SAWING AWAY

BIO KEY

Plant Investigation
Tree Rings
Tree Growth

OVERVIEW

After sawing sections from fallen trees, the youngsters count tree rings and investigate the patterns of tree growth.

BACKGROUND

Many factors affect the rate at which a tree grows. Available sunlight, water, nutrients, the condition of the soil, and temperature are all vital growth factors. Competition among trees for light, water, and nutrients can also affect growth. In addition, different kinds of trees grow at different rates.

During each year of a tree's life, new wood is produced just beneath the bark. At the same time, the bark grows to accommodate the new wood. Wood produced in the spring and summer, when growth is fastest, is lighter in color than wood produced in the fall and winter, when growth is slower. A cross section of a log reveals alternating rings of light and dark wood. By counting the rings from the center of the log out to the bark, the age of the tree can be closely approximated.

Side Two of the "Counting Growth Rings" Technique Card shows how a tree

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grows. New growth takes place at the top and around the outside of the tree each year. The best estimate of the age of a tree can be determined only by counting the rings at ground level. Counting the rings at any other height reveals only the age of the wood at that height, not the age of the whole tree. (**Note**: Don't reveal this information to the youngsters before doing the activity.)

During years of favorable environmental conditions, trees grow rapidly and more wood is produced. The resulting growth ring is relatively wide. On the other hand, narrow rings indicate years of poor or stunted growth, perhaps caused by fire, disease, insect attack, or other poor environmental conditions. By looking at a tree's growth rings and the patterns they make, your youngsters can begin to understand how trees grow, and can make some predictions about the history of the growth conditions in the area.

CHALLENGE: FIND OUT IF THE TOP OF A TREE IS OLDER, YOUNGER, OR THE SAME AGE AS THE BOTTOM.

MATERIALS

For each team of two:
1 bow saw
2 fine-tipped colored marking pens*
2 small pieces of sandpaper*,
10 cm × 15 cm

For the group:
1 data board* and marking pen*
brightly colored push pins
1 "Counting Growth Rings" Technique Card*

* Available from Delta Education.

PREPARATION

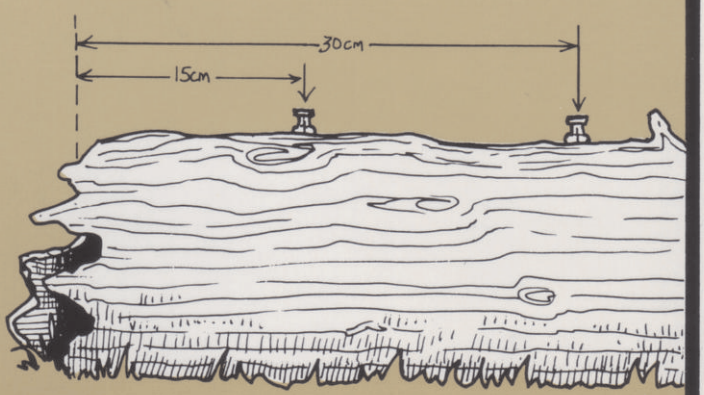
Group Size. This activity works best with groups of up to sixteen youngsters.

Time. Plan on forty-five to sixty minutes for this activity.

Site. Any area with downed trees is a possible site for *Sawing Away*. Check out local wooded parks, state and federal forests, or private woodlots where you can obtain permission to cut the fallen trees. Try to avoid sites with poison ivy, poison oak, or poison sumac. You will need one log or large branch for every four kids. Look for logs at least four meters long and ten to forty centimeters in diameter.

Choose logs that are lying completely on the ground. Use a saw beforehand to make sure the logs you select are not rotten. (Rotten logs are unsuitable for counting rings, but are suitable for the OBIS activity *Logs to Soil*.)

Tagging the Logs. Two teams will work at each log: one team at each end. Each team will make two saw cuts near one end of a log to remove two sections of wood, one section for each team member. To mark the places on the logs where the teams will saw, stick push pins 15 centimeters and 30 centimeters from each end of the logs. (See the illustration.)



Saws. Bow saws are designed for cutting logs and are easy and safe to use if certain rules are followed. (See the "Action" section.) Ask your group to borrow saws from parents and neighbors for this activity.

ACTION

Part One: Counting Rings

1. Ask the youngsters if they think the top of a tree is younger, older, or the same age as the bottom of the tree. Ask the kids to think about how children grow. Are their heads younger than their feet? Do they think trees grow the same way kids do? Ask them if they know of any ways to tell how old a tree is. If no one mentions counting the growth rings, introduce this method.

