Grade 6

The Tree: A Key to Healthy Soil, Air, Water, and Me

Objectives

- Students will use a freshly-cut tree stump or log cross section to evaluate the history of the tree and its growth.
- **Students will be able to differentiate between shelterbelts and field windbreaks, be acquainted with the Utah history of these plantings, and be able to identify the advantages of planting them in open areas.**
- Students will be able to define "urban forest" and explain how trees benefit urban areas.
- Students will be able to list criteria for selecting and maintaining trees suitable to their community's environmental conditions.
- Students will be able to identify ways trees contribute to human health.

Vocabulary Words

annual rings
girth
conducting vessels
environment
competition (in forests)
farmstead shelterbelts
erode
field windbreaks
prevailing winds
evergreen
deciduous
photosynthesis
drought
species
urban forest

Background Information

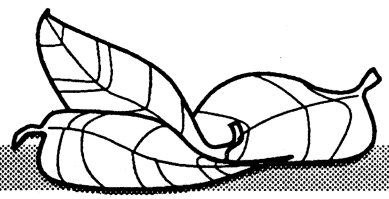
Look at a freshly cut tree stump or a log cross section, and the first thing you'll notice is the series of circles or rings of dark and light wood. By learning to interpret and understand the relationship of these rings, we have many clues to the history of the tree and the forest it came from.

These circles or **annual rings** are created by the yearly growth patterns of the tree. Each year, a new ring is formed just beneath the bark of the tree. The light-colored part of the ring is formed from spring growth. Moisture and nutrient levels are high and the tree is growing rapidly in height and **girth**. **Conducting vessels** are large and the wood fibers are less dense, so the color is lighter. The darker wood is grown as spring moves to summer. The tree's growth slows and conducting vessels are smaller with denser fibers.

You can tell the age of the tree by counting the annual rings. Start at the center and count out. If the tree was cut this year, subtract the age from the year and that's when it started.

When you compare the ways various trees grow, you will see many differences. Some trees grow quickly, some slowly. How fast a tree grows depends on the type of tree and the tree's **environment**. The amount of light and water and/or damage by insects, disease, or fire can cause many differences between trees from different areas or even from the same forest.

In individual trees, you'll see a lot of difference in growth rate over the years. Young trees usually grow fast, slowing down as they get larger and compete with one another. Some may not be able to stand up to the **competition**. They may show little or no growth, and eventually die. Or they may respond to a thinning or removal of other trees around them. They get a



larger share of light and water. That increases their growth rate. Insects, disease, injury by fire, wind, or frost can slow growth rates for certain years.

The results of all these growth-affecting things can be seen in tree cross sections. Trees don't replace damaged cells like people, every harmful event in a tree's life is recorded in the wood.

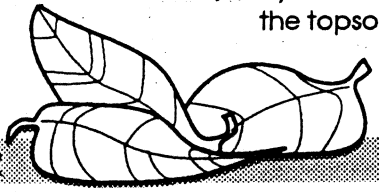
Trees in Our History

When Brigham Young led the Mormon Pioneers into Utah, they found virtually no trees in the valleys. They came from Europe and the eastern U.S. where the land was covered with trees. They weren't sure that they could live in a place without trees. But under the direction of their leader, they made the desert "blossom like a rose"! They began to clear and irrigate the sagebrush covered valleys to grow agricultural crops.

The pioneers were faced with a new problem. There was no ready source of lumber to build houses or firewood for heating and cooking. They had to haul logs and firewood in from the nearby mountains. Things were hard for the early pioneers, but they survived and things began to improve. But they still missed the trees around their homes like before.

It wasn't long before the pioneers realized that the treeless valleys gave no protection from the cold winter winds and snowstorms, and no shade during the hot summer months. To get this protection and shade, the pioneers began to plant trees around their farm buildings and feedlots. These plantings are called **farmstead shelterbelts.**

Pioneers plowed up millions of acres to grow crops. Animals overgrazed the mountains; more and more soil was exposed to rain, snow, and wind. Without grass and brush to hold it in place, valuable mountain watersheds and valley top soil began to erode away. To solve water erosion in the mountains, grazing was limited, trees and grasses were re-planted, and contour trenches were built. In the valleys, dry winds were blowing the topsoil away.



To save valuable topsoil, farmers began planting rows of trees in their fields to slow down the wind. These are called **field windbreaks.**

Farmstead Shelterbelts

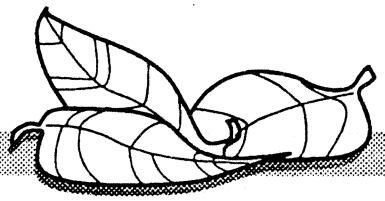
As you drive along through Utah, trees are a familiar sight around farm buildings, and livestock feedlots. Trees give protection from Utah's strong cold winter winds and driving snowstorms.

Winter's prevailing winds in Utah are from the northwest. The ideal farmstead planting, then, is an L-shaped belt of trees and shurbs on the north and west sides of the farmstead area. The design of the planting depends on the number and location of buildings and feedlots on the farmstead. The location of the farmstead with respect to roads is also important. Protecting the farm home is a main goal of these shelterbelts.

For the best protection, the plantings should be about 100 feet from the buildings or feedlots. Trees planted within 50 or 60 feet cause snow to pile up around the buildings or in the feedlot during the winter. It will create a hot air pocket (no air movement) during hot summer days. The northern belt of trees and shrubs should extend east...and the west belt should extend south... about 50 feet beyond the last building or feedlot to be protected.

