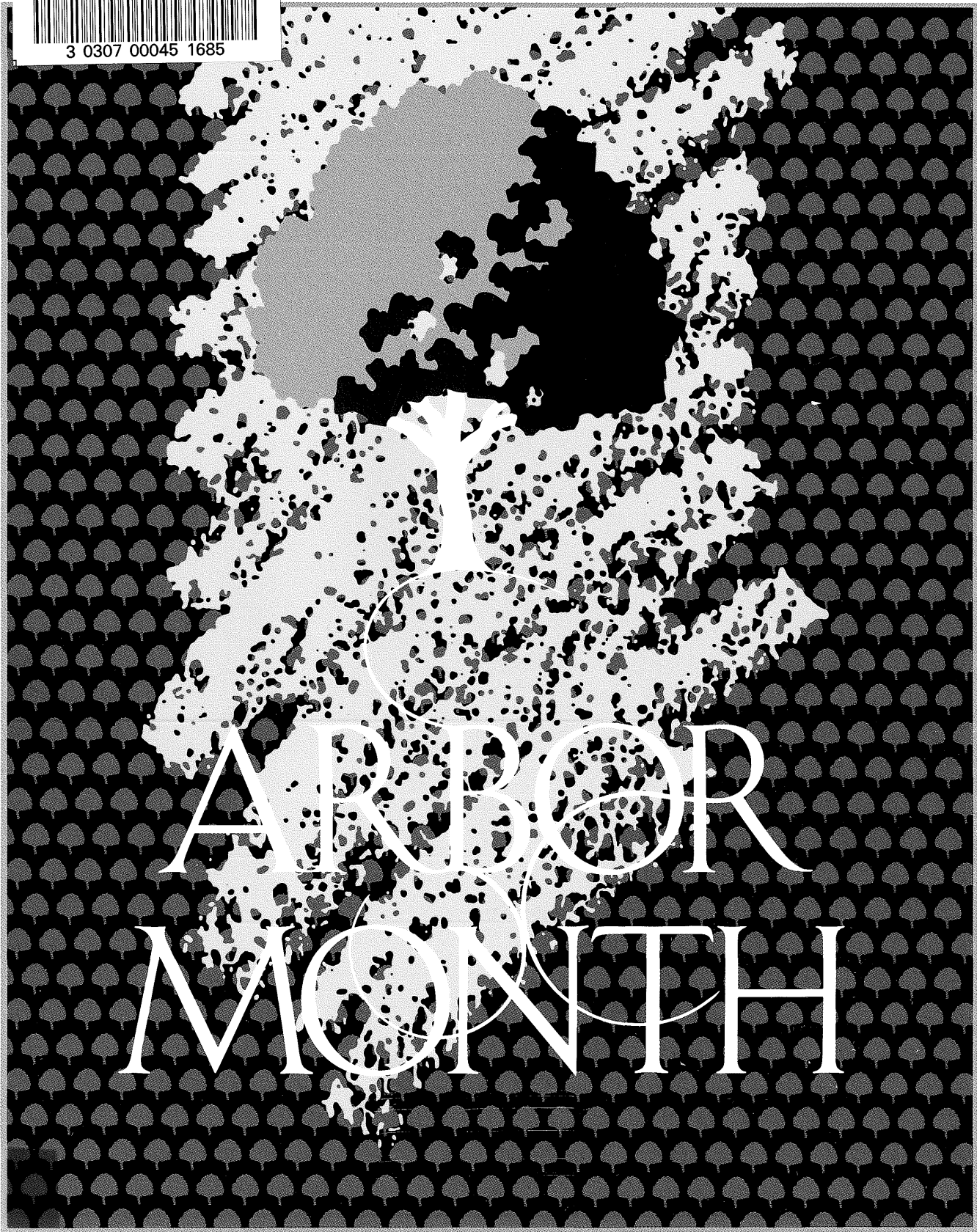


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May 1990

*Celebrate* trees and the places we call home.  
Minnesota Arbor Month Committee

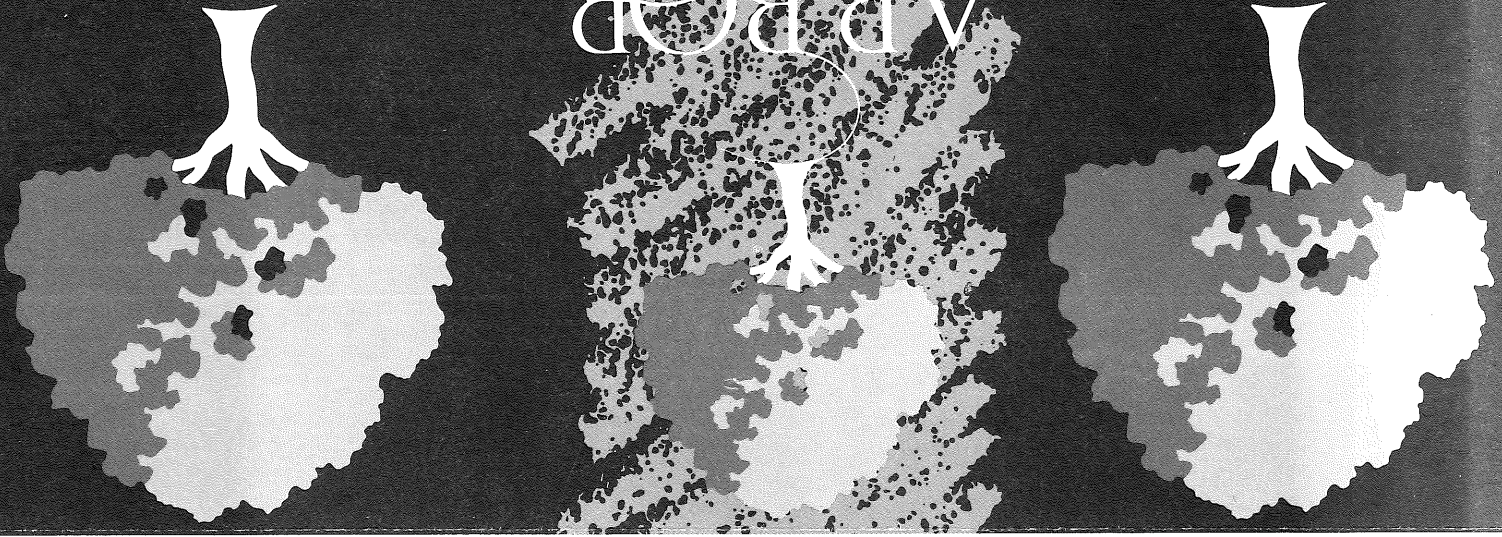


Minnesota Arbor Month Committee

Celebrate trees and  
the places we call  
home

# ARBOR MONTH

May 1990



<p>BULK MAIL #171 St. Paul, MN</p>
--

## Arbor Month 1990...

Encouraging Every Minnesotan to plant and Nurture Trees!

Printed on Recycled Paper

For information on ordering trees

**CALL  
(218) 326-1239**



T-Shirt: Heavy weight  
50/50 T-Shirt in Adult and  
Youth sizes. (White only)  
\$5.00 ea.

Buttons: 2-1/4"  
Buttons, sold  
in boxes of  
100. \$20.00 per  
box of 100  
(.20 each)

Mugs: Sold in sets of 6.  
\$21.00 per set of six  
(\$3.50 each)

Support your community and state, proceeds from these sales help support Minnesota Arbor Month.

**I've ordered:** T-Shirts Adult S \_\_\_ M \_\_\_ L \_\_\_ XL \_\_\_ Mugs \_\_\_\_\_  
Keep this portion for your records Youth S \_\_\_ M \_\_\_ L \_\_\_ Buttons \_\_\_\_\_

Return this portion with your order		ORDER FORM	Total
<b>T-Shirts</b>	Adult S ___ M ___ L ___ XL ___ Youth S ___ M ___ L ___		\$5.00 ea.
<b>Mugs</b>	_____ Sets of 6 at		\$21.00 per set
<b>Buttons</b>	_____ Boxes of 100 at		\$20.00 per box
			<b>Grand Total</b>

**Make and send checks payable to:**  
Creative Promotions, Inc., Attn: Arbor Month  
6288 Claude Way E., St Paul, MN 55076

**Minimum Order \$25.00**

*All prices include tax, shipping and handling charges.  
Allow 4 to 6 weeks for delivery.*

**Send my order to: (Please Print)**

**Payment Method:** (no cash please)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_  
Daytime Phone: \_\_\_\_\_

Check    Money Order    Visa    Master Card  
\_\_\_\_\_  
Expiration Date \_\_\_\_\_  
Signature \_\_\_\_\_  
Name of Card Holder (Please Print) \_\_\_\_\_

© Creative Promotions, Inc. 1990

PLACE  
POSTAGE  
HERE

**Minnesota Forestry Association**  
**220 First Ave. N.W., Room 210**  
**Grand Rapids, MN 55744**



# TREE ORDER FORM

The Minnesota Forestry Association invites you to join in a venture we believe will have a major impact on Minnesota and on the state's need to protect its natural resources.

The events of the past two years - the summers' droughts, conversion of forestland to urban sprawl, tropical deforestation, global warming and ozone depletion - have raised public concern nationwide, and issued a challenge to increase the amount of forestland both locally and on a global scale.

To that end, MFA has joined forces with "Celebrate Minnesota 1990" - a year-long celebration honoring Minnesota's past, celebrating its achievements, and planning for a bright and productive future. The year 1990 also marks the 20th anniversary of Earth Day, when the original challenge was made -- nationwide -- to awaken U.S. citizens to the problems the environment was facing.

MFA has joined forces with these two major events and has seeded one million trees in the anticipation that Minnesota's school children, its communities, organizations and private citizens will "plant a million" in 1990.

Planting trees won't, by itself, solve all environmental ills. But it is one item on the agenda of planning for a bright future. And it is something everyone can do, right now.

**Tree orders should be placed as a minimum of 25 trees per species. Trees can be shipped to arrive approximately three days in advance of Earth Day, April 22, or in advance of Arbor Day, April 27. Special delivery dates may be arranged for planting events taking place anytime from April 1 through June 15.**

**Trees are 45 cents each and are individually polybagged with simple planting instructions attached. Payment should be made within 10 days of billing from MFA office. MFA reserves the right to adjust tree orders if nursery conditions occur making such adjustment necessary. MFA will attempt to notify customer in advance if such adjustment is necessary.**

We would like to order the following:

Red Pine \_\_\_\_\_

White Spruce \_\_\_\_\_

Blue Spruce \_\_\_\_\_

Total Number  
ordered \_\_\_\_\_

at \$.45 per tree \_\_\_\_\_



Organization's Name: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ Zip \_\_\_\_\_

Telephone: (        ) \_\_\_\_\_

Shipping Address: \_\_\_\_\_

Preferred Shipping Date \_\_\_\_\_

Send to: **Minnesota Forestry Association**  
**220 First Ave. N.W., Room 210**  
**Grand Rapids, MN 55744 (218) 326-1239**



## Proclamation

WHEREAS: Minnesota's forest treasures were a significant attraction to early settlers because of their usefulness and the beautiful environment they provided; and

WHEREAS: Trees are an increasingly vital resource in Minnesota today, enriching our lives by purifying air and water, helping conserve soil and energy, creating jobs through a large forest products industry, serving as recreational settings, providing habitat for wildlife of all kinds, and making our cities more liveable; and

WHEREAS: Human activities such as construction damage and pollution, as well as disease and insects, threaten our trees, creating the need for concerted action to ensure the future of urban and rural forests in our state, country, and world; and

WHEREAS: The year 1990 will be one of celebration with special activities showcasing all that is outstanding about Minnesota occurring statewide, including the celebration of the twentieth anniversary of Earth Day, and the planting of one million trees by Minnesota citizens, both young and old; and

WHEREAS: Each year on the last Friday in April - Arbor Day - the people of Minnesota pay special attention to the wonderful treasure that our trees represent and dedicate themselves to the continued health of our state's stock of trees;

NOW, THEREFORE, I, Rudy Perpich, Governor of the State of Minnesota, do hereby proclaim April 27, 1990 to be

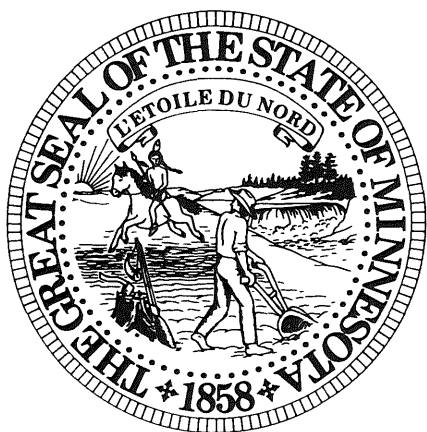
### ARBOR DAY

and the month of May 1990 to be

### ARBOR MONTH

in Minnesota.

Further, I urge all citizens to become more aware of the importance of trees to their well-being, to participate in tree planting programs that will ensure a green Minnesota in decades to come, and to plant, nurture, protect, and wisely use Minnesota's great treasure of trees.



IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the State of Minnesota to be affixed at the State Capitol this thirteenth day of December in the year of our Lord one thousand nine hundred and eighty-nine, and of the State the one hundred thirty-first.

*Rudy Perpich*  
GOVERNOR

*Jean Anderson Grove*  
SECRETARY OF STATE





# Celebrate



## Arbor Month

M A Y

### Sponsoring Organizations

Minnesota Shade Tree  
Advisory Committee

Minnesota Forestry  
Association

Minnesota Nursery and  
Landscape Association

Minnesota Society of  
Arboriculture

Minneapolis Park and  
Recreation Board

Celebrate Minnesota 1990

Minnesota Beautiful

Iron Range Resource and  
Rehabilitation Board

Minnesota Department of  
Agriculture

Minnesota Department of  
Education

Minnesota Department of  
Natural Resources

Minnesota Department of  
Trade and Economic  
Development

Minnesota Department of  
Transportation

Minnesota State Horticultural  
Society

Bloomington Public Schools

Earth Day 1990

Minnesota Green

National Youth Leadership  
Council

Minnesota Project Learning  
Tree

Minnesota Agriculture in the  
Classroom

### CONTACT:

Peter-Jon Rudquist, (612) 296-3349  
MN Department of Agriculture

Meg Hanisch, (612) 296-5958  
MN Department of Natural Resources

April, 1990

Dear Educator:

They're **READY, EASY-TO-USE, and FREE:** the 1990 Arbor Day/Month Education Kits! All you need are students and a few simple materials!

The year 1990 marks the twentieth anniversary of Earth Day. It's also the year of statewide events and festivals to Celebrate Minnesota. What better way to participate than by planting and caring for trees.

Please check for the following:

- The official 1990 Arbor Day/Month poster with the theme: "Celebrate trees in the places we call home."
- The new "Teachers' Guide to Arbor Month" containing teacher background information, bulletin board ideas, Arbor Month "to do" calendars, activities, and work sheets for grades K-9.
- Stickers illustrating and emphasizing the Arbor Day/Month theme.
- A message and official Arbor Day/Month proclamation from Governor Perpich.

These materials provide an outstanding opportunity to learn about trees! And they make learning fun!

Please note that the "Teachers' Guide to Arbor Month" is divided by grade level. We suggest that each teacher be given the section of the guide appropriate for his/her grade(s) and that this material be placed in a three-ring binder. Our future plans include producing new activities each year to add to the guide.

Please **reproduce these materials** and share them with all educators within your school or organization.

We'd really like your comments and suggestions about Arbor Day/Month and how to make it even better. Tell us what you liked, other things you would like to see, and any improvements you can suggest. (We've enclosed a handy, self-addressed mailer for your comments.)

Thank you for your interest and participation in Arbor Day/Month.

Plant a tree on Arbor Day and care for it for life!

Sincerely,

Arbor Month Committee

(more)



## Five Regional Arbor Month Ceremonies Named

Plan to have your group or classroom attend the regional ceremony nearest you. Each event offers unique learning opportunities and everyone will get to plant or care for trees.

**Northeast Regional Ceremony:** Ironworld USA, Chisholm, Minnesota. Friday, April 27, 1990. All attendees will be planting trees; tours will be available through the Iron Range Resources and Rehabilitation Board's new seedling growth chamber. For more information, contact Mr. Orlyn Olson, (218) 254-3321.

**Northwest Regional Ceremony:** Moorhead, Minnesota. Friday, May 4, 1990. For more information, contact Mr. Bob Fogel, (218) 299-5340.

**Southwest Regional Ceremony:** Worthington, Minnesota. Tuesday, May 1, 1990. For more information, contact Ms. Nancy Ackermann, (507) 662-5577.

**Southeast Regional Ceremony:** Waseca, Minnesota. Friday, April 27, 1990. For more information, contact Mr. Mark Bartelt, (507) 835-3840.

**Metropolitan Regional Ceremony:** Minnesota Landscape Arboretum, Chanhassen, Minnesota. Friday, April 27, 1990. All attendees will be planting trees, Douglas Wood (environmental singer/songwriter and native Minnesotan) will provide a 45-minute concert, and tree tours of the grounds will be available. For more information, contact Mr. Peter-Jon Rudquist, (612) 296-8410.

Consider yourself invited, roll up your sleeves, and dig in!



