing season, a tree in a temperate region may produce a particularly wide ring. During a drought, a colder-than-average winter, or an unseasonable frost, a tree will produce a particularly narrow ring. In a science called dendrochronology (which literally means "the study of tree time"), scientists have found that they can learn about past climates by studying the ring patterns of very old trees.

PART A-Cookie Counting

1. Show everyone the poster "America's History is written in her trees." Discuss the important dates on the poster and how they relate to the rings on the cross section. Discuss how trees can tell us what happened during their "lifetime".
2. Pass out the tree cookies and hand lens to individuals or small groups of students.
2. Have the students estimate (not count the rings) how old this part of the tree was when the tree cookie was cut. Ask the students how they estimated the age.
3. Give students a copy of the student page "Reading Tree Cookies." Explain how to count the rings to find the age of a cross section (count only the light or only the dark rings). Using the Tree Rings student page, count with the class the number of rings on the cross section. Then, using their sample tree cookies, have them count the rings to determine the age of the section they have.
4. List the following terms on the board: outer bark, phloem (FLOW-uhm) or inner bark), cambium (KAM-bee-uhm), xylem (ZEYE-luhm) (or sapwood), and heartwood. Have the students label the diagram "Tree Cookie Parts" with these terms. Use a labeled transparency to review their responses. Next, have students identify these parts on their own tree cookies.
5. Using the Background information, explain the different kinds of markings that tree cookies display (scars from a forest fire or a dead branch, narrow rings from insect attacks or drought, etc.). Have them look for clues in the markings of the three tree cookies on the bottom of the "Reading Tree Cookies" student page, and guess what might have happened to the tree that time. Discuss their responses.
6. Have students use the hand lenses to look for small holes in the xylem and heartwood of the tree cookie. The tiny channels enable water and nutrients to travel up the trunk and branches of the tree.

PART B-Tree Stories (For the teacher)
1. As a class, on a very large piece of paper or a large piece of material (a sheet works well), have students draw a life-size cross section of a Yellow-poplar tree trunk. Draw an appropriate number of growth rings for the tree's size, about 2-4 rings per inch in diameter. Remember, there should be some variety in the growth rings to reflect changing environmental conditions. As a group, decide on the year the tree began growing and the year it was cut.
2. Divide the group into teams. Assign each team a category of research for finding information related to the tree. Categories should include (1) possible significant events in the tree's lifetime, such as years of drought, flood, or fire; (2) significant world events during the life of the tree; (3) significant

events in state or national history during the life of the tree; and (4) significant events of people in your classroom, school, or community during the life of the tree. Teams should each identify at least five dates for events in their category. Have the students use the Internet, along with other resources, to obtain information for their category.

3. Have each group select a color for its event labels and make the labels. Students can staple the cross section to a bulletin board, place labels around the outside margin, and connect the labels with string to a tack inserted at the appropriate year. ==This is a great way to connect social studies requirements with forestry.==

4. Have each group report to the rest of the class what they added to the cross section.

Variation-My Life as a Tree

1. Show students a tree cookie and explain how it was obtained from a tree. Let students feel and examine the tree cookie.

2. Explain what the rings on the cookie are and what they tell us about the tree (age of tree or limb, years of rapid or slow growth). Show students how to count the rings to determine the tree's (or limb's) age and let them practice.

3. Using white paper plates with ridges, demonstrate for students how to create a "tree cookie" using the bumpy perimeter as the bark, the smooth inside edge as the cambium, and center circle as the heartwood.

4. Have students each use a paper plate and crayons to create a tree cookie the same age as themselves. Have them identify when important events in their lives took place, such as when they were born, when they started school, and so on. They might then use this information to write an autobiography.

ASSESSMENT OPPORTUNITIES

Here are a few suggestions that you can leave with teachers to follow-up with:

- Have students look at a tree cross-section and write a possible scenario that accurately matches the pattern of growth rings,

- Read the following story your students and ask them to take notes (Have them pay particular attention to the years mentioned,). After telling the story, allow students to ask questions so that their notes are complete. Then ask each student to draw a picture of what the tree cookie of this tree might look like. Assess each drawing to make sure students have indicated the events in the tree's life at points that match the time frame given in the story.