A farmstead shelterbelt's main purpose is to stop the wind. The idea is to plant as few rows as possible and still do the job of stopping the wind. **Evergreens** are especially good for this because they keep most of their needles all year around and give good winter protection. Their branches also extend all the way to the ground.

It is ideal to plant shelterbelt trees close together in rows and plant the rows close together so they grow together and give the earliest possible protection. When trees are planted close together, however, they should be thinned out before they begin to crowd each other. In a dense shelterbelt, the amount of light reaching inside trees is limited. The outside branches of the outside rows exposed to the sun will be alive to the ground line, while the branches inside the shelterbelt may be dead except in the tops of the crowns.



Field Windbreaks

All America awoke to the seriousness of soil losses through wind erosion when the first great dust storm hit the Great Plains in May, 1934. The storm started in western Kansas, Texas, Oklahoma, and eastern Colorado. It carried an estimated 200 million tons of soil at a height of almost two miles across the country in a north and easterly direction and for hundreds of miles out over the Atlantic. Dust settled in Canada, blocked out the sun over our nation's capitol, and sifted through screens of homes and office buildings all across the country. Some farms lost topsoil as deep as their plows reached. The blowing soil particles cut off crop plants at the soil line as cleanly as you could cut them with a knife.

After the dust storms, field windbreaks began to appear throughout the Great Plains and midwest states. The two main purposes of a field windbreak are:

1. To hold the valuable topsoil in place - keeping it from blowing off the land and filling up ditches.

2. To keep the winter snowfall on the cropland. This prevents snow from blowing off the land and piling up in ditches, along roads, and on highways. It helps keep more moisture in the crop soil, too.

An effective field windbreak is not one that is so dense that it completely stops the wind. Instead, a windbreak should be open enough to slow down the wind and allow it to filter through - much like a screen in a window opening on your house. This allows the snow to filter through the tree planting and spread over the protected cropland. When the snow melts, moisture is added over the entire protected area. Since **deciduous** trees lose their leaves in the winter, they are better to use for field windbreaks than evergreens. A single row correctly spaced can do the job.

Along with holding the topsoil in place and keeping the winter snowfall on the cropland, field windbreaks (a) provide food, cover, and travel lanes for wildlife; (b) provide more pleasant conditions for planting, cultivating, and harvesting crops; and (c) add beauty to the landscape.

Trees and Us

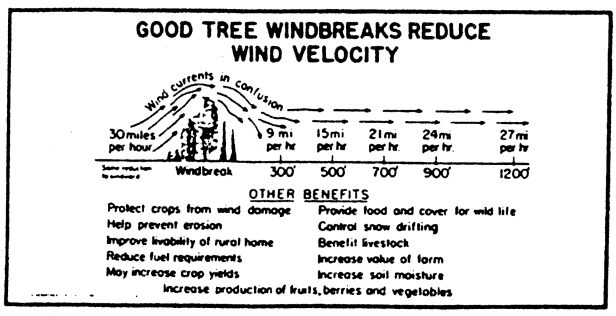
Trees do more than spruce up our space and provide wind shelter! They serve humans in many beautiful, practical, important ways.

Trees supply the oxygen we need to breathe. Trees make their food through **photosynthesis;** carbon dioxide and water are combined with sunlight energy to make sugars (tree food) and oxygen. Enough oxygen is produced by a single acre (about the size of a football field) of young growing trees to supply the needs of 18 human beings each year.

Trees help our environment. They clean the air by trapping much of the dust, dirt, and grit that pollute the air and fall on us. They keep our air supply fresh by absorbing the carbon dioxide we exhale and that is given off by factories and engines. They are great privacy and sound barriers. They refresh our watersheds, cool the air, and shelter us from direct sunlight on hot, sunny days.

Trees help save energy costs. A single row of tall evergreens planted on the northwest side of a home can cut fuel bills up to 20 percent. On hot summer days, trees are natural air conditioners; they lower air temperatures by evaporating water in their leaves. Shade trees planted near homes can lower the indoor temperature considerably.

Trees do much to make our lives and our world healthier and happier!



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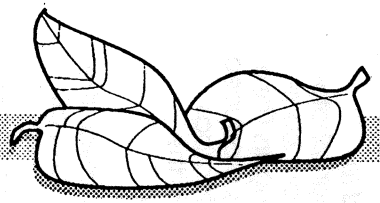
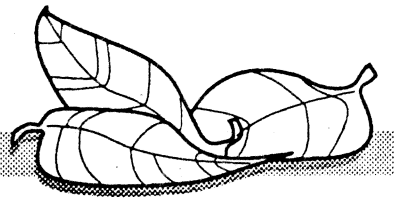


See activity details on pages 6-7 through 6-13.