# Celebrate



**Arbor  
Month**  
M A Y

### Sponsoring Organizations

Minnesota Shade Tree  
Advisory Committee

Minnesota Forestry  
Association

Minnesota Nursery and  
Landscape Association

Minnesota Society of  
Arboriculture

Minneapolis Park and  
Recreation Board

Celebrate Minnesota 1990

Minnesota Beautiful

Iron Range Resource and  
Rehabilitation Board

Minnesota Department of  
Agriculture

Minnesota Department of  
Education

Minnesota Department of  
Natural Resources

Minnesota Department of  
Trade and Economic  
Development

Minnesota Department of  
Transportation

Minnesota State Horticultural  
Society

Bloomington Public Schools

Earth Day 1990

Minnesota Green

National Youth Leadership  
Council

Minnesota Project Learning  
Tree

Minnesota Agriculture in the  
Classroom

### Dear Educator:

Please take a few moments to fill out this questionnaire. This is the only way for us to determine how you like the packet. If you wish to continue receiving these materials each year, OR if you see areas where we could improve, let us know! There is space on the back panel for your comments and ideas.

Thank you,

Minnesota Arbor Month Committee

Name: \_\_\_\_\_ Grade(s) you teach: \_\_\_\_\_

School: \_\_\_\_\_

Address: \_\_\_\_\_

### General Information

1. Did you or other teachers in your school use these materials?  Yes  No
2. Were the materials reproduced and shared with others?  Yes  No
3. Please estimate the number of students/people involved in 1990 Arbor Month activities from your school: \_\_\_\_\_
4. Do you wish to continue receiving Arbor Month materials?  Yes  No

### About the Packet (Please rank according to usefulness)

	Poor	Average	Excellent
5. Format (broken down by grade level)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Stickers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Poster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Overall Arbor Month Education Packet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### About Your Arbor Observance

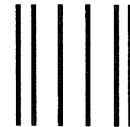
11. Did you or your school plant trees for Arbor Month?  Yes  No
12. How many trees were planted? \_\_\_\_\_  
What types? \_\_\_\_\_
13. How will those trees be cared for? \_\_\_\_\_



**Comments** (Use the space provided below)

14. Your comments/suggestions are critical to the progress of this program. Please let us know what you think of the State Arbor Month Program. What do you like about it and how might we improve it.

( FOLD IN )

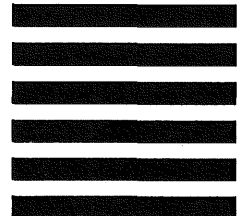


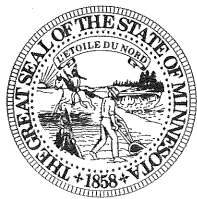
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Plant Industry Division  
90 West Plato Boulevard  
St. Paul, MN 55155-9902





# STATE OF MINNESOTA

OFFICE OF THE GOVERNOR

ST. PAUL 55155

RUDY PERPICH  
GOVERNOR

April, 1990

From the Governor...


In this year of Celebrate Minnesota 1990, I take special pleasure in again proclaiming the last Friday in April -- April 27, 1990 -- to be Arbor Day and the month of May to be Arbor Month in Minnesota. This year citizens all over Minnesota will be planting a million trees in recognition of the vital resource we have in trees.

Trees are a living resource. They purify our air and water, help conserve soil and energy, and they create jobs through a large forest products industry. Trees enrich our recreational settings, provide habitat for wildlife, and green our cities. As global warming concerns increase, trees are even more important for their "cooling effects" and their ability to reduce carbon dioxide build-up.

Arbor Day and Arbor Month will be key activities in the Celebrate Minnesota 1990 schedule of events. We want to showcase Minnesota to the rest of the nation as it turns its eyes towards the U.S. Olympic Festival-90 in the Twin Cities this July. We are also celebrating Earth Day 1990, the 20th anniversary of the first Earth Day, on April 22. What better way to display our state and recognize the fragility of Earth's environment than through one of its greatest natural resources -- trees!

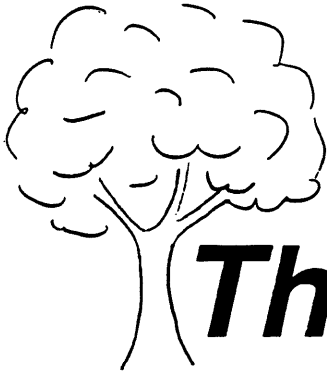
I urge all citizens to plant, nurture, protect, and wisely use these Minnesota treasures.

Sincerely,

  
RUDY PERPICH  
Governor







# **The Jacob Tree**

## **Plant a tree for Jacob**

**Dear Educator:**

*In October of 1989, a little boy named Jacob was abducted at gunpoint near his home in St. Joseph, MN. Jacob has not yet been found, but his name has become a rallying cry of pain and hope and love. The phrase, "Jacob's Hope", has come to symbolize a commitment, not only to Jacob, but to children everywhere. Missing children. Exploited and abused children. Children who are hurting. Children at risk.*

*This spring, as part of Arbor Day and Earth Day, we are asking that you -- your school or classroom -- plant a "Jacob Tree". They will be planted all over the state - some with a special ceremony, with a commemorative plaque or stone or ribbons. The Governor is planting a Jacob Tree. Mayors and city councils and parks and the Minnesota Arboretum are planting Jacob Trees. Each will be a powerful symbol of our commitment to children - to their safety and protection, their education, their rights to a safe and healthy environment. But of all the trees that are planted, perhaps the most important will be those planted by children. Planted by children and for children - a statement of personal power and affirmation in the face of a sometimes flawed and sometimes frightening world. That is why we are asking your school to participate, and to plant a tree in honor of Jacob.*

*A "Jacob Tree" can be any sort of tree that is appropriate to your local environment. If possible choose a tree that is already fairly good sized and well established, for optimum chances of growth. Pick a suitable spot, a place where the tree can receive enough water and light and has a good chance to grow. It's important for kids to know that every tree may not grow. That's the nature of trees, and why so many are being planted. If a tree dies, that's not the end of "hope", it's just time to plant another tree. In any case, the planting of any tree is just a first step. Help students make a commitment to its nurturing and growth.*

*Planting a "Jacob Tree" can be symbolic of many things. It can be part of the "Celebrate Minnesota 1990" program, a part of Arbor Day and of the special 20th anniversary of Earth Day. Above all, it will symbolize our dedication to the kind of Earth our children should have, and give them a feeling of participation.*

*There is no greater symbol of life and of growth than a beautiful tree. Plant a tree for the children. Plant a tree for Jacob.*

**Jacob Wetterling Foundation**  
*EarthSong*  
**Central Minnesota Celebrate**  
**Earth Days 1990 Committee**  
**The Office of the Governor**  
**Arbor Day Committee**





# **The Jacob Tree**

**Plant a tree for Jacob**

**Dear Student:**

**In October of 1989, a little boy named Jacob was kidnapped near his home in St. Joseph, MN. Jacob has not yet been found, but "Jacob's Hope" goes on. This spring there is something you can do to help keep the hope alive. Plant a tree. Plant a "Jacob Tree".**

**Your tree can help to symbolize hope and strength for Jacob, and for children everywhere who may be missing or abused or hurting. Your tree will say that you care, and as it grows it will help make the world just a little more beautiful, giving just a little more shade, a little more oxygen, a few more homes to the creatures with whom we share the earth.**

**Pick a good place for your tree, a spot where it can receive enough water and light and has a good chance to grow. It's important to remember that every tree may not grow. That's the nature of trees, and why so many people will be planting Jacob Trees this spring. If your tree should die, that just means it's time to plant another tree, and try again. Soon you'll be succesful, and the world will have one more beautiful tree in it. Your tree. And Jacob's.**



**Jacob Wetterling Foundation  
Arbor Day Committee**

**EarthSong**

**Central Minnesota Celebrate  
Earth Days 1990 Committe**

**The Office of the Governor**

# Available Sources of Trees & Information

## Sources of Trees

**Need Help Paying for Trees?** — There are many possibilities for sponsors for tree planting projects. Why not ask the local lumberyard, the local newspaper, or the local bank to purchase trees for your project? The lumberyard could sponsor enough trees to replace the amount of forest products they sell in one year, the newspaper could sponsor enough trees to replace the newsprint they use each year, etc. In addition, local civic groups such as the Masons, the Lions or a local sportsmen's club are good possibilities for sponsorship.

The **Minnesota Forestry Association** has containerized seedlings available in 1990 at 45¢ each to stimulate tree plantings by schools, colleges, and groups all over the state. Contact Kathleen Preece at (218) 326-1239 or write Minnesota Forestry Association, 220 First Ave. NW, Grand Rapids, MN 55744. It's important to order soon to insure receipt of your trees before your planting date. (See enclosed Tree Order Form)

The **Department of Natural Resources** is also a source of low cost trees to be used for the purposes of reforestation, windbreaks, shelterbelts, erosion control, soil and water conservation, or permanent food and cover for wildlife. Contact the DNR at 1-800-652-9747, or at 612-296-4480 for more information.

**Soil and Water Conservation Districts** — Most SWCDs have trees available for sale. Look in your phone book under your County Soil and Water Conservation District or Soil Conservation Service.

**Private Nurseries** — Check with your local nursery for trees and shrubs.

## Information

The **Minnesota Arbor Month Committee** has two materials which will be helpful in coordinating tree planting projects.

- The "Community Planning Guide" packet includes a step-by-step manual on how to coordinate a tree planting celebration. This piece is invaluable to those organizing an Arbor Day celebration.
- The "Teacher's Guide to Arbor Month" is a curriculum packet broken down by grade levels K-9 which will be ready for distribution in the spring.
- For either of these materials, contact the MN Arbor Month Committee, Room 226, 90 West Plato Blvd., St. Paul, MN 55107.

The **National Youth Leadership Council** has information for colleges and high schools. They have scheduled a training workshop that will cover the issues which surround trees as well as broader environmental issues. Materials will be available, as well as resource people to advise on an actual tree planting project. For more information, contact Diana Smith at the National Youth Leadership Council, Fairview Community Center, 1910 West County Road B, Roseville, MN 55113, or call 612-631-3672.

**Earth Day 1990**, April 22, 1990 will be celebrated across the United States as the twentieth anniversary of the first Earth Day. An Earth Day Environmental Activity Kit is available from Celebrate Minnesota 1990, 900 American Center Building, 150 East Kellogg Blvd., St. Paul, Minnesota 55101.

**Global Releaf** is a grassroots movement sponsored by The American Forestry Association. For a free information kit, contact The American Forestry Association, P.O. Box 2000, Washington, DC 20013 or call (202) 667-3300.

The **Star/Tribune** newspaper is creating an educational supplement that will introduce the issues surrounding recycling and waste management. The supplement will be written for youth in grades 7-12, and will be easily adaptable to the elementary level. Use of the supplement is encouraged for home learning. This free supplement may be ordered by phoning Star/Tribune Specialist Operators at (612) 375-7360.



**Tree Owner's Manual** is a valuable booklet including information on tree varieties, plus planting and maintenance. To order **Tree Owner's Manual**, write for Catalog Number AG-MI-3898 including \$1.20 each plus 6% sales tax. Send your order and payment to Distribution Center, Room 3, Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108.

**Soil and Water Conservation Districts** have put together a packet entitled "The Tree: A Key to Healthy Soil, Air, Water and Me". Copies available from your local county SWCD or contact the Minnesota Association of Soil and Water Conservation Districts, 1884 Como Avenue - Suite 25, ST. Paul, Minnesota 55108. Telephone (612) 649-1440.

**Minnesota Green** has prepared a booklet entitled **Creating Community Gardens**. To obtain a copy, send \$3.00 each to: Minnesota State Horticultural Society, 1970 Folwell Avenue - #161, St. Paul, MN 55108.

**Minnesota Extension offices** have materials on their "Adopt a Tree" program available through their Forest Resources Project. Contact your local county extension office.

A more complete listing of environmental education materials is available through the Environmental Protection Agency, Office of External Affairs (A-108), Washington DC 20460

## **Finding Sites for Planting Trees**

### **Minnesota State Resources —**

**The Department of Natural Resources —** Information is available on sites through the DNR Private Forest Managers who are willing to help find sites at which to plant trees. See the enclosed map for location of the regional DNR offices. State parks are another potential source of sites, for information, contact your nearest State Park Manager.

**Minnesota Department of Transportation —** Contact the local MnDot Maintenance District Office.

### **County Resources —**

**County Foresters —** Call your county courthouse and ask for the county forester. If there is no forester, ask for the Parks and Recreation office. In addition, contact the County Extension Office.

**Soil and Water Conservation Districts —** SWCDs may be able to help find sites for planting trees to establish windbreaks, shelterbelts, or for wildlife habitat. Look in your phone book under your County Soil and Water Conservation District or Soil Conservation Service.

**County Fairgrounds —** Contact your County Fair Board to see if they would like trees planted around the edge of the fairgrounds, for shade, or in ornamental plantings.

### **Local Resources —**

**Local City Forester —** Call your city hall office and ask for the city forester. If there is no forester, ask for the Parks and Recreation Department.

**Nature Centers or Arboretums —** Contact the nature center or arboretum in your community.

*This information prepared by Celebrate Minnesota 1990, the Minnesota Arbor Month Committee, the Minnesota Forestry Association, the National Youth Leadership Council, and Carol Greenwood of the Minneapolis Girl Scout Council.*



Make your plans for ARBOR DAY, Friday, April 26, 1991  
ARBOR MONTH, May 1991

Everyday we hear more and more about increasing carbon dioxide in the earth's atmosphere causing the "Greenhouse Effect" leading to "Global Warming." Certainly, the memory of the 1980s, which saw the five hottest years this century, is still fresh in the minds of most Minnesotans.

But, there is something that each of us can do to help reduce the potential consequences of "Global Warming"—PLANT A TREE! Because trees use carbon dioxide as they grow, they can help cool the globe. And even more importantly, shade from trees helps keep buildings cooler, decreasing the need for air conditioning and the resultant carbon dioxide produced from fuel consumption. Trees can turn unlivable homes and urban "heat islands" into cool and comfortable "oases." Planting trees for "MINNESOTA RELEAF" is now more important than ever.

The "MINNESOTA RELEAF" campaign is just one part of a larger effort headed by the American Forestry Association called "Global Releaf"—an international effort aimed at reducing the carbon dioxide build-up in the earth's atmosphere. "Global Releaf" challenges people everywhere, from citizens to national leaders, to look to new goals—goals that establish new visions of how our generation will not only halt environmental destruction, but reverse it and regenerate more stable and balanced ecosystems.

In cities and towns across the country, the "Global Releaf" goal is to plant 100 million trees by 1992. National surveys have shown that there is sufficient space for doubling the number of trees in our communities. In rural areas, there are enough opportunities for tree planting and active tree management to help offset up to one-third of the current carbon dioxide produced by burning fossil fuels.

Yes, we can all help! So mark your calendar, now, for Friday, April 26, 1991. You, your family, and your friends will want to be a part of the effort and the celebration. Start planning this year by finding good sites for new trees and determining which kinds of trees are best suited for your area. So, plan to create some of your own "MINNESOTA RELEAF"! Not only will you be doing something that can make a difference about the "Greenhouse Effect," but you will help make your own environment a more beautiful and healthier place in which to live, work, and play.



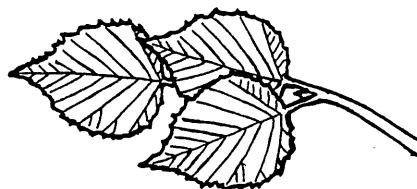
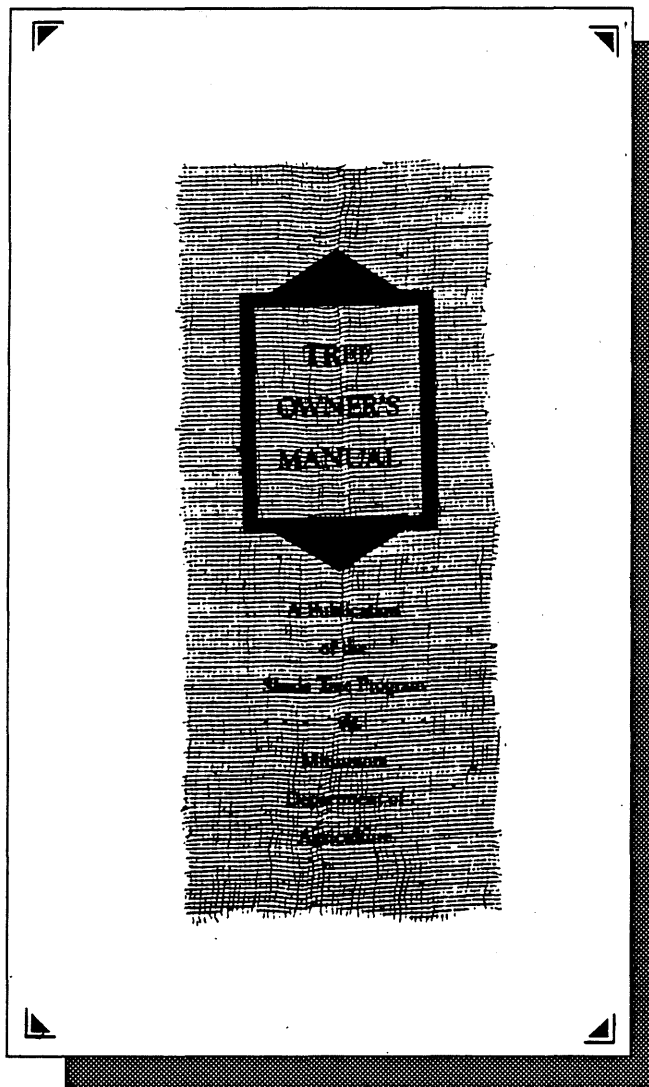
For more information about the "MINNESOTA RELEAF" program, contact the Minnesota Department of Natural Resources, Division of Forestry, 500 Lafayette Road, St. Paul, Minnesota 55155-4044.