2. Point out the marked logs. Tell the youngsters that they will find out the age of the top and bottom portions of the logs by cutting sections of wood from each log and counting growth rings. (The top of the log is the narrower end.) Before distributing the saws, give the youngsters these saw-safety rules:

- While walking with a saw, hold the blade away from your body.
- Keep fingers and hands away from the blade at all times.
- Clear away all debris and branches that might interfere with your sawing.
- One partner should hold the log steady while the other partner saws. Exchange places often.
- While sawing, be careful not to pinch your fingers between the saw handle and the log.
- When a saw is not being used, lay it flat on the ground. Do not prop it up.

3. Divide the group into teams of two, and assign one team to the top end and one team to the bottom end of each log. Assign your more energetic teams to thicker logs. Give each of the teams a bow saw, and tell them to make cuts where you have placed the push pins in the logs.

4. As the teams saw, you should obtain a log section for demonstration purposes. When the teams finish their two cuts, have them bring their two sections to a central location.

a. Show the kids how a light sanding of the cut end helps expose the growth rings. Dabbing a bit of saliva on the wood also helps.
b. Now demonstrate the process of making a dot with the marking pen on each dark ring of wood. Start at the center, and move toward the edge,

making a slight spiral pattern as you go. You may want to show the group the illustration on the "Counting Growth Rings" Technique Card.
c. Count the dots to determine the age of the section.

5. Give each youngster a piece of sandpaper and a marking pen, and let them begin marking and counting rings. Since the two sections taken from the same end of each log are so close together, the sections' ages (number of rings) should be about the same. If the two sections differ by more than two years, help the kids re-count.

6. Draw one log shape on your data board for each team's log. Label one end of the log shapes "bottom" and the other end "top." Let the teams record

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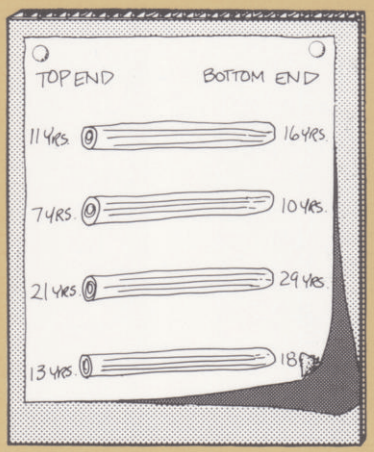
the ages of their log ends in the appropriate place on the log shapes. Now ask the kids if the tops of trees are older or younger than the bottoms. After reviewing the results, explain basic tree growth with the aid of the "How a Tree Grows" illustration on the Technique Card.



Part Two: A Step into Time—Backwards

1. Ask the youngsters to pretend that their trees fell (and stopped growing) today. Then ask one of the kids for her age. Have all the youngsters count off the rings on their log section, from the outside edge toward the center of the log cross section, stopping at the ring that corresponds in number to the youngster's age. Tell the youngsters that this ring was produced in the same year that the youngster (and probably other youngsters in the group) was born. Ask the youngsters to compare the width of that growth ring with the width of other growth rings in their sections. Was it a good year (a wide ring, indicating lots of growth) or was it a "bad year" (a narrow ring, indicating little growth)?

2. Make a list on the data board of factors the kids feel might influence the growth of a tree. The list should include: sunlight, nutrients (food), competition from other trees, and disease.

3. Have each team use the pattern of the growth rings on the sections to tell a story reconstructing the growth history of the tree. You might start off by holding up a log section and telling a story such as this: "This tree has large center rings, which means that it grew very fast as a seedling. But there was a drought for several years. The tree's growth slowed down and the rings narrowed. Finally the drought ended, and the tree started growing fast again. The last five years were very good growth years."

LOG RHYTHMS

1. How many different kinds of trees did you look at? Compare the growth patterns of two different kinds of trees. How are they similar? How are they different?

2. Try to estimate the age of some of the surrounding living trees.

3. What is the oldest log you worked on?

Note: Return the log sections to their original locations. If the kids want to take their sections home, be sure that you have permission for them to do so.