Calendar

1 Research: The "Dust Bowl" of the mid 1930s. Social Studies/History	2 Look for: The "green tinge" in the tree canopy. Science	3 Discuss: Farmstead shelterbelts and field windbreaks. Create: Background and symbols for bulletin board. Science/Art	4 Look for: Tulips and daffodils blooming. Create: Symbols and "aerial" view of farmsteads. Science/Art	5 Create: Paper/pencil sketches and plans of farmsteads and shelterbelts. Social Studies
6 Look for: Crab apple trees in bloom. Present: One or two groups' shelterbelt projects. Science/Language Arts	7 Present: Group shelterbelt projects. Science/Language Arts	8 Present: Remaining group shelterbelt projects. Science/Language Arts	9 Research: Examine freshly cut tree stumps and read the rings. Science	10 Look for: Leaves forming on silver maple and red oak trees. Write: Fact cards and post near your tree stump. Science/Language Arts
11 Create: Crayon or soft lead pencil rubbings of annual rings of a tree. Art	12 Research: Estimate important dates in your community's history by reading rings. Social Studies/History	13 Look for: Dandelions. Do: *Copycat Pages* 1 and 2. (Activity Sheets) Science	14 Write: A story about "The Life of A Tree Stump." History/Language Arts	15 Look for: Lilac bushes and apple trees blooming. Discuss: Urban forests. Science
16 Look for: Bees pollinating. Interview: Develop a set of questions for your guest speaker (See Activity 19). Science/Language Arts/ Social Studies	17 Look for: Silver maple and elm seeds falling. Research: Identify locations in your community that would benefit from trees. Science/Social Studies	18 Look for: Bridal wreath blooming. Discuss: How are trees keys to healthier soil? Air? Water? People? Science	19 Listen: Guest Speaker-forester, parks manager, public groundskeeper, Department of Natural Resources or Department of Agriculture employee. Social Studies/Lang. Arts	20 Look for: Monarch butterflies. Write: Thank you notes to guest speaker, noting new things learned from his/her visit. Science/Language Arts

Bulletin Board Idea



Designing Shelterbelts and Windbreaks

Students participate by creating an "aerial" view background for the bulletin board itself, then attaching farm buildings and shelterbelt symbols. In groups, they will construct various farmstead shelterbelt patterns to reduce effects of wind on the farm buildings and soil. Use these symbols as patterns to create farmsteads with shelterbelts, or have students make their own symbols.