For free Arbor Month materials to be mailed in early 1991, contact the Minnesota Arbor Month Committee, Division of Plant Industry, 90 West Plato Boulevard, St. Paul, Minnesota 55107-2094.





Get Ready for Spring!  
**Order Your Copies  
of the Tree Owner's Manual Today**



*The Tree Owner's Manual is a 24 page guide to proper tree selection, planting and care.*

*The Tree Owner's Manual :*

- \* Contains information about the economic and environmental benefits of trees in the landscape.
- \* Outlines critical considerations necessary for properly selecting the appropriate tree for your planting site.
- \* Details the steps necessary to properly plant and maintain trees.
- \* Introduces the characteristics of over 100 trees which are recommended by many of Minnesota's most highly regarded shade tree experts.

**Only \$1.20 each** (plus 6% sales tax)  
10% discount for orders of 100 copies or more

*Please allow 4 to 6 weeks for delivery.*

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**Tree Owner's Manual**  
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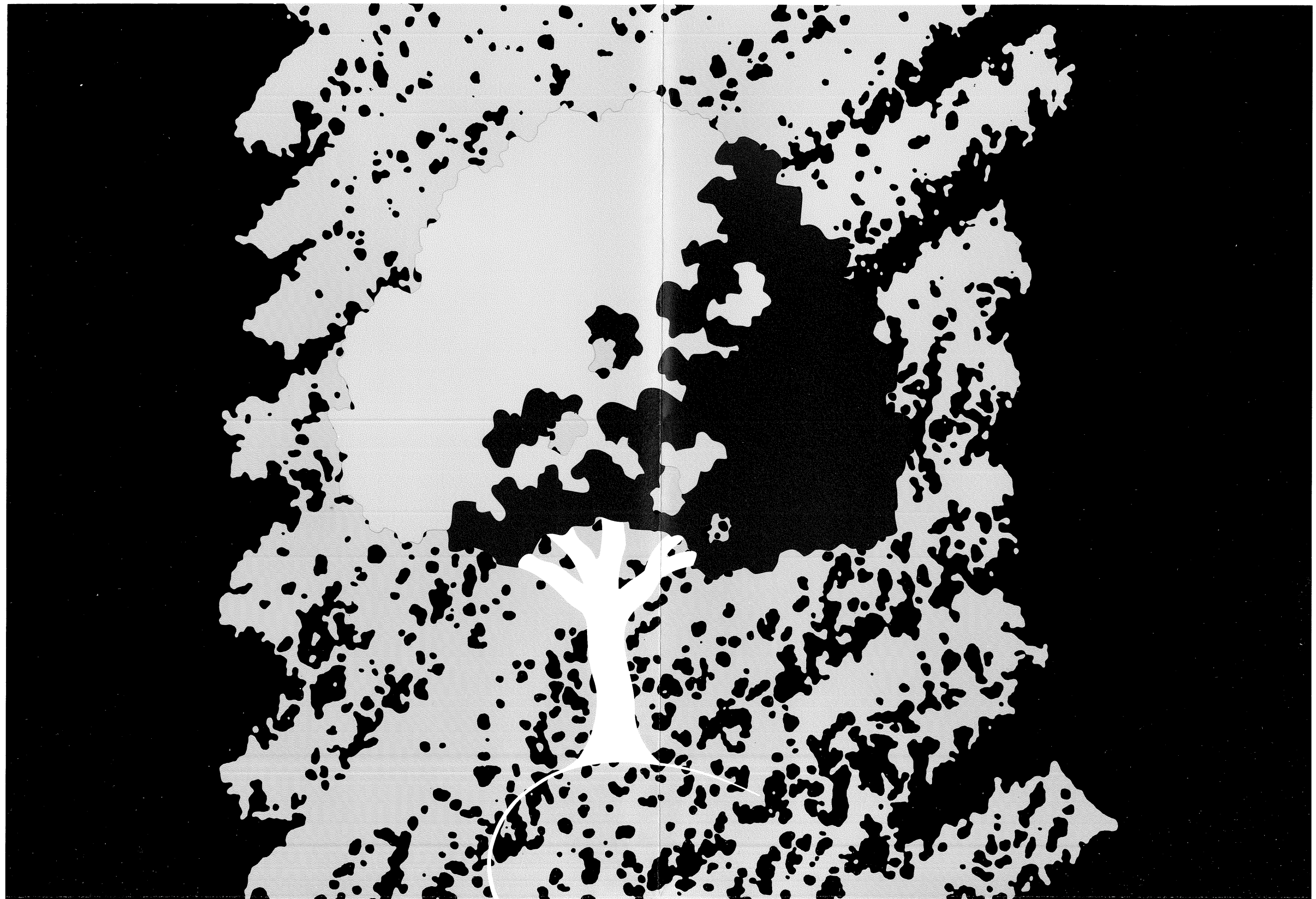
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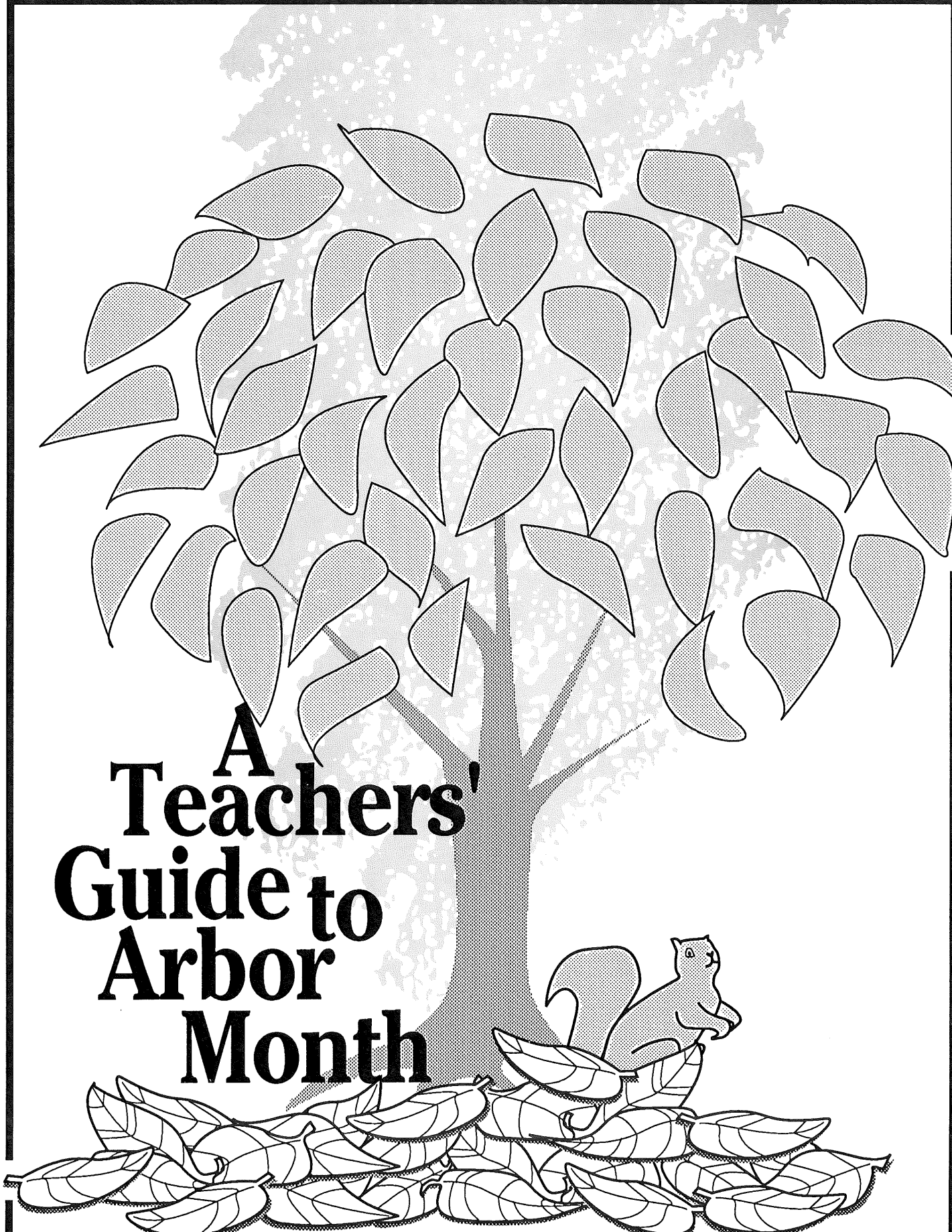




# ARBOR MONTH

May 1990

*Celebrate* trees and the places we call home.  
Minnesota Arbor Month Committee



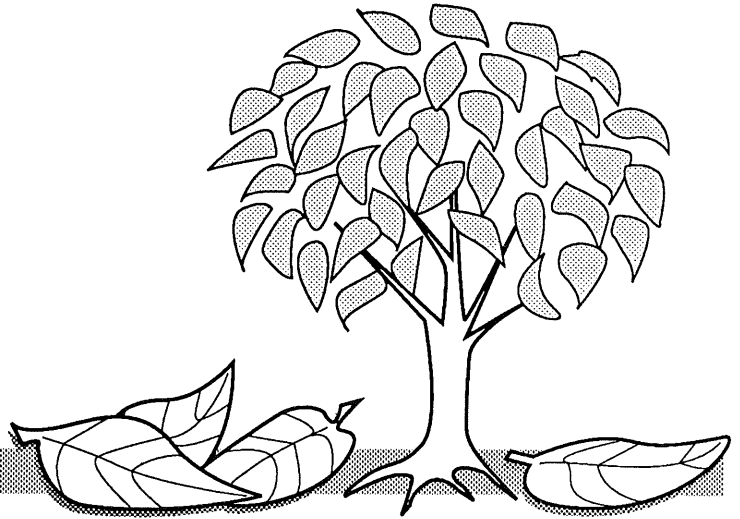
**A  
Teachers'  
Guide to  
Arbor  
Month**

Minnesota Arbor Month Committee



# Introduction

## Plant Your Future

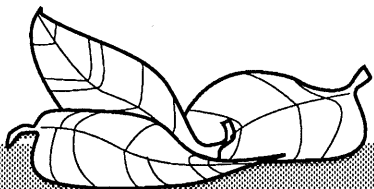


Arbor Day and Arbor Month offer us a unique opportunity each year to give a lifelong gift to ourselves. Plant a tree, and we've given root to a spot of beauty in our world. We've made a step toward creating a better environment, and have added to the natural world we will pass on to our children and the generations to come. Rarely do we have the opportunity to do something as simple as planting a tree---and then see the results literally growing before us today and far into the future.

Glance through the pages of your *"Teachers' Guide to Arbor Month"* and you'll discover a host of ready-to-use ideas to make your arbor celebrations interesting and significant to students of all ages. Don't feel limited to using only the ideas suggested for your own grade level. Scan all the grade level materials and feel free to choose any projects that interest you and your group. Don't miss the Appendix and Resources sections of your guide. They're packed with activities and resource opportunities for youngsters of any age...and for adults, too.

You'll want to keep your *"Teachers' Guide to Arbor Month"* handy not only during your spring celebrations, but throughout the school year. It's a great reference for tree information any time, and offers a treasury of learning opportunities that integrate into environmental education, science, social studies, language arts, and Minnesota history lessons any time of the year.

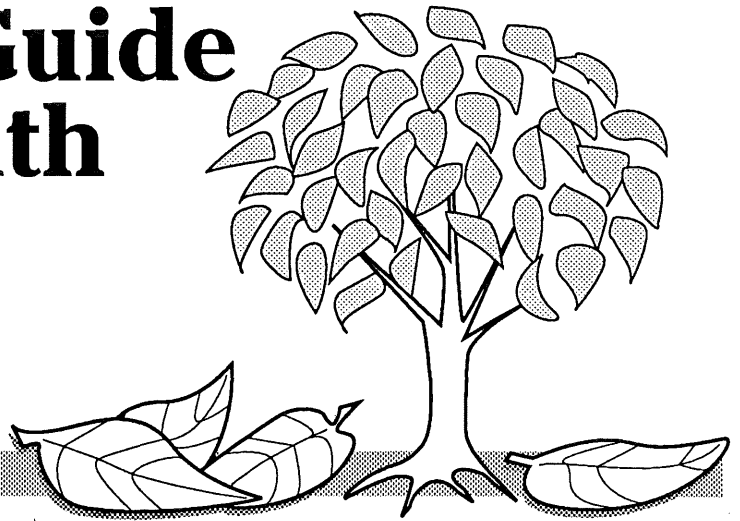
This *"Teachers' Guide to Arbor Month"* has been especially prepared for you by the Minnesota Arbor Month Committee, a group of concerned agencies, organizations, and individuals who promote the planting, caring, and nurturing of trees. Please feel free to reproduce any of these materials and share them with other educators within your school or organization.





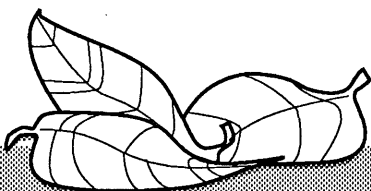


# A Teachers' Guide to Arbor Month



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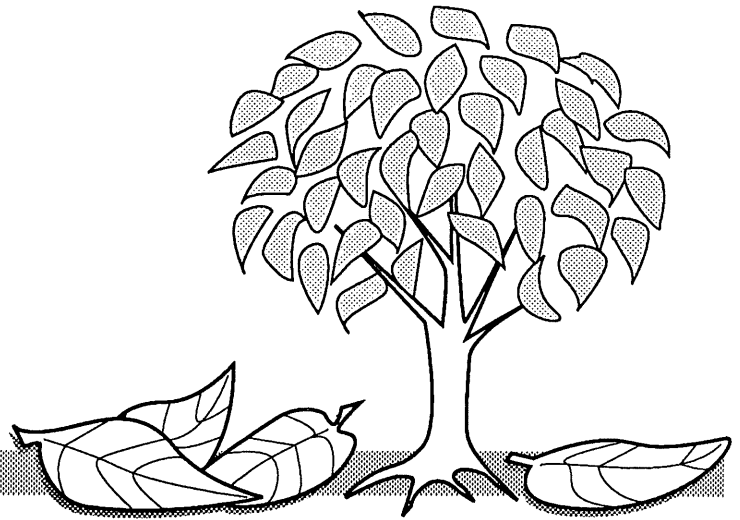
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# Arbor Day

## Background and Ceremony Ideas



### Objectives

- To motivate youngsters to love, conserve, and plant trees for a better environment.
- To provide a plan for conducting Arbor Day/Arbor Month ceremonies or tree-planting campaigns.

Tree planting is what a Minnesota Arbor Celebration is all about. Just one tree planted on Arbor Day does more than shade the spot where it's planted. It gives root to the love of trees and the stewardship of renewable resources.

This *"Teachers' Guide to Arbor Month"* is a collection of bulletin board ideas, tips, facts, activities, and reproducibles designed to make your observance an exciting and lovely tradition...and to help young people become tree conscious all year long. Through Arbor Day celebrations and teaching students about trees, you help them plant the future for themselves and for generations of Minnesotans to come!

### Arbor Day

To everyone concerned with the protection and conservation of tree resources, Arbor Day is a day to celebrate! It's a special day when people learn about, plant, and care for trees.

Arbor Day is an American tradition. Arbor celebrations began in Nebraska in 1872. Nebraska, along with other Great Plains states, had almost no trees. Still, the region grew flourishing agriculture crops and the climate was suitable for growing trees. A man named J. Sterling

Morton believed the state needed more trees. He sponsored

a campaign for tree planting in Nebraska, setting aside April 10 for just that purpose. The idea spread. In 1876, Minnesota became the fourth state to adopt the tradition. Today all 50 states observe Arbor Day on various dates, and all plant trees on their Arbor Days. Minnesotans celebrate Arbor Day the last Friday in April, along with most other states in the region. Since 1978, May has been Arbor Month in Minnesota. By then, the ground has thawed to allow planting and the weather is warm enough to get young trees off to a good start.

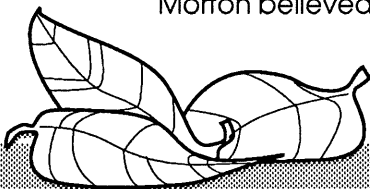
This chapter is your guide to planning complete Arbor Day/Month celebrations. Keep a Good Thing Growing!