Story about a Tree:

Once upon a time, a tree grew in the forest. In its first 10 years it grew slowly because the large trees overhead blocked the sunlight. In its 11th year, the large tree next to it blew down in a storm. This allowed sunlight to reach the little tree, and for the next 10 years it grew rapidly. In its 21st and 22nd years there was a severe drought and the tree could not get enough water. This stress caused the tree to grow very slowly for three years. In its 25th year, favorable conditions returned and the tree grew normally for 15 years. In its 40th year, wildfire raged through the forest. The tree's thick bark enabled it to survive, but it was deeply scarred. It grew slowly for several years after that. Year 45 was particularly bad. Bark beetles got under its skin, fungus entered its body through woodpecker holes, and caterpillars ate most of its leaves. For five years the tree hardly grew at all and became very weak. In its 50th year, it blew down in a storm. A science teacher found the fallen tree and used a chain saw to make a big tree cookie from the trunk.
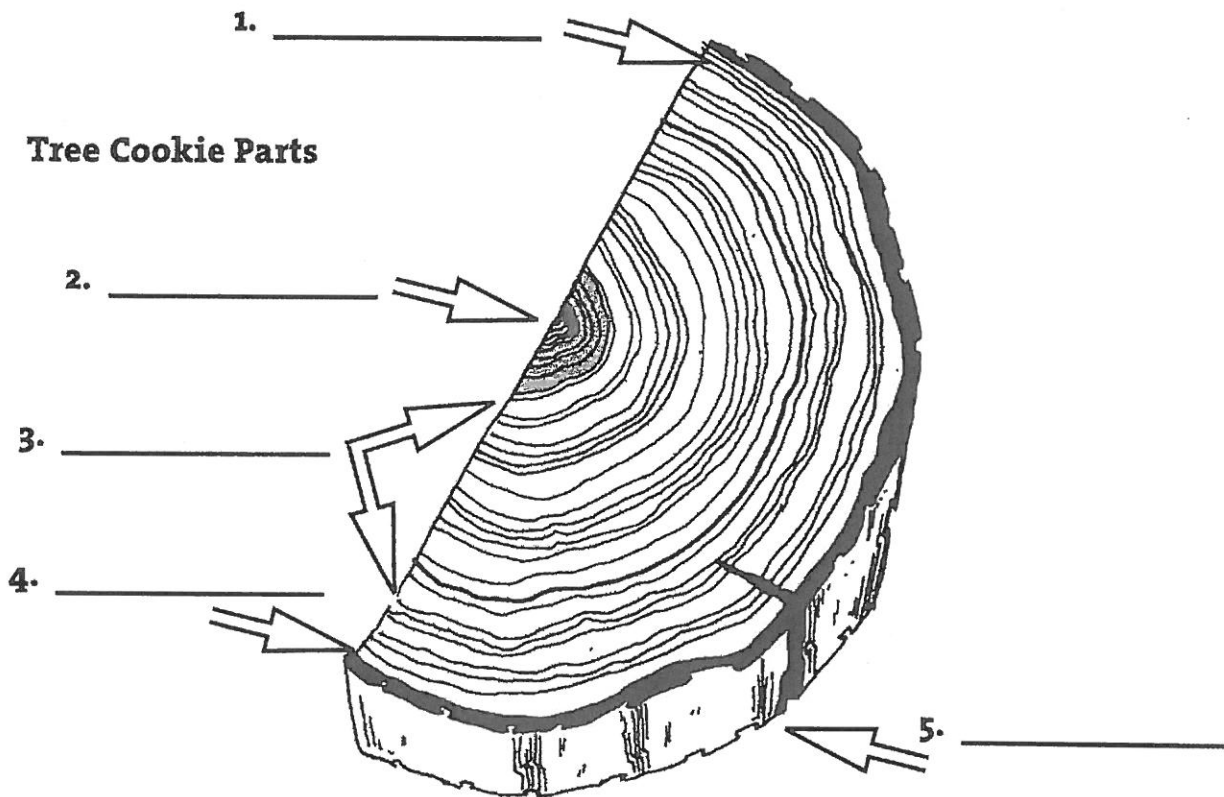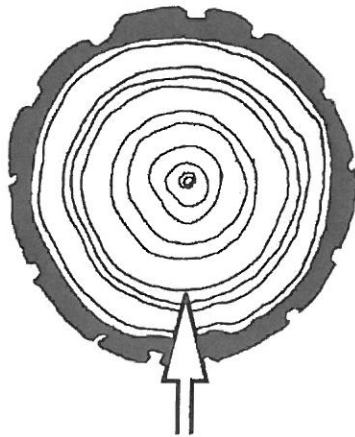
Tree Rings