Pine tree

Poleshed

Barn

Silo

Corn bin

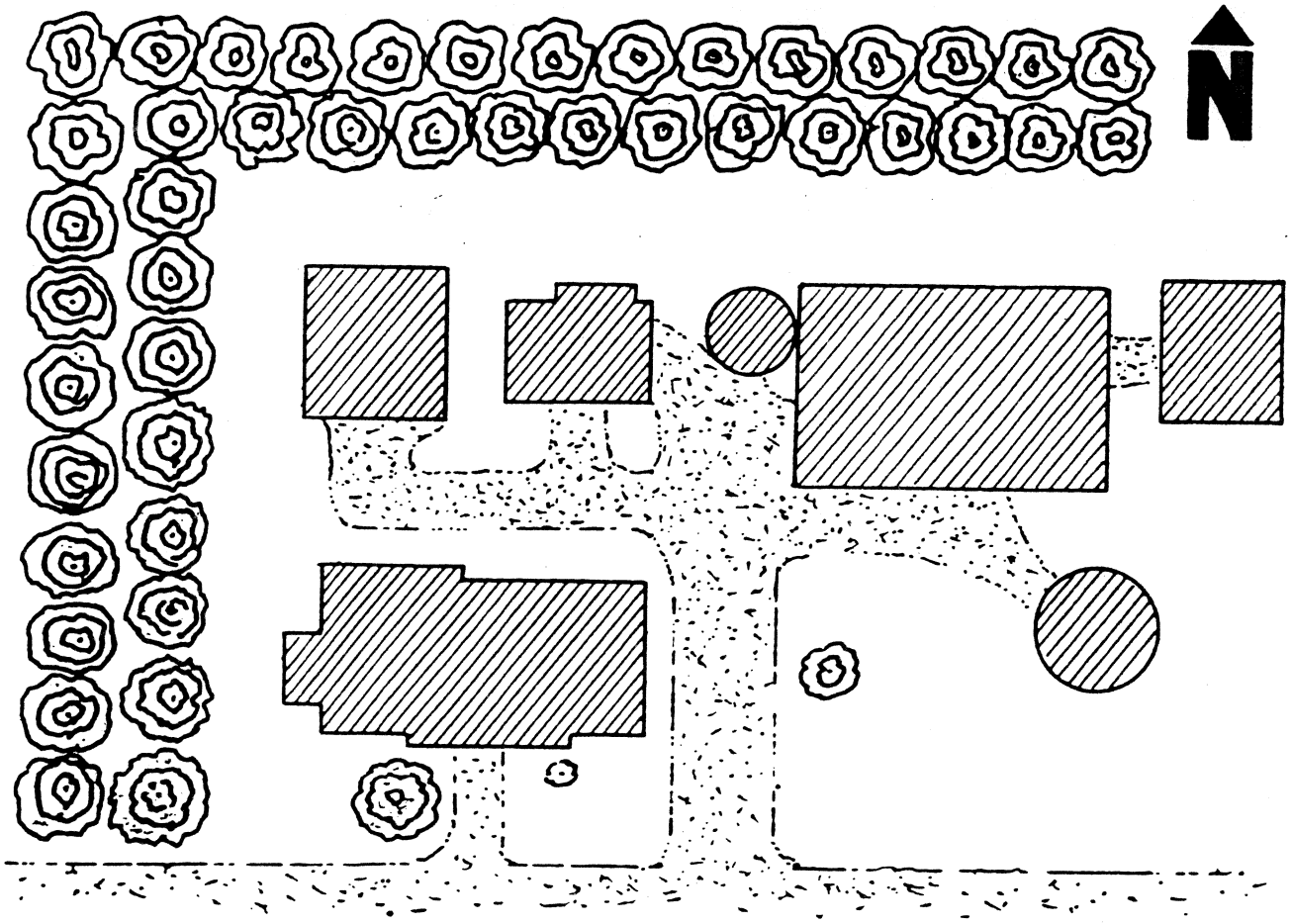
House

Broadleaf tree

Shrub

Pine tree

Bulletin Board Idea Continued

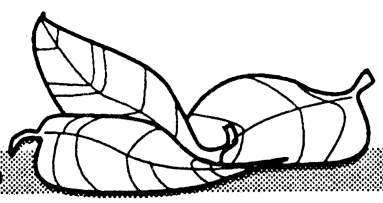


Key: 1" = 25'

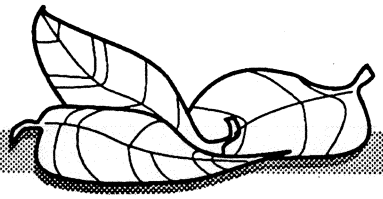
A sample windbreak design for farm headquarters:

Guidelines for plantings:

1. Plant shelterbelt on north and west sides of farmstead buildings.
2. Plant first row of plantings about 100' from buildings and feedlots, and 50' beyond.
3. Plant at least three rows of trees for desired density and protection.
4. Plant slow-growing trees in outside rows (pine, arborvitae, spruces).
5. Plant fast-growing trees in inside rows (maple, honeysuckle).
6. Plant rows about 16 feet apart.



Activities



Hands On - Minds On Activities

Follow these activities in order and you have one for each of the 20 days in Arbor Month (see calendar). Or, pick and choose any of the activities that best meet your class's needs.

To complete the calendar activities during the month, collect or ask youngsters to bring in a freshly-cut tree cross-section of a branch or trunk.

Activity 1: Dust Bowl days.

Display any materials with information about the "Dust Bowl" of the mid 1930s. Have a large sheet of paper or tag board titled "Dust Bowl of the 1930s" available. Students research the topic and list facts they find on the piece of paper.

Fun Fact: Trees hold the soil and reduce erosion. Native Trees along rivers, creeks, and streams in Utah protect the banks by slowing down and absorbing runoff water like giant sponges.

Activity 2: Look for: The "green tinge" in the tree canopy.

Share the facts about the "Dust Bowl." Add any new understandings to the sheet of paper.

Activity 3: Windbreaks and shelterbelts.

Discuss farmstead shelterbelts and windbreaks. Ideal shelterbelt design planting is an L-shaped belt of trees and shrubs on the north and west sides of buildings. Plantings should be 100 feet from buildings and feedlots and 50 feet beyond the last building or feedlot. Have students start cutting symbols for buildings, several trees, and shrubs. See designs for symbols on page 6-5. Have some students attach white paper to the bulletin board. Trim and title the board. This will be the background for an aerial view of a farm. Working together, determine the scale of inches for feet and feet for miles, then mark off an area on the bulletin board that is several hundred feet square. Next, students draw a road and driveway for one farm. It should look like an aerial view. Scale option: 1" = 25' and make a square section 36" x 36".

More about farm shelterbelts:

In addition to stopping the cold winter winds and preventing the piling up of snow around buildings, a farmstead shelterbelt provides these benefits:

1. Saves up to 20 percent of the cost of fuel for heating the home.
2. Reduces feed costs for livestock. Livestock use up less energy to keep warm; this energy can be used to gain weight.
3. Provides food and cover for songbirds, gamebirds, and small wildlife mammals. During recent winters in North Dakota, over 50 percent of our pheasants wintered in farmstead shelterbelts.
4. Protects flower gardens, vegetable gardens, orchards, and ornamental plantings.
5. Provides shade for the farm family and livestock.
6. Provides a picnic and recreation area in its shelter.
7. Makes the task of daily farm chores more pleasant and less vigorous, whether it be feeding livestock or repairing farm machinery.
8. Makes the farmstead a quieter place to live because outside noises are deadened.
9. Makes the entire farmstead more attractive and increases its value.

Fun Fact: During a bad winter, cattle protected by tree windbreaks lose 10 lbs. per unit less than unprotected cattle. During a good winter, cattle protected by tree windbreaks gain 35 lbs. per unit more than unprotected cattle.

More about field windbreaks:

Wind erosion and the loss of rich, productive topsoil aroused public concern on a national scale after the "Dust Bowl" days. This marked the beginning of wide-scale tree planting on the Great Plains known as shelterbelts. This type of planting is known as "field windbreaks" in Utah.

How do farmers decide if field windbreaks can help them? It's determined by:

1. *Type of soil.* The need for field windbreaks is greater on a farm with sandy soil than a farm with clay soil. Why? Clay soil particles are smaller than sand particles, but they stick together to form larger particles or "clods." Since these larger clay clods are heavier than the smaller sand particles, they are not as easily blown away by the wind.

2. *Type of vegetation.* When a farmer is growing row crops such as corn and soybeans, bare soil is exposed between the rows. This bare soil is subject to erosion, especially when the plants are small. Field windbreaks protect this soil. If, however, there are woodlands, roadside

grass, pasture, small grain crops, and stream or ditch plants near row crops, the need for field windbreaks is not as great.