### Arbor Day Ceremony

Here's a framework of events you can specially adapt to your school or community. Your ceremony should include the reading of an Arbor Celebration proclamation and the planting of one or more trees. It can be much more, however. Singing, reading poems, entertainment by musicians and other performers, and refreshments all lend a festive air to your program and encourage more widespread participation.

Here is a typical order of events for an Arbor Ceremony:

1. **Welcome** by mayor or other local dignitary.
2. **Brief history of Arbor Month** read by program coordinator, student, or business leader. (Use the "Arbor Day" paragraphs in column one or choose a summary from a library book or encyclopedia.)
3. **Reading and signing of Arbor Day/Month Proclamation** by mayor or other local dignitary.



4. **Poems or selected readings.** (Have students write or choose some. See also Suggested Poems and Song.)

5. **Ceremonial tree planting.** (See Appendix, page 3.)

6. **Refreshments** and other entertainment.

7. Many classes will follow up (or precede) their ceremonies with special classroom activities. *Under Cover* on page 4 of this chapter is an example.

#### Details to Remember

1. Foul weather contingency plans.

2. Printed programs. They hold events together.

3. Prepared-in-advance planting sites. Dig the holes in advance and provide mulch for each tree.

4. Follow-up tree care. ***Make sure someone comes back after the ceremony to water the tree(s) on a regular basis.*** Arrange to have one person or a group of people provide continued regular tree care.

5. Shovels. Have enough shovels for dignitaries...and remind them to wear sturdy shoes!

6. Media coverage. Provide write-ups for the media at the ceremony. Be available for questions.

7. Rehearse the details. A "dry run" the day before the ceremony helps you relax. You may decide to use a lectern, public address system, and other aids.

8. Refreshments. April and May are often cool; you may want to move indoors after the planting for hot drinks and more of the program.

## Suggested Poems and Song for Arbor Day Ceremony

### Trees

Trees are the kindest things I know,  
They do no harm, they simply grow.

And spread a shade for sleepy cows,  
And gather birds among the boughs.

They give us fruit in leaves above,  
And wood to make our houses of.  
And leaves to burn on Halloween,  
And in the spring new buds of green.

They are the first when day's begun,  
To touch the beams of morning sun.

They are the last to hold the light,  
When evening changes into night.

And when the moon floats on the sky,  
They hum a drowsy lullaby.

Of sleepy children long ago-  
Trees are the kindest things I know.

Source unknown.

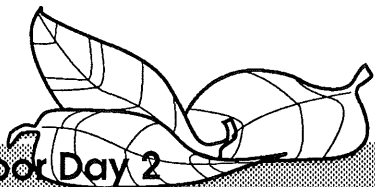
### Why We Keep Arbor Day (for 7 children)

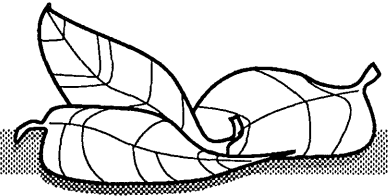
First: Trees of the fragrant forest,  
With leaves of green unfurled,  
Through summer's heat, through winter's cold  
What do you do for our world?

Second: Our green leaves catch the raindrops,  
That fall with soothing sound,  
Then drop slowly, slowly down,  
'Tis better for the ground.

Third: When rushing down the hillside,  
A mighty fresh stream forms,  
Our giant trunks and spreading roots  
Defend our happy homes.

Fourth: From burning heat in summer,  
We offer cool retreat,  
Protect the land in winter's storm  
From cold, and wind, and sleet.





Fifth: Our falling leaves in autumn,  
By breezes turned and tossed,  
Will make a deep sponge carpet warm  
That saves the ground from frost.

Sixth: We give you pulp for paper,  
Our fuel gives you heat;  
We furnish lumber for your homes,  
And nuts and fruits to eat.

Seventh: With strong and graceful outline,  
With branches green and bare,  
We fill the land all through the year  
With beauty everywhere.

All: So-Listen from the forest  
Each one a message sends  
To children, on this Arbor Day  
We trees are your best friends.

#### **Anthem For Arbor Day**

(To the tune of "My Country 'Tis of Thee")

Joy for the sturdy trees!  
Fanned by each fragrant breeze,  
Lovely they stand!  
The songbirds o'er them trill,  
They shade each tinkling rill,  
They crowd each swelling hill,  
Lowly or grand.

Plant them by stream and way,  
Plant where the children play  
And toilers rest,  
In every verdant vale,  
On every sunny swale,  
Whether to grow or fail,  
God knoweth best.

Select the strong, the fair,  
Plant them, with earnest care-  
No toil is vain.  
Plant in a fitter place,  
Where, like a lovely face,  
Let in some sweeter grace  
Change may prove gain.

God will his blessing send-  
All things on him depend.  
His loving care  
Clings to each leaf and flower  
Like ivy to its tower.  
His presence and his power  
Are everywhere.

-Samuel F. Smith

#### **What Do We Plant?**

What do we plant when we plant a tree?  
We plant the ship, that will cross the sea.  
We plant the mast to carry the sails;  
We plant the plants to withstand the gales-  
The keel, the keelson, and beam and knee;  
We plant the ship when we plant the tree.

What do we plant when we plant the tree?  
We plant the house for you and me.  
We plant the rafters, the shingles, the floors,  
We plant the studding, the lath, the doors,  
The joists and siding, all parts that be:  
We plant a house when we plant the tree.

What do we plant when we plant the tree?  
A thousand things that we daily see;  
We plant the spire that out-towers the crag,  
We plant the staff for our country's flag,  
We plant the shade, from the hot sun free;  
We plant all these when we plant a tree.

*The poems and song are from "A Teachers' Guide to Arbor Month," reprinted 1985.  
Produced by Minnesota Department of Agriculture with assistance of many other agencies.*



# Follow-Up Fun

## Under Cover

For an Arbor Day Ceremony follow-up activity in primary and intermediate grades, invite your youngsters to go under cover!

### Objective

- Students will be able to describe three ways trees are important to wildlife.

### You will need:

copies of *Under Cover* Sheets A and B  
small, pointed scissors  
crayons or markers  
blank sheet of paper  
pencils (optional)  
tape  
stapler

Here's a fun way for students to discover some of the many ways animals use trees. Pass out a copy of page A to each student and explain that all of the animals in the picture use trees or the areas around them for shelter, for food, or as a nesting site. Tell them they probably wouldn't find all of these animals on the same tree at the same time. That's because animals use trees for different things during different times of the year and they tend to spread themselves out among different trees so they'll have plenty of room.

As you discuss the animals in the picture you can use the information provided below. Afterward, pass out copies of page B and let each student make his or her own "peek-a-tree." Note: In the discussion below, the names of the animals that appear on pages A and B are in bold italics.

## Hidden By The Leaves

*A Place to Rest:* Many birds use trees as resting spots. For example, the **barred owl** may rest in the branches of a tree during the day or may perch there at night to look and listen for mice and other prey.

*Nesting High:* A fork in a tree may be a perfect place for a **rose-breasted grosbeak** to build its nest. Many other birds and some other animals such as squirrels also build their nests in the branches of trees.

*A Treetop Smorgasbord:* The **gray squirrel** spends most of its time in the treetops and feeds on many different nuts, seeds, and fruits. A lot of other animals also feed in the treetops.

*Blending In:* Some animals are well camouflaged for their life in the trees. The **walkingstick** feeds on tree leaves during the day. Looking a lot like a small stick helps this insect hide from birds and other predators. Some other tree-dwelling insects resemble leaves, thorns, or bark.

## Beneath The Bark

*Growing Up Inside a Tree:* Some animals spend most of their lives beneath the bark of trees. **Bark beetles** lay their eggs in wood underneath the bark. After the eggs hatch, the larvae form patterns in the wood as they eat their way through it.

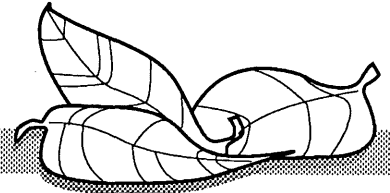
*Nesting Within:* Many animals nest inside trees. Birds such as the **hairy woodpecker** chisel out their own nesting holes in trees. These cavities may be used by many other forest creatures after the woodpeckers have abandoned them. **Honey bees**, flying squirrels, and some birds may build their homes (hives or nests) in abandoned woodpecker nests or in other tree cavities.

*Fruiting Fungi:* Many types of **fungi** grow on trees. The threadlike **mycelium** of these fungi often grows beneath the bark, hidden from view. But when a fungus such as the **shelf fungus** produces its fruiting body, it's easy to spot.

## Around The Roots

*Feeding on the Roots:* Many insects, mites, **millipedes**, and pill bugs spend part of their lives in the ground. The **cicada**, for example, spends its underground life as a nymph around the base of a tree, feeding on sap from the tree's roots. Some fungi form a "partnership" with the roots of trees. These fungi grow around the growing tips of the roots and feed on the tree's sap. The fungi aid the tree by absorbing nutrients from the soil and passing them into the tree.

*Burrowing, Furrowing:* **Earthworms**, moles, and many other creatures tunnel through the soil beneath a tree. As they churn up the soil they make it easier for a tree's roots to grow and absorb oxygen. Some animals such as **short-**

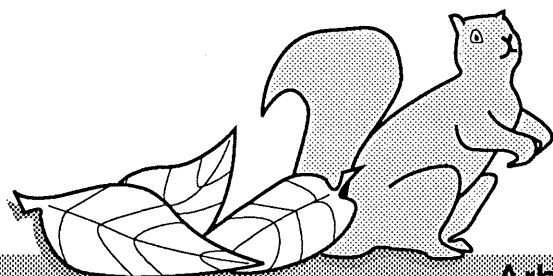


**tailed shrews** and chipmunks dig tunnels beneath trees. And animals such as **chipmunks** and squirrels may store a cache of nuts in the ground near the base of a tree.

#### How To Make A "Peek-A-Tree"

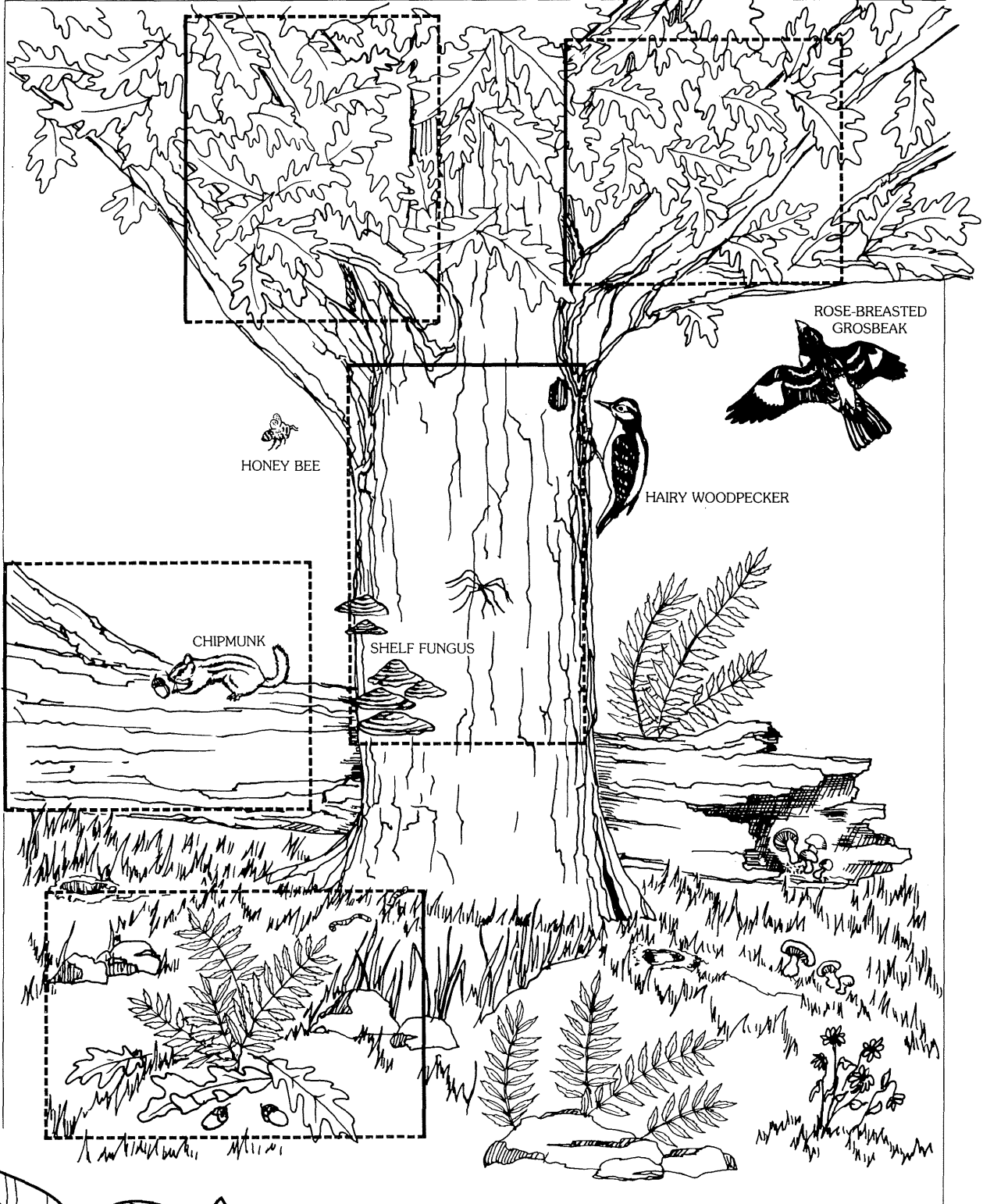
1. Color sheets A and B.
2. Using pointed scissors, cut the rectangles on sheet A on the dotted lines only. Then fold the cut pieces back along the solid lines. (The rectangles should work like little doors.) If you're having trouble getting started, push the point of a sharp pencil through one of the corners of each rectangle. Then stick the point of the scissors through the hole and begin cutting.
3. Make a tab for each door by cutting out a small piece of paper one inch long by 1/2 inch wide. Tape half of the piece of paper to the back of the door so that 1/2 inch hangs free and forms a tab. (Be sure to tape the piece of paper to the back of the door edge opposite the uncut side.) You can use the tabs to keep the doors closed by tucking them under the cut edges.
4. Put sheet A on top of sheet B and staple them together at the top and the bottom.
5. Then open the doors to see what is underneath the leaves and bark and around the roots!

*Sheets A and B adapted from Ranger Rick's Naturescope "Trees Are Terrific." Used with permission.*



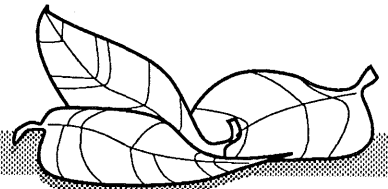
# Activity Sheet A CopycatPage

## Under Cover!

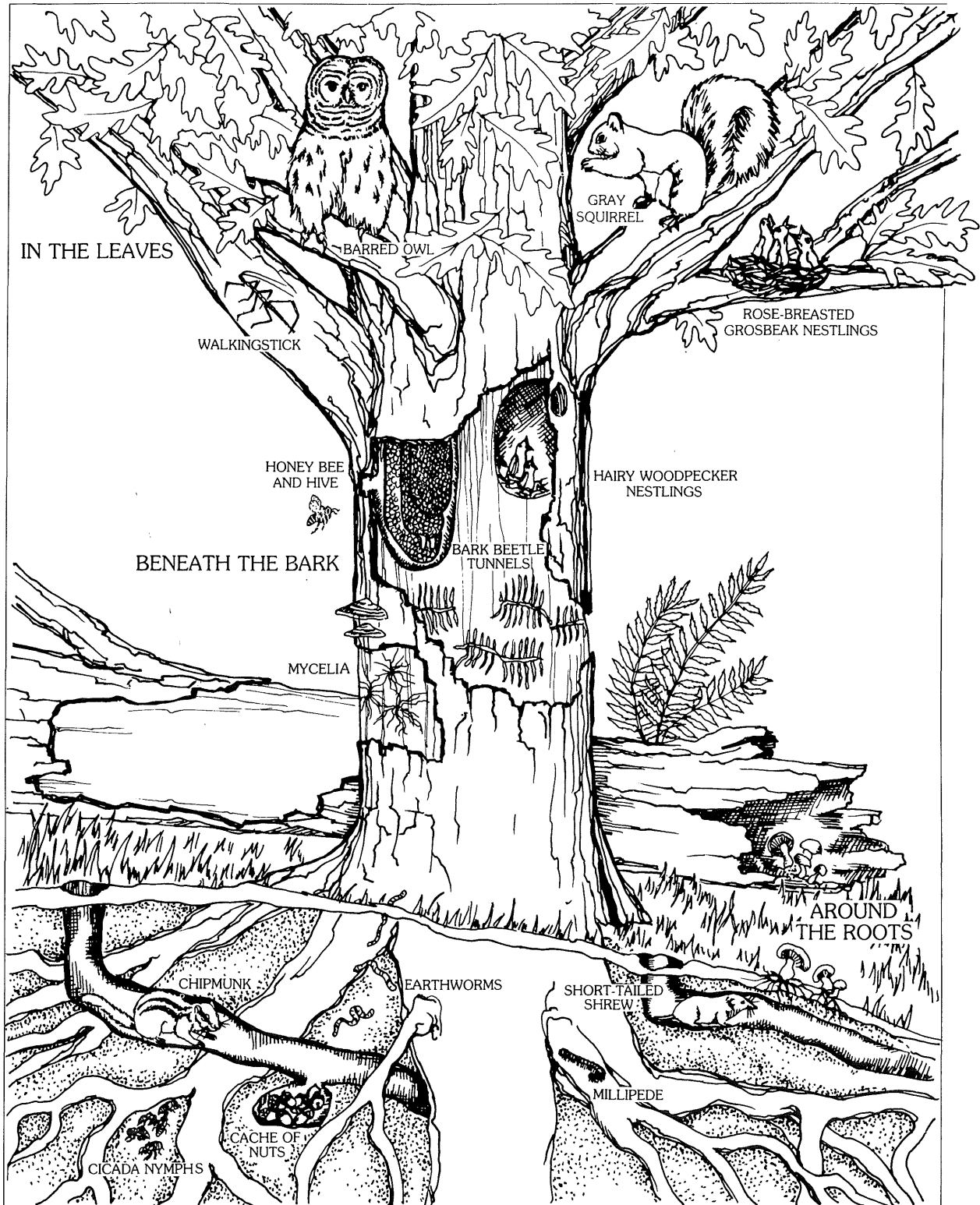


From Ranger Rick's Naturescope "Trees Are Terrific." Used with permission.