BRANCHING OUT

1. Saw through a log that shows evidence of fire damage.

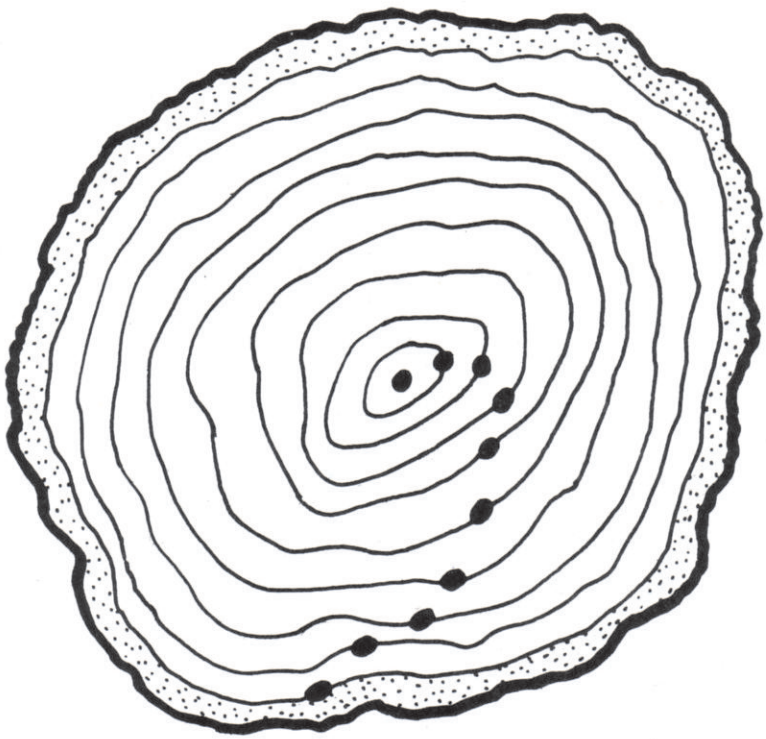
2. Saw through a log at a place where a branch sticks out.

3. Saw through a section of log from end to end.

Sawing Away
COUNTING GROWTH RINGS

Technique Card

Side One



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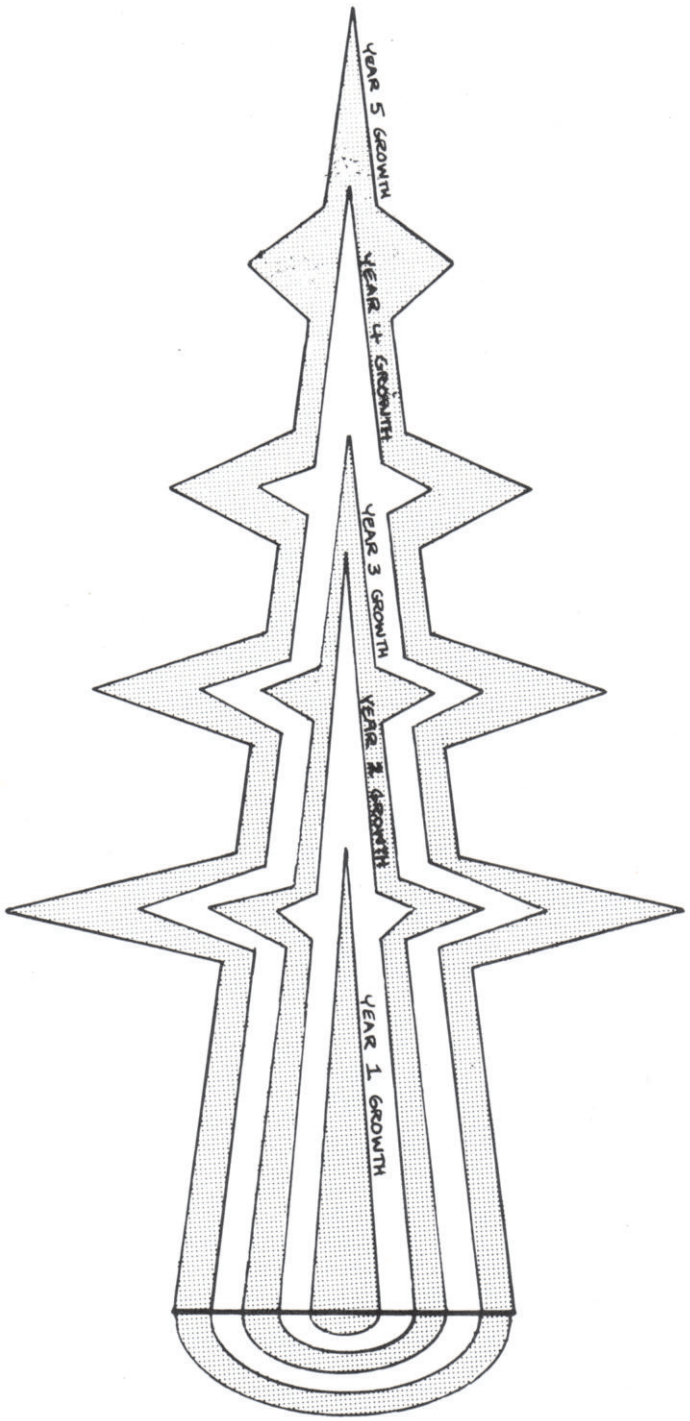
Sawing Away
COUNTING GROWTH RINGS

Technique Card

Side Two

HOW A TREE GROWS



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