3. *Farming practices.* Grass terraces, contour farming, and strip cropping reduce need for field windbreaks. Fall plowing that exposes bare soil during the winter months increases the need for field windbreaks. We have all seen black snow in the ditches along the highway during the winter. This is a mixture of snow and topsoil that blew off farmland plowed the previous fall. Tree plantings, any grass cover, and even corn or soybean stubble would reduce this soil and moisture loss.

In planting a windbreak it should be remembered that trees will slow down the wind for a distance of approximately 25 times their height. Beyond this distance, the trees have no effect. In other words, a field windbreak having trees 30 feet high will slow down the wind for a distance of 750 feet.

Activity 4: Look for: Tulips and daffodils blooming.

Finish work on the symbols and aerial view for the bulletin board.

Activity 5: Build farmsteads.

In groups of four or five, have students sketch one farmstead on a piece of paper. Discuss where farm buildings should be placed. Next, each group decides on where to "plant" a shelterbelt around this farmstead. Remind them of the distances needed to be effective. Have students "plant" a windbreak on their group project sheets.

Activity 6: Look for: Crab apple trees in bloom.

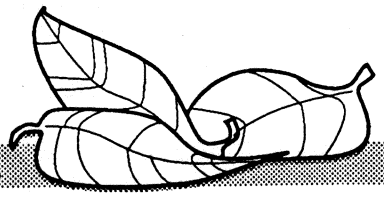
Have one or two groups display their farmstead plan on the bulletin board by attaching their cut-outs to the board with pins. Use cut-out symbols for buildings, roads, trees, etc. Have a "reporter" explain the group's thinking in their plan.

Activity 7: Farmstead sketches.

Have two or more groups display their sketches and give the reasons for their decisions.

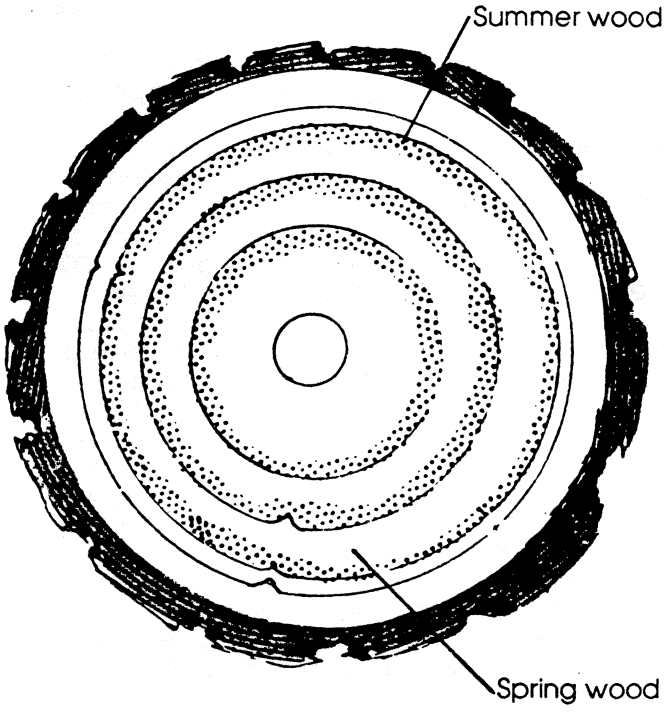
Activity 8: Farmstead sketches, continued.

Have remaining groups display their sketches and give reasons for their decisions.

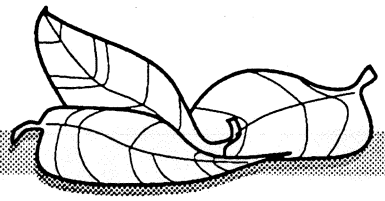


Activity 9: Stump spies.

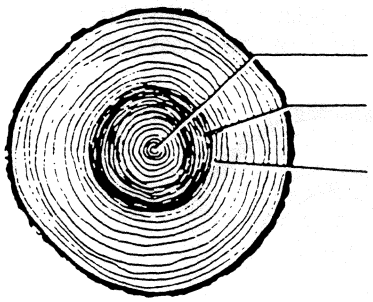
Bring a freshly cut tree cross section into the classroom. Invite several students to count the rings, and to read the rings. Tree rings are nature's record keepers. "Read your stump" with these tips: Look for the pattern of wide light rings and dark narrow rings in the wood. Each light band represents one spring's growth. The dark band is summer growth. Together they are one annual ring. A new annual ring is added under the bark each year. To tell the tree's age, count from the center out to the bark. The width of the light rings also tells about the weather during past springs. Wide rings mean spring weather was good: warm days, lots of rain, much growth. Narrower rings mean spring was probably cold or dry so the tree didn't grow as much. Or, the tree may have been crowded in early years, shaded by larger trees until they were harvested. Trees don't "just grow"; the surrounding environment has a big effect upon them.