# Activity Sheet B CopycatPage



## Under Cover!

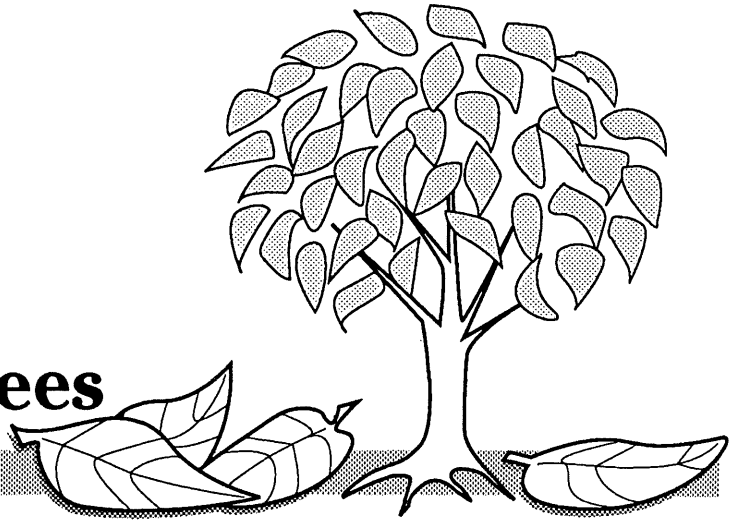


From Ranger Rick's Naturescope "Trees Are Terrific." Used with permission.



# Kindergarten

## Getting to Know Trees



### Objectives

- Students will become more aware of their natural environment and the beauty of trees.
- Students will observe trees and be able to describe seasonal changes in specific trees.

### Vocabulary Words

carbon dioxide	crowns
oxygen	fluids
seeds	bark
roots	adult
trunks	

### Background Information

What would the world be like without trees? We would certainly miss their beauty. Think about the changes in colors from season to season, the rustle of leaves under our feet, the beautiful green of the evergreen trees standing in the white of winter snow. What are some other beautiful things about trees?

A summer without trees would be much hotter. Trees give us shade and help cool the air. Trees “drink” huge amounts of water each day, and some of that water passes into the air to give us moisture. Trees also clean our air by taking **carbon dioxide** out of it and using it to make their own food. As they do this, they make **oxygen**, which is the air we breathe.

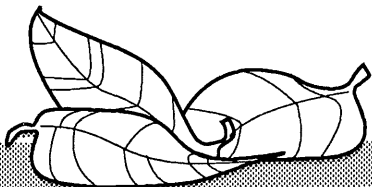
Many animals would be without homes and food if there were no trees. Birds, squirrels, bugs, and mice are just a few of the animals that live in trees. These animals and others get much of their food from trees. Bark, nuts, leaves, and fruit are tasty treats for many animals—and for people, too.

Trees cover about one-third of the earth and are the largest plants in our world. They can live for a very long time. One tree in California is 4,600 years old!

Trees, like other plants, grow from **seeds**. Trees have three main parts: **roots**, **trunks**, and **crowns**. As they grow tall above the ground, exciting things are happening underground, too. Below the soil where we can’t see them, roots are spreading far out from the tree in all directions. The roots are creeping through the soil looking for water and nutrients (food). They’re also helping hold the tree in place so it doesn’t blow over.

The tree’s main stem—called the trunk—keeps growing from year to year. The trunk keeps the tree standing strong and tall. It gives us wood, holds up the top part of the tree (the crown), and is a passageway for water and other **fluids** to move up and down the tree. The rough outer skin of the trunk is called **bark**. Layers inside the trunk make the tree grow bigger each year. You stop growing when you become an **adult**, but trees grow all of their lives.

The crown of the tree is the branches and leaves. It has the important job of making food for the tree. The leaves are tiny “factories” that make food. To do this, they need water, carbon dioxide from the air, and energy from the sun.





## Young Children and Trees

No one needs to tell us that young children thrive on activity! Most of them are also naturally curious. Capitalize on these traits, and you have the makings of a delightful tree-discovery learning experience.

Encourage children to really look at the trees in their neighborhood. Invite them to get to know at least one tree as a "special friend." Some of the activities in this section encourage each child to "adopt" a special tree, learn what kind it is, what kinds of life go on around it, and how it changes from season to season. They're also encouraged to cherish the beauty of trees. Appreciation for beauty begins early. Teachers have a unique opportunity to help young children begin this journey of pleasure.

An ideal first experience for kindergartners is a field trip or outdoor nature hike. Be sure to get permission from land owners and others as needed if you're leaving the school property. The children can also look for trees to "adopt" at this time. (You may be beginning your tree study at Arbor Day time this year. Next year, you may want to start your Arbor activities at the beginning of the school year. Then youngsters can watch their trees through a cycle of seasonal changes. For activities throughout all four seasons, see Appendix, page 4.)

## Your Field Trip or Nature Hike

1. Choose a place that has as many trees as possible and is within walking distance or a short bus ride from your school.

2. The ideal ratio is one tree for every three students in class, but groups may be larger if necessary.

3. Many of the activities suggested in this lesson may be used with bushes if trees are not plentiful in your area.

4. If possible, a few of the students should adopt an evergreen tree. They make interesting comparisons with deciduous trees.

5. Before the field trip, ask the students to join you in deciding on a set of rules. Try to set "do" rules rather than "do not" rules. You'll want to include the following:

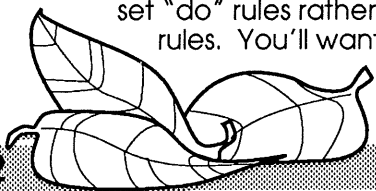
- Always keep the teacher or your adult group leader in sight.
- Leave the place as you find it. (Avoid stepping on plants whenever you can.)
- Be quiet and move slowly so you do not disturb creatures living near the trees.

The children should visit their trees frequently throughout the year. Your role as a teacher is important in helping them truly see the changes in their trees. Observations become valuable understandings through the questions and guidance you give.

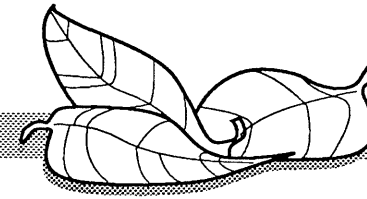
A variety of questions and activities have been included in the Appendix, pages 4-7 to help you. They are separated into five groups:

1. Those continued through the year.
2. Those conducted in autumn (soon after the school year starts).
3. Those conducted in winter.
4. Those conducted in spring.
5. Those conducted in summer (after school ends).

Encourage the students to ask their own questions, and to compare and discuss their ideas freely with others. The questions and activities you choose and the amount of guidance you give the students depends on the attention span, interests, and the "personality" of the whole class.























# Kindergarten



See activity details on pages K-5 through K-12.

## Calendar

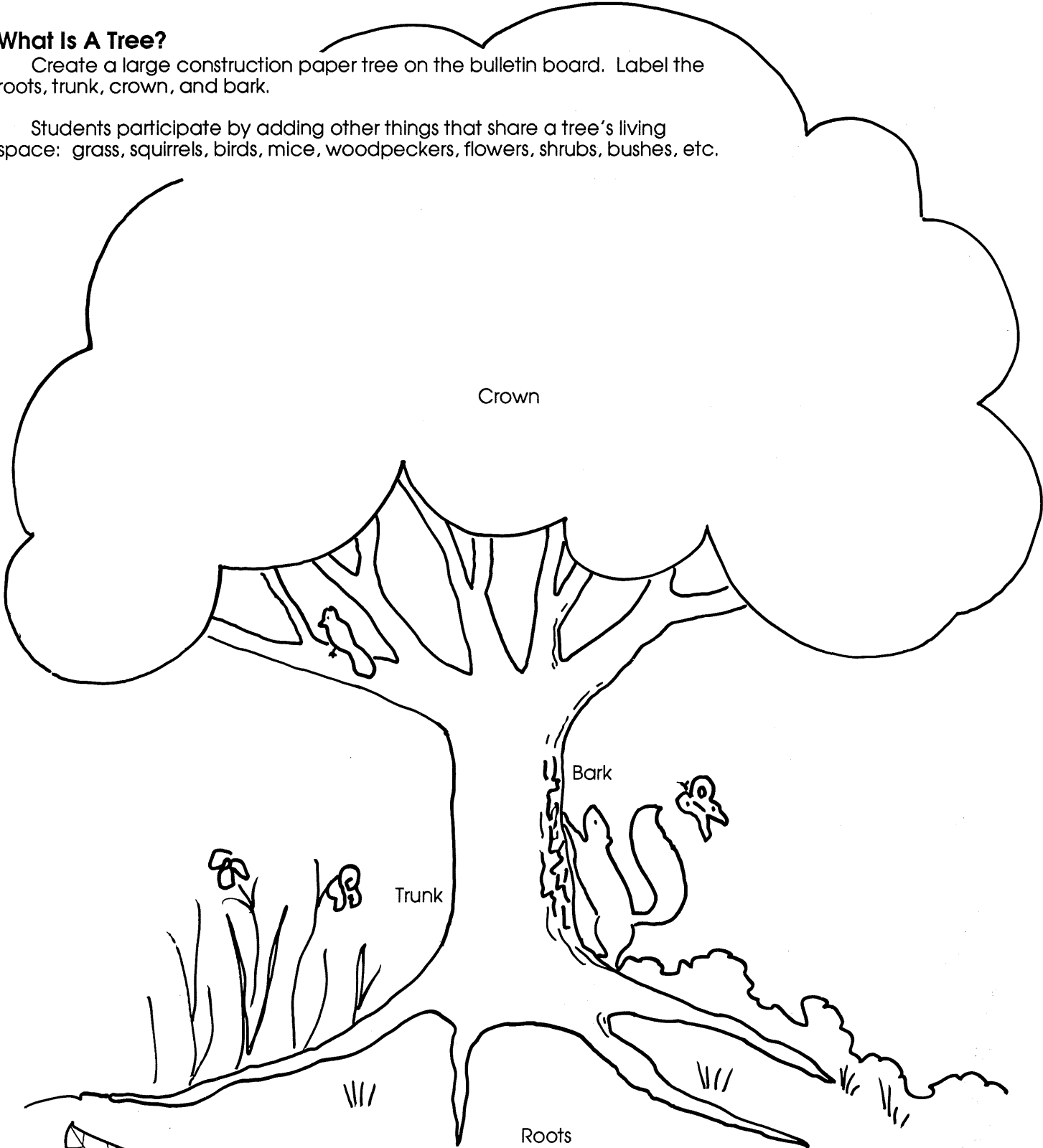
<p>Do: <i>Is it a tree?</i> (Activity Sheet)</p> 	<p>Hike: Take a nature hike!</p> 	<p>Discover: Scientists' tools!</p> 	<p>Create: Natural collages.</p> 	<p>Look for: Robins returning. How do trees help robins?</p> 
<p>Science</p>	<p>Science</p>	<p>Science</p>	<p>Art</p>	<p>Science</p>
<p>Read: Shel Silverstein's "The Giving Tree."</p> 	<p>Discover: Tree shapes. (Activity Sheet)</p> 	<p>Discover: Things made from wood.</p> 	<p>Do: Touch and feel activity.</p> 	<p>Look for: Lilac bushes and apple trees blooming.</p> 
<p>Language Arts</p>	<p>Math</p>	<p>Art/Social Studies</p>	<p>Science</p>	<p>Science</p>
<p>Discover: Trees all through the year.</p> 	<p>Do: Outdoor touch and feel activity.</p> 	<p>Create: Leaf melties.</p> 	<p>Do: <i>Measure up!</i> (Activity Sheet)</p> 	<p>Do: Plant seedlings.</p> 
<p>Art/Science</p>	<p>Science</p>	<p>Art</p>	<p>Math</p>	<p>Science</p>
<p>Discuss: Trees... friends to many.</p> 	<p>Look for: Monarch butterflies, pussy willow catkins, bees pollinating, tulips blooming. Learn a tree song!</p> 	<p><i>Fun fact:</i> The U.S.A.'s largest living thing is the General Sherman Tree.</p> 	<p>Create/Listen: Forest sounds.</p> 	<p>Create: The most beautiful tree in the world!</p> 
<p>Science</p>	<p>Science/Music</p>	<p>Language Arts</p>	<p>Music/Language Arts</p>	<p>Art</p>

# Bulletin Board Idea

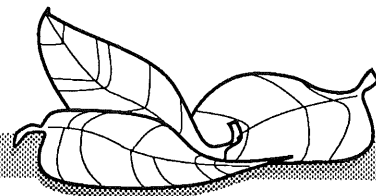
## What Is A Tree?

Create a large construction paper tree on the bulletin board. Label the roots, trunk, crown, and bark.

Students participate by adding other things that share a tree's living space: grass, squirrels, birds, mice, woodpeckers, flowers, shrubs, bushes, etc.



# 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 the following: paper towel or toilet tissue tubes, bags (Activity 2); magnifying glass, microscope, scissors or knife, tweezers, (Activity 3); "The Giving Tree" by Shel Silverstein (Activity 6); things made from trees (Activities 8 and 9); leaves, wax paper, potato peeler, crayon shavings, paper towels or newspaper, iron, string (Activity 13); one or two seedlings per student (Activity 15); rhythm band instruments, tape recorder (Activity 19).

### Activity 1: Is it a Tree?

*You'll need:* Activity Sheet A (page K-8) and crayons.

A tree is the largest of all plants and differs from other plants in four ways:

1. Most trees grow at least 15-20 feet tall.
2. They have one woody stem that is called a trunk.
3. The trunk grows at least three to four inches thick.
4. A tree's trunk (stem) can stand by itself.

All other plants are different from trees in at least one of these ways.

Look at the activity sheet. Ask: Do you see the tree in Box A? Is it a tree? Why or why not? Color it if it is a tree. If it's not a tree, don't color it. (Continue in the same manner with the rest of the boxes.)

**Activity 2:** Go on a spyglass nature walk! (See Background Information-Field Trip section, page K-2 for field trip planning and activity ideas.)

*You'll need:* Spyglasses-paper towel tubes, toilet tissue tubes, or construction paper tubes; bags to collect things in.

Take a walk in the neighborhood and look at the trees. How many trees do you see? What different kinds of trees are there? Look through your spyglasses at certain trees or parts of trees. Take turns describing what you see through your spyglasses. Can others "spy" and find the same objects? Use bags to collect things that come from trees-leaves, acorns, maple seeds, bits of bark. Be sure not to damage or destroy living trees as you make your collection.

**Activity 3:** Study your nature hike discoveries the scientific way!

*You'll need:* Microscope; magnifying glass; tweezers; scissors or knife; sunlight or strong indoor light.

Ask:

- a. What is a scientist?
- b. What kinds of tools do scientists use?
- c. How do these tools help scientists?
- d. How can these tools help us learn about trees?

Examine the tree parts collected earlier under the microscope and magnifying glass. How do things look different? What are some new things we learned?

**Activity 4:** Tree art.

Use the tree parts studied in Activity 3 to create art—nature scenes, gardens, designs. Glue nature's pieces to drawing paper; complete by adding crayon or paint details.

**Activity 5:** Look for: Robins returning.  
How do trees help robins?

**Activity 6:** Read "The Giving Tree" by Shel Silverstein.

In what ways did people hurt the tree? In what ways could they have helped the tree and kept it safe?

Ask students to bring things to school that are made from trees. (See Activity 8).

**Activity 7:** Explore tree shapes.

*You'll need:* Activity Sheet B (page K-9). Ask: What shapes do you see on the bottom of your paper? Cut out the shapes and paste each one onto the tree it matches.

Thinking ahead to tomorrow: Try to bring something to school that is made from a tree. See if you can think of something unusual.

**Activity 8:** Tree things.

Talk about the things students brought that are made from trees. Ask: How would our lives change if we did not have some of these things? Give each student a sheet of paper. They fold the sheets into quarters (to have four boxes). In each box or "window" they draw something that is made from a tree.