Reading Tree Cookies

1. _____

Tree Cookie Parts

2. _____

3. _____

4. _____

5. _____
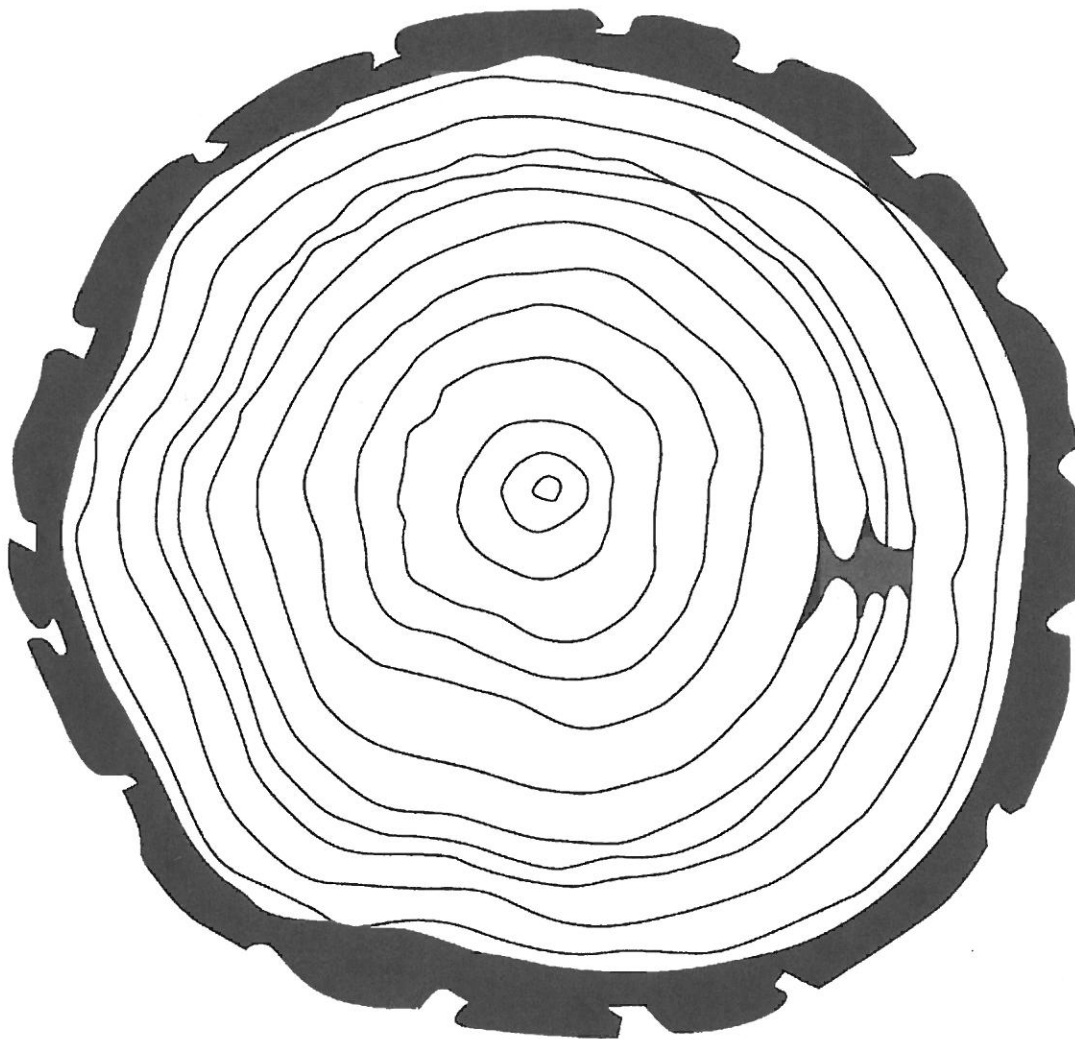
Cookie Clues: What happened to the tree where the arrow is?

6. _____

7. _____

8. _____