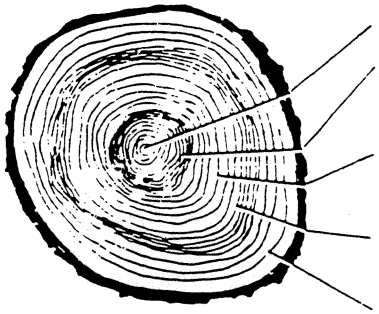


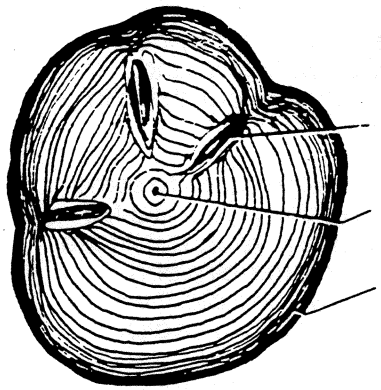
Tree cross sections are available from Project Learning Tree (see the Resources section), or they may be obtained from a tree service, a firewood pile, or cut from pruned branches.



Examine these ring patterns. What stories do they tell? How are the growth patterns alike? How are they different?







Activity 10: Look for: Leaves forming on big tooth maple and Gambel oak trees.
Post these fact cards near the tree stump:

• During a good growing season, a wide ring is laid down.

•During a poor growing season (**drought**, cold winter, a spring frost) the ring will be much narrower, showing the tree was able to grow very little.

• Other things besides weather influence a tree's growth, too. Examples are insect damage, diseases, fire, root damage, transplanting, and competition from other trees for sunlight, water, or nutrients.

Look at the rings and ask students to try to determine which annual rings represented good growing years and which represented poor growing years.

Activity 11: Ring rubbings.
Make crayon rubbings of annual rings from several trees. Simply put lightweight paper over the rings and rub on the paper with the side of a crayon.

Activity 12: Using the rubbings from Activity 11, determine:
a. How do the annual ring patterns of different **species** of trees vary?
b. Which tree is the oldest?
c. If you know approximately when a tree was cut, you can count backwards on the rings and identify the rings that correspond with important dates in your community or nation. Mark and label those rings.

Activity 13: Look for: Dandelions.
Do Activity Sheets A and B (pages 6-12, 6-13).
Pass out copies of Activity Sheet A (page 6-12) and have everyone look at the cross sections on the left-hand side of the page. Explain that each cross section represents a different tree. On the right-hand side are pictures showing seven factors that can affect tree growth. Go over the factors with the students so they understand each one. Then discuss each cross section and the factor or factors that could have influenced its growth pattern. Have the youngsters draw lines from each cross section to the matching factor or factors.

Cross Section A: The uneven growth shown in the rings could have been caused by a fallen tree leaning against the tree (picture 1). The tree grew more on one side than the other, and curved up around the fallen tree. This uneven ring pattern could also belong to a tree growing on a steep slope (picture 6).

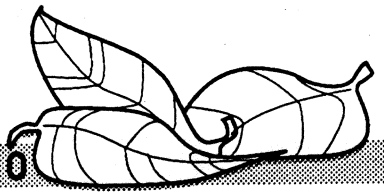
Cross Section B: The scarring in this cross section was caused by a forest fire during the tree's sixth growing season (picture 2).

Cross Section C: The mark beginning in year six is all that's left of a branch that died and fell off (picture 7). Eventually the tree's trunk grew around the remains of the branch and covered it. (The branch could also have been broken or cut off.)

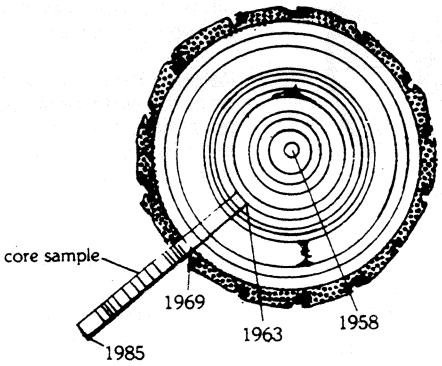
Cross Section D: The narrow rings shown in this cross section could have been caused by several factors such as drought (picture 3), heavy insect damage (picture 4), or damage from construction (picture 5). If a tree lost all or most of its leaves because of an insect attack or drought, it would not be able to make food and would grow very little that year. And root damage from the construction of a house or sidewalk too close to the tree would reduce the water and minerals the roots could take up. Ask the students if they can think of other factors that might cause narrow growth rings (disease, cold winter, a spring frost, transplanting, competition from other trees for sunlight and nutrients, etc.)

Now pass out a copy of Activity Sheet B (page 6-13) to each person. Explain that the large cross section at the top of the page is from a tree that was used to build a farmhouse. They must find out when the farmhouse was built by finding out when the tree started growing and when it was cut down. (They can assume that the farmhouse was built the same year the tree was cut.) They can also discover when some events happened during the life of the tree. To find out, they must study the core samples at the bottom of the page.

First, explain what a core sample is and how a core sample is taken. Have the students cut out each core sample, making sure they leave the lettered tabs attached. Then describe how *dendrochronologists* (people who study the past by looking at tree rings) cross-date trees by matching similar ring patterns from a core sample to a cross section. Explain that only one of the three cores is from a tree that grows in the same area where the log (the cross section) once grew. It has an interval of rings that overlaps with a section of the tree trunk at the top of the page. Students must first decide which core matches the trunk cross section.



To do this, they should take one of the core samples and try to match its pattern of lines with a section of the rings on the round cross section. (See the illustration for how to do this. Remind the students that core samples go no farther than the center of the tree, so they should not extend the core sample across the center of the cross section.)