**Activity 9:** Touch and feel fun.

*You'll need:* Bags or containers; objects to feel.

Place several items in a bag that are things from a tree. Students take turns putting their hands in the bag and trying to identify items by touch only. When they have things in their hands, they describe each item and tell what they think it is. Then they draw the item out to check their guesses.

**Activity 10:** Look for: Lilac bushes and apple trees blooming.

Draw or paint beautiful flowering trees.

**Activity 11:** Trees all through the year.

Give each student a large sheet of drawing paper. They fold their papers into fourths. Then they close their eyes and think about how a certain tree would look during each season. (This can be each person's "adopted" tree - or another favorite tree.) They will need help imagining what the tree looks like in other seasons if they've only been seriously observing the tree during Arbor Month.

Encourage youngsters to draw what they think their trees look like in each of the four seasons. Start with spring-the growing and new birth season. Go next to summer, then fall and winter in left to right, top to bottom sequence.

**Activity 12:** More touch and feel fun.

Go outdoors and get acquainted with trees by touch. Blindfold one student at a time and have each "hug" and feel a tree. As they are feeling the tree, ask some specific questions; students will try to answer by using their senses of touch. Possible questions:

- Is this a young tree? An older tree?
- Is this an evergreen or a tree that loses its leaves in winter?
- Is the tree alive?
- How big around is the trunk? (Show with hands or arms).

After he or she has had a turn, guide the student away from the tree. Remove the blindfold and challenge the youngster to find the same tree again-this time with eyes wide open.

**Activity 13:** Leaf melties.

*You'll need:* Leaves; waxed paper; old

color crayons; potato peeler or grater; paper towels or newspaper; iron; string.

Besides enjoying their shade, look what you can do with leaves! Have each youngster collect two or three well-shaped leaves and press them flat under a stack of heavy books. Arrange pressed leaves on a piece of waxed paper about the size of a notebook page. Using old color crayons and a potato peeler or grater, make crayon shavings to sprinkle over the leaves. Use favorite colors. Cover the leaves and crayon shavings with a second piece of waxed paper. Put three thicknesses of paper towels or a few sheets of newspaper on top to protect the design. Press carefully with a hot iron to melt the crayon shavings. When you take away the newspaper or toweling, you have a beautiful leaf meltie. Trim to a shape you like, thread a string through the top, and hang in the window to "light up" and dazzle!

**Activity 14:** Measure up.

*You'll need:* Activity Sheet C (page K-10). Tell students: We are going to do some measuring today. On the bottom of your sheet is a ruler. Cut it off the sheet. Then use it to measure the parts of trees on the rest of the paper. (Depending on your group, you may need to do this activity together or have extra aides available to help students who have difficulties.)

**Activity 15:** Plant seedlings.

*You'll need:* A seedling for each youngster. Available from:

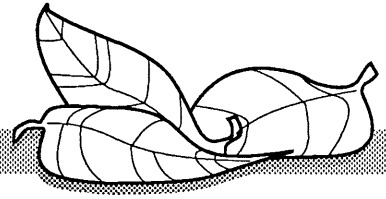
Minnesota Forestry Association  
220 First Avenue Northwest, Room 210  
Grand Rapids, Minnesota 55744  
(218) 326-1239  
45 cents each

What do trees need to live? They need water, light, and air just like other plants. Review how to plant a tree (Appendix, page 3). Send home a seedling with each student to plant in their yards or in flower pots until they can be planted safely outdoors. Send a copy of "How to Plant a Tree" (Appendix, page 3) along with each seedling.

**Activity 16:** Trees...friends to many.

Talk about some of the many creatures that call a tree a friend and how they use it. How many can you think of? Birds build their nests in trees. Many birds eat bugs that are on trees or in the bark. A tree can provide shade for people and a fun place for children to play. Squirrels have their homes in trees, eat nuts and jump from branch to branch. Some caterpillars hide from





the birds by rolling themselves up in the leaves while they turn into moths. Leaves from last year decay and become food for earthworms. They also enrich the soil.

**Activity 17:** Look for: Monarch butterflies, pussy willow catkins, bees pollinating, tulips blooming.

Learn a song about trees: "The Little Nut Tree," "Don't Sit Under the Apple Tree With Anyone Else But Me," "Here We Go Round the Mulberry Bush," etc.

**Activity 18:** Meet General Sherman.

*Fun fact:* The U.S.A.'s largest living thing is the General Sherman Tree, a giant sequoia in Sequoia National Park in California. It towers more than 272 feet tall and has a trunk about 36 feet wide. That means it's as tall as a 20-story building and its trunk is as wide as a semitrailer is long. It's probably almost 3,000 years old.

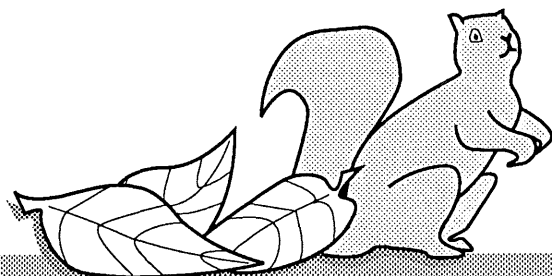
**Activity 19:** Forest sounds.

*You'll need:* Rhythm band instruments; tape recorder.

Gather rhythm band and other instruments and create your own forest music. How does a forest sound? Which instrument(s) would you use to sound like breezes through the leaves, squirrels leaping from branch to branch, birds calling, a tree being chopped down or falling? How about feet shuffling through the fall leaves, a deer running through the bushes, a woodpecker pecking, a sleepy owl hooting? Would a forest sound different at night than during the daytime? Tape record your best efforts. Invite others to listen to your tape. Did anyone "hear" your forest the same way your group did?

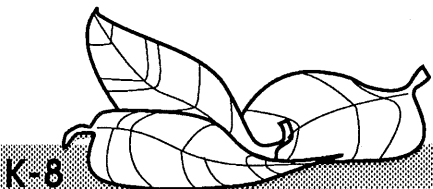
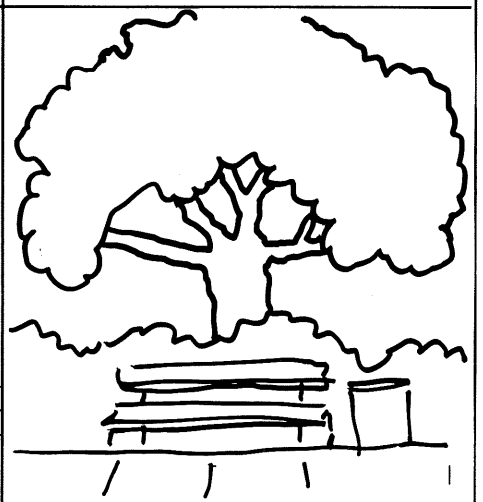
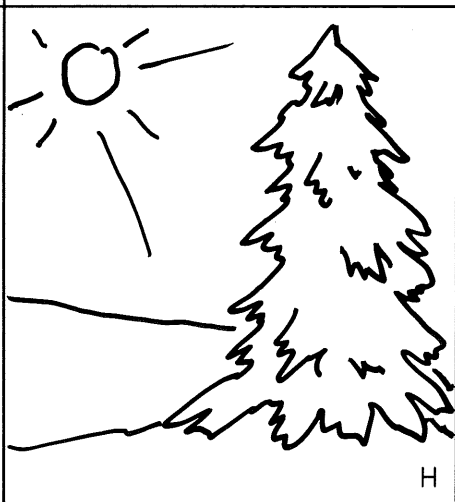
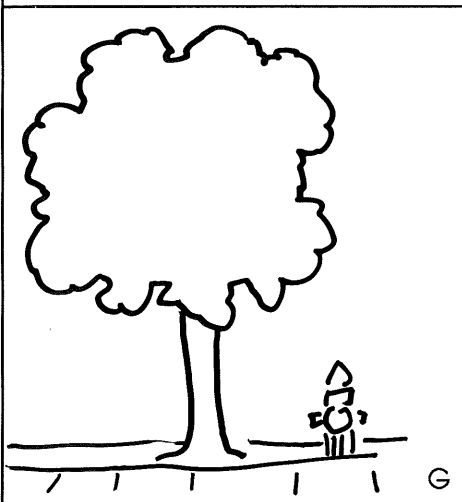
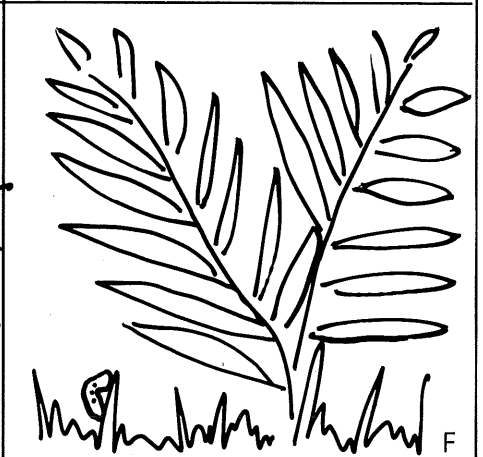
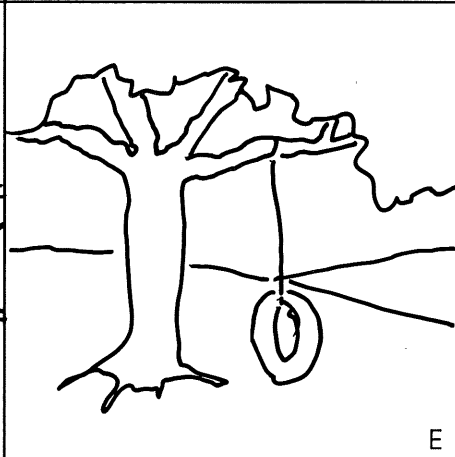
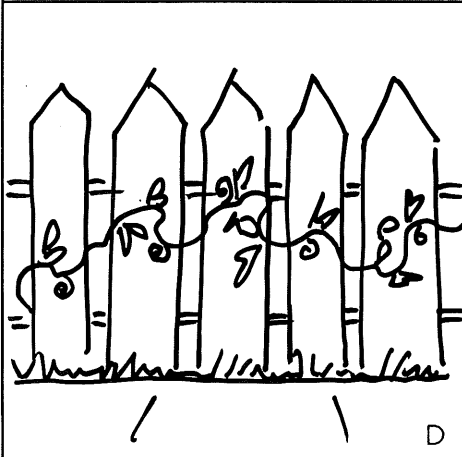
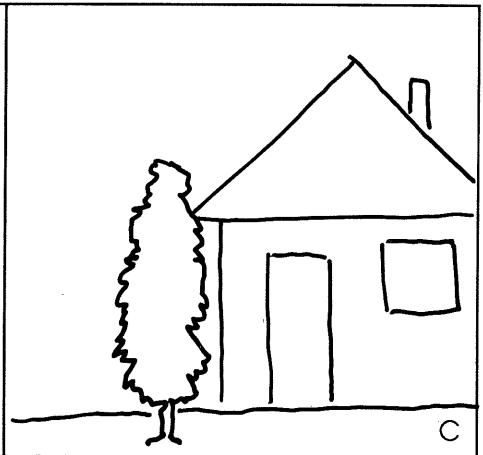
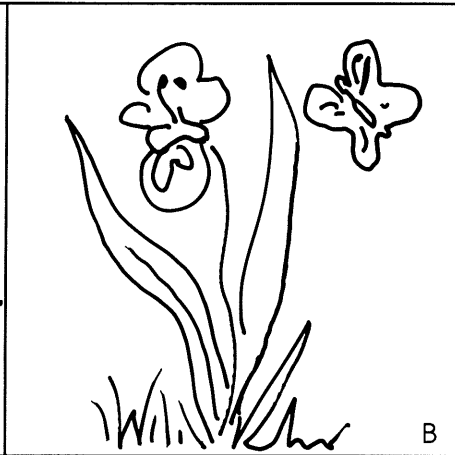
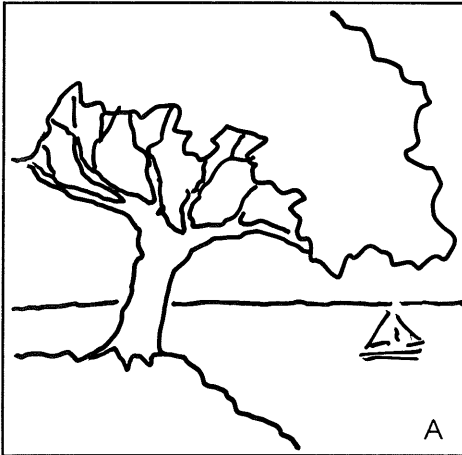
**Activity 20:** Beautiful trees.

Invite students to close their eyes and think of the most beautiful tree in the world. Ask: What would it look like? Where would it be? What would you do with it? What would you say to it? Each student draws a picture of his or her "dream tree."



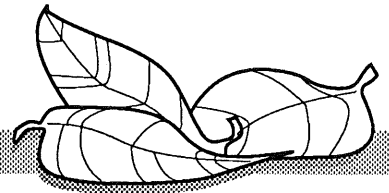
# Activity Sheet A

Is it a Tree?





# Activity Sheet B



## Explore Tree Shapes

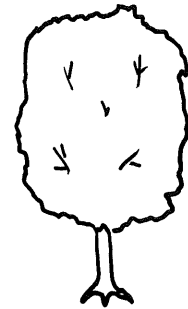
Cut out the shapes below and paste them on a tree that matches each shape.



oak



spruce



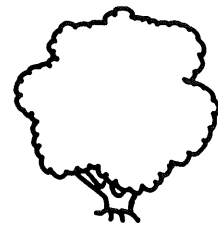
maple



cypress

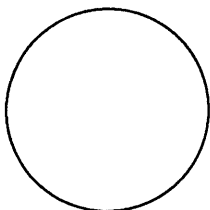
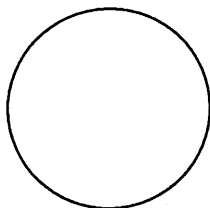


cedar

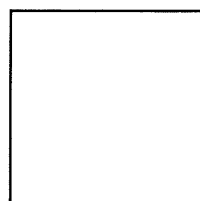
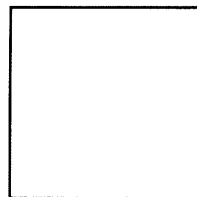


crab apple

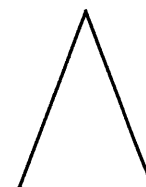
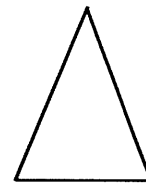
round



square

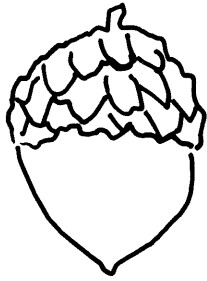


triangle

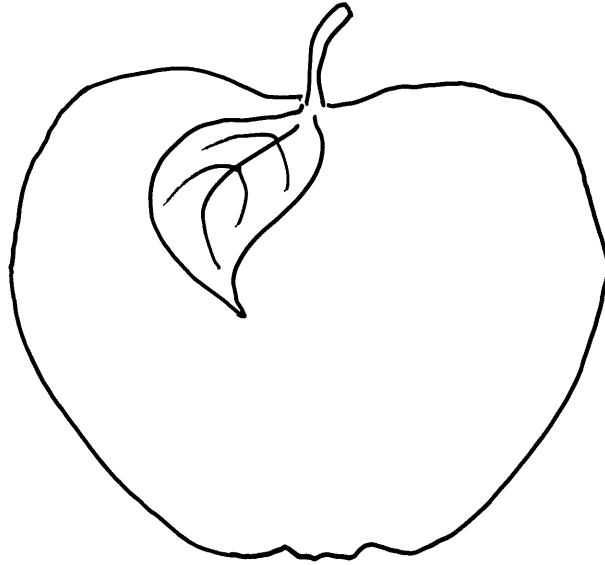


# Activity Sheet C

Measure Up!



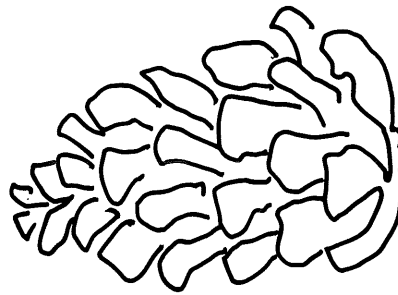
\_\_\_\_\_ inches wide



\_\_\_\_\_ inches wide



\_\_\_\_\_ inches tall

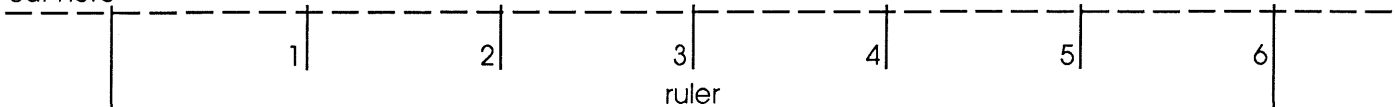


\_\_\_\_\_ inches long

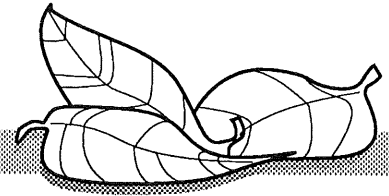


\_\_\_\_\_ inches long

cut here



# More Activity Fun



## Tree Tots

Talk about the parts of a tree and take a tree walk.

*You'll need:*

- a. Leaves from several different kinds of trees.
- b. Twigs, bark, fruit, nuts, or other tree parts.
- c. Pictures of trees and tree parts.
- d. Paper.
- e. Construction paper.
- f. Tape.
- g. Marker (optional).
- h. Glue (optional).
- i. Yarn (optional).

Here's an activity that will help younger children look more closely at trees. First, they'll learn about some of the different "parts" that make up a tree. Afterward, you can take them on a walk outside to compare some of the different trees in your area.

Before the students arrive, find four or five different kinds of trees around your school or nature center and collect some leaves from each. (Collect a leaf for each child in your group. If you gather the leaves quite a while before you do the activity, you can keep them fresh by wrapping them in a wet towel.) Collect a few twigs, pieces of bark, and other tree parts, too. Keep in mind where all of the trees are located so you can find them again when you go outdoors with your students.

Trace an outline of each kind of leaf on a piece of paper. (You may need to enlarge the outlines and go over them with a dark marker so they'll be easy to see from a distance.) Tape or hang each of the leaf outlines in a different place in the room.

When you're ready to start the activity, have the students sit in a circle. Lead a discussion about the different parts of a tree. Show pictures of leaves, bark, branches, roots, and other tree parts as you talk. Pass around any parts you collected before the activity. You may want to talk about what each tree part does.

After the discussion, give each child one of the leaves you collected. To help them observe their leaves closely, ask some questions. For example: Are the leaf edges pointed or smooth? Are any of the leaves a different color from the others? Do any of the leaves have tiny hairs on their undersides? Can you see and feel the

veins? Is there anything special about any of the leaves? (For example, some may notice that their leaves have been munched on by insects or other animals.)

Next, tell the students there's a picture of each type of leaf hanging somewhere in the room. Have them look for the leaf outlines that match their own particular leaves, then have each of them go and stand next to the correct picture.

Once everyone has found the right leaf shape, take a walk outside to find the trees the leaves came from. Youngsters take their leaves with them outside.

Each group of students with the same kind of leaf keep their eyes peeled for "their" tree. Stop at certain trees as you walk along and ask if anyone thinks his or her leaf came from that particular tree. Have the youngsters who say "yes" hold their leaves up in the air. Are they right? Next, all the students look for some of the tree's parts on the ground. Can they find twigs and buds, fruit or nuts, other leaves, or any other tree "pieces"? Compare the parts they find to those of other trees you stop and talk about.

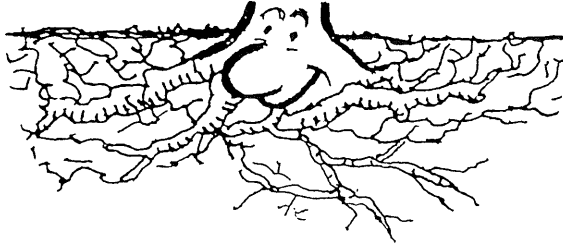
*Adapted from Ranger Rick's Naturescope "Trees are Terrific." Used with permission.*

## Rodney the Root Says...

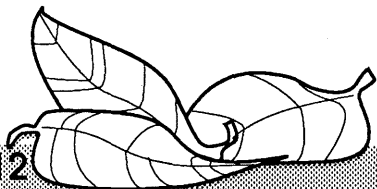
Finish my tree! See Activity Sheet D (page K-12).

# Activity Sheet D

Rodney the Root says...

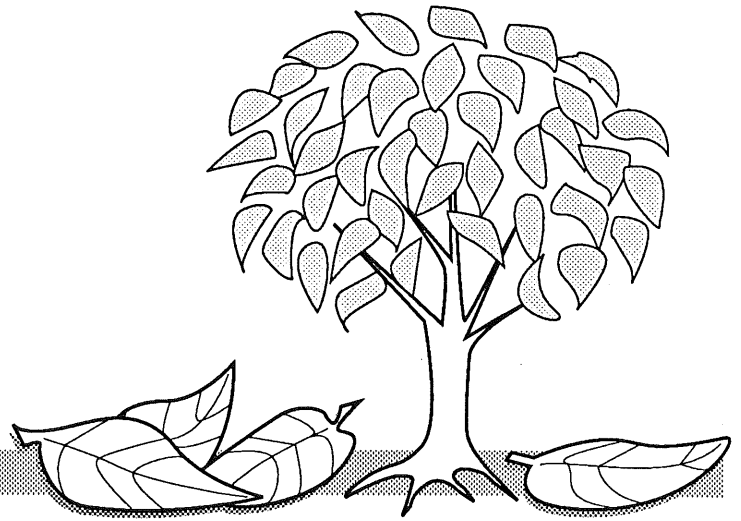


finish my tree.



# Grade 1

## Parts of a Tree



### Objective

- Students will be able to identify the main parts of trees and the function of each.

### Background Information

Have you ever had or seen a tree house? What are some things that are fun about it? Will it keep you warm in the winter? Dry in the summer? What kind of tree house would you build if you could have anything you wanted?

The house you live in is sort of a "tree house" already. How can that be? Think about some of the many things in your house that come from trees. What are some of them? (doors, furniture, paper, etc.) This unit will help you learn about parts of trees and you will find out about some of the many things trees give to us.

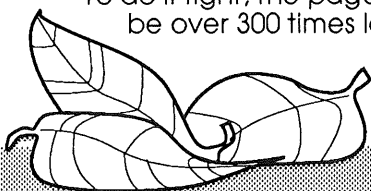
Trees have three main parts - **roots**, **trunks**, and **crowns (canopies)**. Each part has a special job to do in keeping the tree healthy and growing.

### Roots

Explore roots, and you'll discover a fascinating underground world. People who study trees are learning more each year about tree roots. They tell us the tree root system is probably the least understood part of a tree.

We've all seen sturdy trunks and leafy crowns of trees, and possibly tripped over the roots. But no human has ever seen a whole adult tree. Drawings in books are only part of the picture.

To do it right, the page would have to be over 300 times larger than it is now.



### Vocabulary Words

roots	evergreen	cambium
trunks	needleleaf	inner bark
crowns (canopies)	broadleaf	sap
minerals	inner wood	outer bark
oxygen	xylem	photosynthesis
absorbs	conduct	litter layer
		recycle

What does a whole tree really look like? You'll have to use your imagination for what's underground, but here are some of the facts:

- Almost all (about 99%) of the roots live and grow within three feet of the surface of the soil.
- Roots don't just grow downward or toward any particular thing, but wherever they can get the moisture and **minerals** they need...up, down, and sideways.
- There's a connection between the root system and the rest of the tree. If part of the roots die, an equal amount of the crown may die, too.
- Tree roots come in many different sizes. Some are so tiny you can only see them with a microscope. Others may be up to 12 inches or more across.

Large, woody roots grow horizontally (side to side), mainly in the top 12 inches of the soil and usually no deeper than three to seven feet. They often stretch out from the trunk to take up a space four to seven times larger than the crown! These roots spread across an area that can be twice the height of the tree.

Why are roots important? To grow, all parts of the tree need to be healthy. Roots hold the

tree in the ground so it can stand straight. They help the tree make food for itself. Roots absorb water and minerals that move up through the trunk and are used by the tree to make food. They store energy too.

Roots grow wherever they can get what they need: **oxygen**, water, minerals, and support. That means they won't grow where soil is too hard and pressed together, or where there is no oxygen. You may have seen roots of city trees follow cracks and crevices in pavements, pipelines, sewers, or cables. That's because there are air passages in these places that give oxygen and water to the trees. When roots are above ground where you can trip on them, it may be because the soil has washed away or become too packed to give them what they need underground.

The surface layers of soil, with rotting bits of leaves, are rich in organic elements. They make a great home for millions of insects, worms, and other creatures. These tiny creatures do much to help trees. As they tunnel about in the surface layers, they fluff up the soil and make pore spaces for the air, water, and minerals roots need. That's why most tree roots are found in the surface layers of the soil. They fan out in thousands of fine, short root tips smaller than a human hair. It's through the tips of these tiny roots that the tree **absorbs** most of its water and minerals.

Roots are important. By understanding roots better, we can help keep trees safe and healthy.

## Trunks

Trunks and branches give a tree its shape. The trunks of most **evergreen (needleleaf)** trees grow straight up to the top of the tree. All the branches grow out from the trunk. The branches near the top are shorter than those farther down, giving the trees a "Christmas tree" shape. The trunks of most **broadleaf** trees do not reach to the top of the tree. Instead, the trunk divides into spreading branches, giving the crown a rounded shape.

The trunks of most trees are made up of five layers. From inner to outer, these layers are:

1. **inner wood (heartwood):**  
This is the woody non-conducting tissues in the center

of the tree. Inner wood has two main jobs: to store growing compounds and sugars and to support. After the tree has fully developed all its new parts for the season (leaves, twigs, seeds/fruits, etc.), the sugars are stored in the cells of the inner wood. This stored energy will help power next year's spring growth until the tree again fully develops its leaves.

The inner wood helps hold the tree up, too. This inner part of the tree is where we get wood for building and making things.

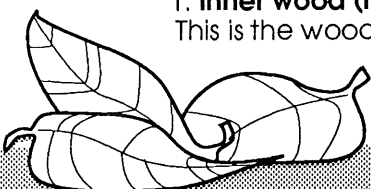
2. **xylem:** Xylem is a narrow band of cells at the outer-most edge of the inner wood. Its main job is to **conduct** water and minerals throughout the tree, from the root system towards the leaves. It has tiny pipelines that carry water and small amounts of dissolved minerals from the roots to the leaves.

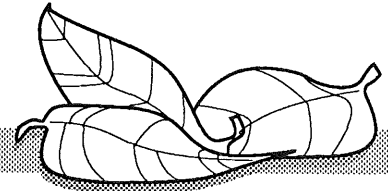
3. **cambium:** This is a thin layer of growing tissue on the outside of the xylem. Its job is to make the trunk, branches, and roots grow thicker. The trunks and branches of most trees grow thicker as long as the tree lives. It is this cambium layer that causes the thickening. It uses the sugar manufactured by the leaves to make new plant tissue. On its outside, the cambium makes new phloem tissue, or inner bark. On its inside, it makes new xylem, which eventually becomes wood. (See Grades 7-9, page 8 for more information).

4. **inner bark or phloem:** This layer also has tiny pipelines. The food made by the leaves moves through the phloem to the other parts of the tree. This food is called **sap**.

5. **outer bark:** This is the "skin" of hard, dead tissue that protects the living inner parts of the tree from injury. The outer bark stretches to let the trunk and branches grow thicker. The bark of a few kinds of trees, such as beeches and birches, is smooth because it stretches easily. But the bark of most other trees does not stretch so well. As the trunk and branches grow thicker, they push against the bark. It finally cracks, dries, and becomes rough with large ridges. Most trees lose old bark from time to time and replace it with a new layer.

**Remember:** Bark needs our protection! A tree's outside bark protects it from insects, fungus, and disease. The inner bark moves food from the leaves to the roots. Peeling, carving, or





damaging a tree's bark may cause the tree to die.

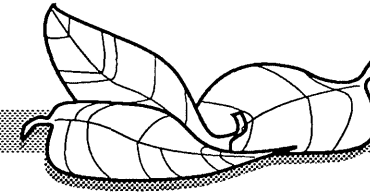
### **Crown (Canopy)**

The crown is the branches and leaves of the tree. It has the important job of making food for the tree. The leaves (the leaves of a pine tree are its needles) are tiny "factories" that make food, using water absorbed by the roots and carbon taken from the carbon dioxide in the air. Only a small amount of the water carried to the leaves is used to make food. The leaves lose most of the water into the air. Like the water and dissolved minerals carried from the roots, the food made by the leaves is also called sap. It travels through the leaves, branches, and trunk to parts of the tree where it is needed. These leaf "factories" get their energy, or fuel, for the work of making food from the sun. Putting the sun's energy to work to make food in this way is called **photosynthesis**.

Other important parts of a tree include the flowers and fruits. Flowers and fruits are the ways in which most trees reproduce. That's where seeds are found that will grow into new trees. Trees have many kinds of flowers. Some trees have very showy flowers and others have small, plain-looking flowers. Needleleaf trees have small, plain flowers that are hardly noticeable.





















The fruits of some broadleaf trees, such as apples and cherries, have a tasty outer covering. The fruits of other broadleaf trees, like acorns and beechnuts, are hard nuts. Ashes, elms, and maples have thin, winged fruits. Most needleleaf trees bear their seeds in cones.

# 1-4 Grade 1



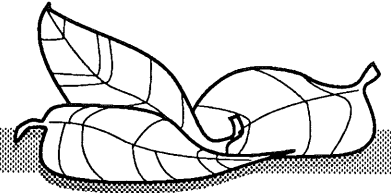
See activity details on pages  
1-6 through 1-12.

## Calendar

Discover: Roots!   Science	Look for: Robins returning. Create: X-ray vision art.   Science/ Art	Discover: Role of root hairs.   Science	Build: Root viewing boxes.   Science	Look for: Tulips blooming. Have a maple tasting party.   Science
Do: Bark rubbings.   Art	Look for: Lilac bushes and apple trees blooming.   Science	Hike: Take a nature scavenger hunt.   Science/Art	Write: Be poets! Tree poems are fun and easy.   Language Arts	Listen: Go on a guided fantasy to your favorite woodland.   Language Arts
Do: <i>Rodney the Root</i> (Activity Sheet).   Science	Discuss: Recycling. How can we save trees? <i>Fun Fact:</i> Saving a four-foot stack of newspapers saves a tree!   Social Studies	Hike: Take a nature hike. Walk and talk trees!   Science	Create: Natural monsters!   Art	Create: <i>3-D Trees!</i> (Activity Sheet)   Art
Do: Taste incredible edibles - and they're all from trees!   Science	Discover: Root power!   Science	Listen: Enjoy Joyce Kilmer's familiar poem, "Trees."   Language Arts	Look for: Maple and elm seeds!   Science	Play: "Leaf It To Us."   Science/ Language Arts



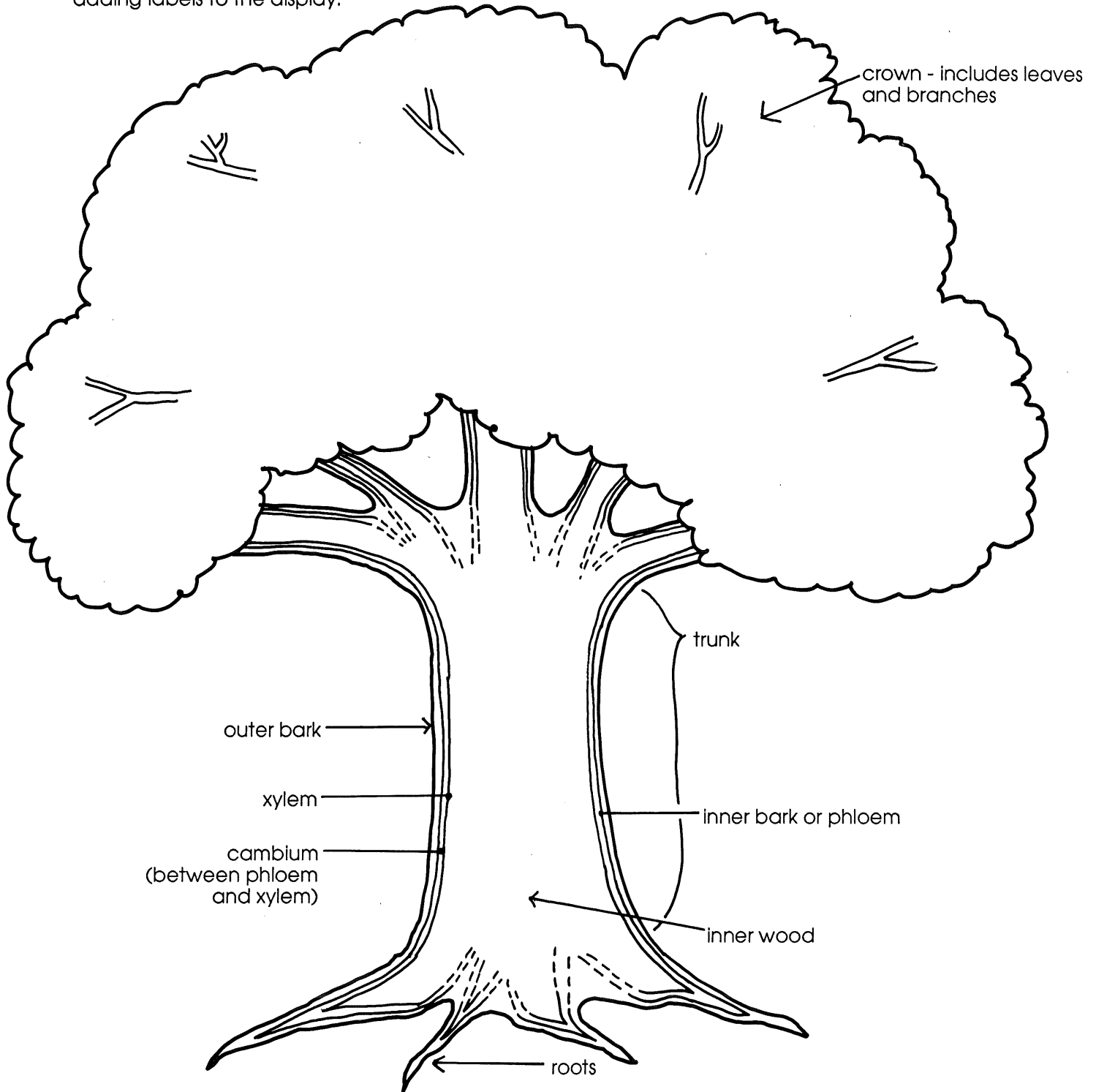
# Bulletin Board Idea



## Parts of a Tree

Make a large tree cutout (three-and-a-half to four feet tall). Post on a bulletin board or wall.