When they've discovered which core sample overlaps the cross section (core sample B), they should count backward on the core sample to find out the actual dates when the core sample matches the cross section. Tell them that the line closest to the letter on their tab is the annual ring from 1985.

Once they determine the dates they can figure out when the tree was cut down and when it first started growing. (It was cut down in 1930 and started growing in 1896.)

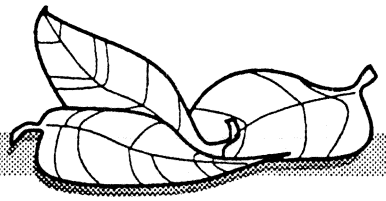
Then have the students assign dates to some of the events in the tree's life. What year did fire scar the tree? (1915). How many years did it take for the tree to grow around the remains of a dead branch? (10 years). How long did the drought that began in 1912 last? (two years).

Wrap up the activity by asking the students for ideas on other things that cross dating can reveal.

Adapted from Ranger Rick's Naturescope "Trees are Terrific." Used with permission.

Activity 14: Creative writing.

Write a story about the tree stump's life...taking into account the annual rings and the kinds of growth years they each represent. For idea starters, check out your library. Literature is filled with fascinating folklore and legends about



plants and trees. Your media specialist or librarian will be able to direct you to good sources. For example: It's said that Ojibway Indians seldom took down a living tree because they believed a tree could feel pain. Their medicine men told of trees wailing as they were being chopped down. Many other tribes around the world have also been especially respectful of trees. The primitive Basoqa of central Africa sacrificed animals to each tree they were about to cut down. Scandinavian folklore sparkles with gnomes, trolls, and other wee folk who dance in the air, cavort through meadows, and often live or sleep in trees. What examples can you turn up to share?

Activity 15: Look for: Lilac bushes and apple trees blooming.

Introduce the term **urban forest**. It may be hard to see the forest for the buildings in our cities and towns, but it's there! The urban forest grows along boulevards, in parks, along streams, in yards and hidden corners of our daily environment. Take another look! Where are the urban forests in your neighborhood?

Urban forests give us special benefits. Our watersheds are protected and the quality of urban water supplies is improved, thanks to trees. They increase property value, provide habitats for birds and other animals, shade our homes and playgrounds, are pretty to look at, and fun to climb. They absorb carbon dioxide and give us fresh oxygen to breathe. They even serve as an early warning system against environmental pollution. If the trees start dying, we'd better investigate the reasons!

Activity 16: Look for: Bees pollinating.

Develop a list of questions for the guest speaker in Activity 19. Idea starters:

a. Who is in charge of trees in our community?
b. How much money is spent on trees each year in our community?
c. Has the community planted any trees?
   Where did they get the trees to plant?
   What kinds of trees were planted?
   Why were these kinds chosen?
   What regular care do the trees get?
   Did the trees survive?
d. Does the department in charge of trees have certain criteria for choosing the kinds (species) of trees that will be chosen?
e. Who decides when and where the trees will be planted? Can local citizens plant trees on public property? If they can, what is the procedure for doing so?

Activity 17: Look for: Silver maple and elm tree seeds falling.

As a group, identify locations in the community where a tree or trees should be planted. In what ways would trees benefit these places? When your guest comes (Activity 19) be prepared to ask how to go about getting trees planted in places such as those the group identified.

Activity 18: Look for: Bridal wreath blooming.

Discuss: How trees are keys to healthier (a) soil; (b) air; (c) water; (d) people.

Activity 19: Guest speaker: Forester, parks manager, public groundskeeper, etc.

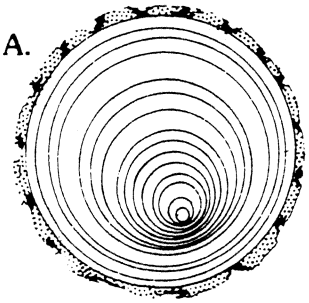
Activity 20: Look for: Monarch butterflies.

Write thank you notes to your guest speaker, noting new things learned from his/her visit.

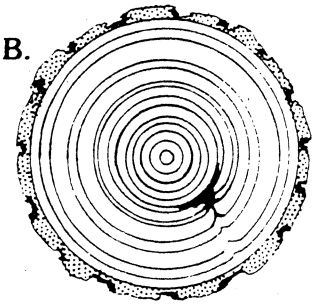
Activity Sheet A CopycatPage

Reading The Rings - Part 1

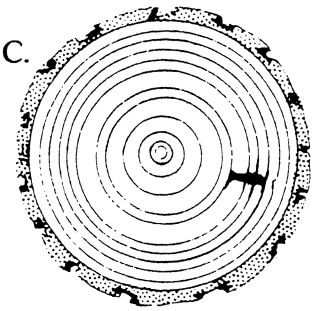
A.



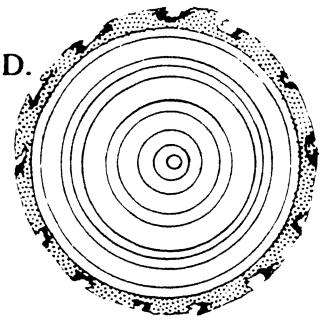
B.



C.



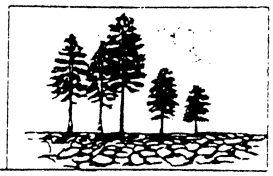
D.



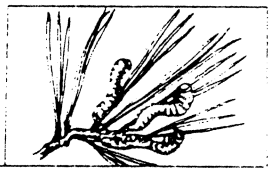
1. *Fallen tree* _____

2. *Fire* _____

3. *Drought* _____



4. *Insect attack* _____



5. *Construction* _____

6. *Growing on slope* _____

7. *Dead branch* _____

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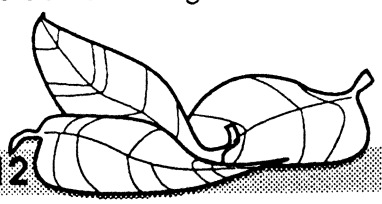
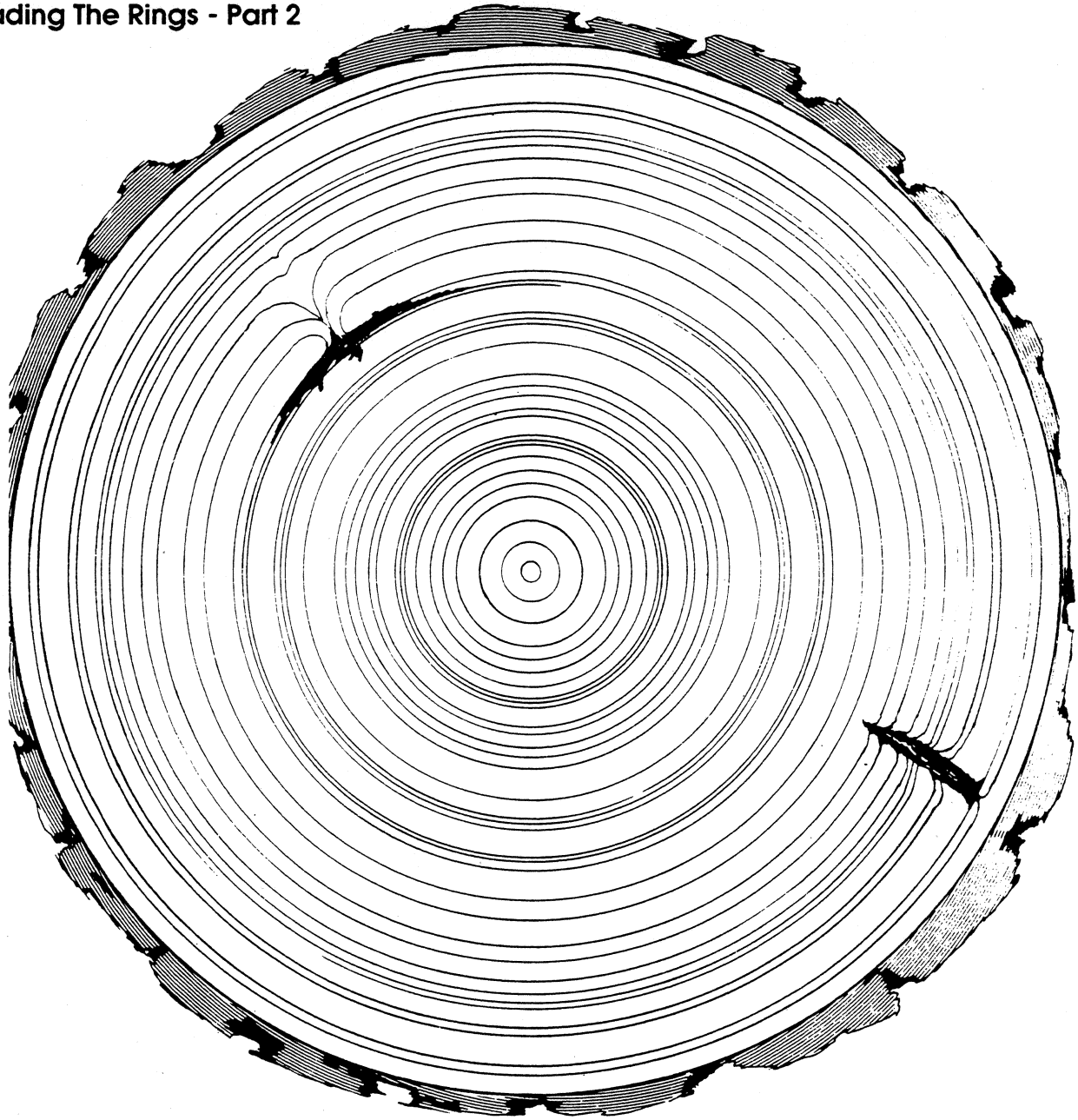
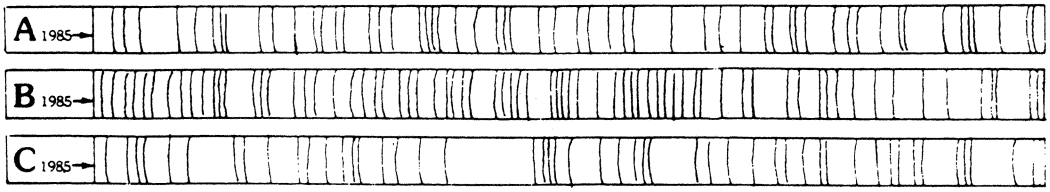


Instructions - See Activity 13, page 6-9.

Activity Sheet B CopycatPage

Reading The Rings - Part 2





Instructions - See Activity 13, page 6-10.

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