Students participate by painting or coloring the tree, drawing in the layers and parts of the tree, and adding labels to the display.



# 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 the following: two seedlings (Activity 3); milk carton, two jars, potting soil, knife, glass, waterproof glue, plastic kitchen wrap, dark cloth (Activity 4); maple sugar and candy (Activity 5); leaves, twigs, bark, fruit, tree pictures (Activity 13); toilet tissue tubes, yarn (Activity 15); "tree edibles" (Activity 16); packet of seeds, egg shells, egg carton (Activity 17); large tree cutout; construction paper leaves; beanbag; tape or piano music; tree and non-tree items (Activity 20).

### Activity 1: Examine roots!

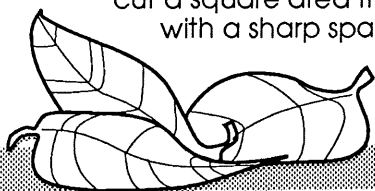
*You'll need:* Sharp sticks or forks.

Tree root expert Dr. Thomas Perry tells us how to examine tree roots. Most of the small absorbing roots of trees are in the forest **litter layer** and top inches of the soil. They are often smaller across than the lead in a pencil. You can easily expose them: Carefully sweep away surface litter and soil with fingers and dig gently with a sharp stick or fork. These small roots are constantly growing, dying, and regrowing throughout the season, and can be examined with the eye or with a hand magnifying lens. A healthy root tip usually has a creamy white, pink, or light tan interior and will snap like a fresh garden bean. It has a pleasant odor that can be masked by the odor of good, clean earth. Unhealthy root tips are limp and dull in color, and sometimes stained blue or black by disease fungi. They will often smell of rotting things. Have you uncovered healthy roots?

Dig (gently, please!) more deeply into the soil, and you'll see that most of the fine roots have grown upward into the surface layers of soil from larger roots that grow horizontally. These horizontal roots are usually located four to eleven inches below the surface.

If the only roots available for you to examine are in a grassy lawn, here's how to proceed: Go out about 15 feet from the trunk of the tree and cut a square area through the sod with a sharp spade or trowel.

Gently peel



back the sod. You'll see both the tree roots and the grass roots intermingled in the surface inches of the soil. When you're done, just pat the sod down carefully and water for several days.

**Activity 2:** Look for: Robins returning. Why do they search among tree roots near the ground?  
Art: "X-ray Vision."

Invite students to think about what they saw in the root examination (Activity 1). Read the root Background Information (page 1-1) and review what they know about roots. Then, using fine lines and "x-ray vision," they each sketch their idea of what an entire tree looks like, tree tops to root tip. Which part of the tree will take up most of the drawing space?

### Activity 3: The Role of Root Hairs.

*You'll need:* two seedlings, potting soil, and two jars for this observation activity.

Show how root hairs have a vital role in absorbing water and minerals from the soil by using two nearly identical seedlings. (Be sure the root systems of seedlings are kept moist; seedlings are likely to die if allowed to dry as long as 20 minutes!) From one seedling, remove all of the tiny hair-like roots, leaving the main roots intact. Plant both seedlings in identical soil in two jars, and water daily. Compare growth and vigor of the two trees. Graph heights.

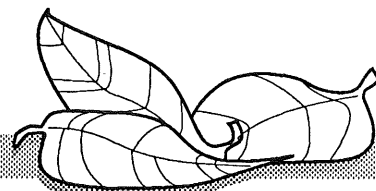
Is growth good or poor? Is foliage wilted or healthy? What color are the leaves? The seedling without root hairs may survive, but growth will be poor and foliage will likely be wilted from the first day on.

After the root lesson above, care for your healthy seedling until it becomes well established. Then students can plant it in an area they decide is well suited to the tree's survival needs.

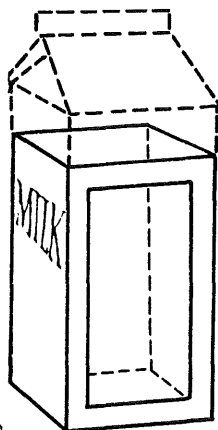
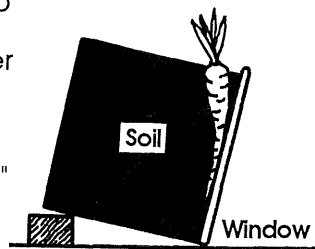
### Activity 4: Root viewing box.

*You'll need:* a half-gallon milk carton; sharp knife; piece of glass cut 3 1/2" x 7 1/4"; purchased "soil" mix; waterproof glue.

Roots get full exposure with this fun project made from a milk carton. With a lot of sunlight or an indoor grow light, it's a great way to show how roots develop in ideal soil. Use it to show other things, too: How seeds sprout and grow (beans or peas are easy); how roots develop in problem soil; how water moves through different soil types; how cuttings form roots, etc.



Cut the top from the milk carton. Cut out a window area from the side, leaving a 1/4" border frame. Insert the glass. For a snug seal, use waterproof glue. Thoroughly dampen the soil mix, then fill the box to near top and water again to settle the soil. Sow seeds 1/4" from the glass window.



Important: Tip the carton at a slant to keep roots growing against the glass so their action can be seen. Cover the box with plastic kitchen wrap to slow evaporation. Moisten soil when it becomes dry. Cover the window with dark cloth except at viewing time, as many roots tend to grow away from any light source. Fertilize after a month.

**Activity 5:** Look for: Tulips blooming.

Maple tasting party. How would you like to eat pancakes or waffles with real maple syrup on them? REAL maple syrup is made from the sap of a sugar maple tree. The sugar maple sap has more sugar in it than sap of other trees. (Sap is water mixed with the sugar and minerals a tree needs to grow.) Native Americans taught European settlers how to make syrup and sugar from sap. These were the only sweeteners, other than honey, that many settlers had.

Sap starts to move in the trees in late winter or early spring (typically during March in Minnesota). Sap moves when the days start warming up and the nights are still freezing cold. If the days and nights are both cold, nothing will happen. The trees are tapped as soon as the sap begins to move or run. A hole is drilled into the tree with a tool called a brace. A spout is put into the hole and sap starts dripping out of the spout. A tube is attached to the spout to bring the sap into a bucket. Only a small amount of sap is taken so there is plenty left for the tree.

Sap is thin and runny, but we like syrup a little thicker. That's why people boil the sap and cook out some of the water. It takes a long time to make the syrup thick enough, and the sap is closely watched so it doesn't burn. About 40

gallons of sap cook down to make one gallon of syrup. Have a tasting party with maple syrup and maple sugar candy to taste. (If you can, bring in a person who taps trees to show children the equipment and how it is used.)

**Activity 6:** Bark rubbings.

Take a tour of a woods or neighborhood (be sure to get permission) and make rubbings of various tree barks using crayons and light-weight drawing paper. Enjoy the various textures you find. Are your rubbings from old trees or young trees? How do you know?

**Activity 7:** Look for: Lilac bushes and apple trees blossoming.

**Activity 8:** Nature scavenger hunt.

Give each student a bag and a list of things from nature to find. Guide students to a safe and specific outdoors area in which to hunt. Set a time limit and turn them loose. Encourage hunters to select things of interest they find on their own, too. Caution them not to break, damage, or take living plants. Your scavenger list may include things like acorns, pine cones, maple seeds, elm seeds, catkins or pussy willows, leaves.

As a follow-up you may wish to have students make art collages to display some of their natural finds.

**Activity 9:** Creative writing: Poetry.

Brainstorm words that can be used and list them on a chalkboard. Then write poems about why trees are so special in our lives. Students can write about what trees and forests do for them, how they make them feel. Or, they can pretend they are trees and talk about how things look from a tree-top point of view! What are some other ideas?

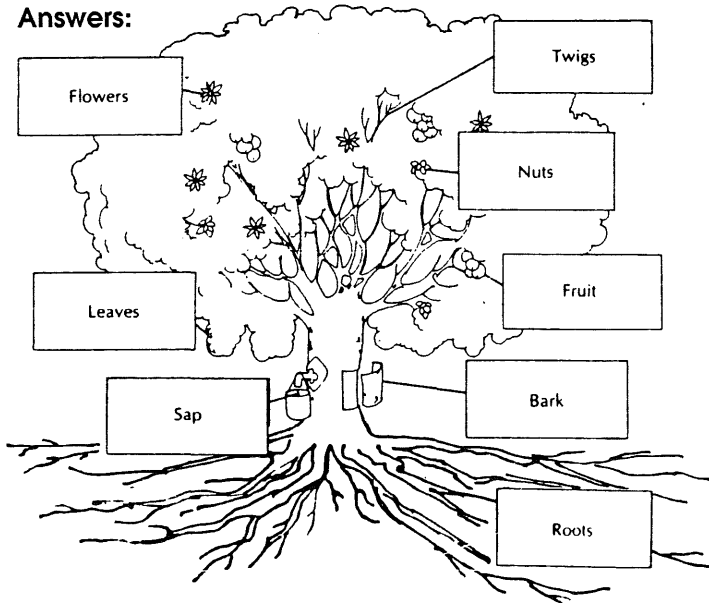
**Activity 10:** Guided fantasy.

If there is room, have the students lay down on the floor. (Alternate site: if you have a woods available, go into the woods for this project.)

Tell students: Close your eyes. You are resting on your back in a large forest. What are you feeling? What does it smell like? What sounds do you hear? How do the trees look from this angle? How does the sky look?

**Activity 11:** Do Activity Sheet A (Page 1-11).

**Answers:**



leaves from each one. (Collect a leaf for each child in your group. If you gather the leaves quite a while before you do the activity, you can keep them fresh by wrapping them in a wet towel.) Collect a few twigs, pieces of bark, and other tree parts, too. Keep in mind where all of the trees are located so you can find them again when you go outdoors with your students.

Trace an outline of each kind of leaf on a piece of paper. (You may need to enlarge the outlines and go over them with a dark marker so they'll be easy to see from a distance.) Tape or hang each of the leaf outlines in a different place in the room.

When you're ready to start the activity, have the students sit in a circle. Lead a discussion about the different parts of a tree. Show pictures of leaves, bark, branches, roots, and other tree parts as you talk. Pass around any parts you collected before the activity. You may want to talk about what each tree part does.

**Activity 12:** Become recycling sleuths.

What are some of the many ways we can **recycle** to help save our trees? Recycle paper products; save newspapers for recycling centers; find out where the nearest recycling center is for you. What other things will they recycle? What do they make from the recycled products? What can you do? Cut out magazine pictures to make greeting cards; use discard mail as scrap paper; cut corners from envelopes and slip over pages for neat bookmarks. What are some other things you can do?

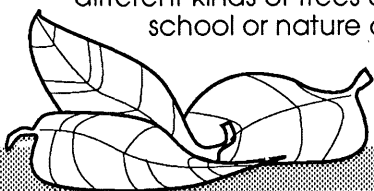
*Fun fact:* Recycle just one Sunday edition of the New York Times newspaper and we've saved 75,000 trees!

**Activity 13:** Walk and talk trees.

*You'll need:* leaves from several different kinds of trees; twigs, bark, fruit, nuts, or other tree parts; pictures of trees and tree parts.

This activity helps younger children look more closely at trees. First, they'll learn about some of the different "parts" that make up a tree. Afterward you can take them on a walk outside to compare some of the different trees in your area.

Before the students arrive, find four or five different kinds of trees around your school or nature center and collect some

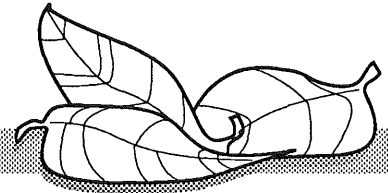


After the discussion, give each child one of the leaves you collected. To help them observe their leaves closely, ask some questions. For example: Are the leaf edges pointed or smooth? Are any of the leaves a different color from the others? Do any of the leaves have tiny hairs on their undersides? Can you see and feel the veins? Is there anything special about any of the leaves? (For example, some may notice that their leaves have been munched on by insects or other animals.)

Next, tell the students there's a picture of each type of leaf hanging somewhere in the room. Have them look for the leaf outlines that match their particular leaves, then have each of them go and stand next to the correct picture.

Once everyone has found the right leaf shape, tell them they're going to be taking a walk outside to find the trees the leaves came from. (Have them take their leaves with them outside.)

Each group of students with the same kind of leaf should keep their eyes peeled for "their" tree. Stop at certain trees as you walk along and ask if anyone thinks his or her leaf came from that particular tree. Have the youngsters who say "yes" hold their leaves up in the air. Are they right? Next, all of the youngsters look for some of



the tree's parts on the ground. Can they find twigs and buds, fruit or nuts, other leaves, or any other tree "pieces"? Compare the parts they find to those of the other trees you stop and talk about.

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

**Activity 14:** Natural monsters.

Tree monsters are lurking in your classroom! Go outside and gather items from trees that you could make monsters from. Glue these pieces onto construction paper and add paint or crayon details. What is the name of each monster?

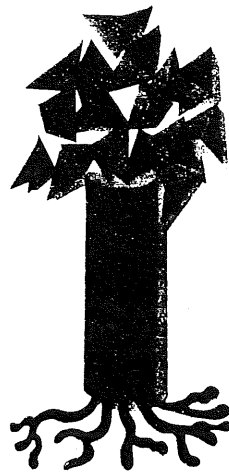
**Activity 15:** Getting to know tree parts!

Do Activity Sheet B (Page 1-12).

*You'll need:* Toilet paper or paper towel tubes, large construction paper, glue, yarn, scissors, markers.

Have fun making three dimensional trees that show some of the basic tree parts. Activity Sheet B shows students the process; they add their own three dimensional features and creativity!

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



Sample Tree

**Activity 16:** Look for: Bees pollinating.

Have an incredible edibles tasting party! Ask: How many tree products have you eaten this week? This year? Your party fare might include bananas, oranges, apples, dates, walnuts, cashews and other nuts, bark (aka cinnamon!), maple syrup, more.

**Activity 17:** Root power.

*You'll need:* package of small seeds, an eggshell broken in half, part of an egg carton, potting soil.

Put some potting soil in each eggshell half; sprinkle seeds in one half shell. Cover according to the directions on the seed package. Put the shells in the carton so they will stay upright. Water very lightly and place in the sunlight. After a few weeks, watch what happens. The shell

with the seeds will start to crack from the roots. Discuss how roots cause damage to sidewalks or basements.

**Activity 18:** "Trees."

Read the familiar tree poem "Trees," by Joyce Kilmer. What does it mean to students?

**Activity 19:** Look for: Maple and elm seeds.

**Activity 20:** Play "Leaf it to Us!"

*You'll need:* a large (approximately three-and-a-half foot) cut out pattern of a tree (use your bulletin board tree as a guide); a pile of construction paper leaves; a beanbag; recorded or piano music; some tree and non-tree items like a rock, feather, pine cone, maple seeds, pine needles, acorn.

Tape or hang the paper tree on the wall or bulletin board (at a height all the children can reach) and stick a circle of tape to each branch tip. Put the leaves in a pile near the tree, set up the music, and you're ready to play the game. Here's what to do:

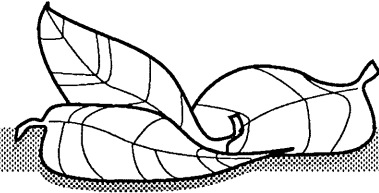
Have the students sit in a semicircle around the tree. Explain that everyone will get to help "dress up" the paper tree with the cutout leaves. But before a player can put a leaf on the tree, he or she must answer a tree question.

Next, give one of the children a beanbag. Start the music, and have the players pass the beanbag around the semicircle. When the music stops, ask whoever ends up with the beanbag one of the questions below. After a player has answered a question correctly, he or she can take one of the leaves from the leaf pile and stick it on one of the tree's branch tips. (If someone gives a wrong answer at first, talk about the question until he or she comes up with the right answer. That way everyone who answers a question will be able to put a leaf on the tree, even if the original answer isn't right.)

Continue playing until all the leaves are on the tree. Make sure everyone gets to answer at least one question. (You may need to add a few questions to this list, depending on the size of your group.)

**Questions**

1. Hold up a "non-tree" object such as a rock. Ask, "Is this part of a tree?"



2. What happens to some tree leaves in the fall? (On some trees (most deciduous trees), the leaves turn different colors and fall off. On most pines and other evergreens, they don't change colors and they don't fall off.)

3. What is a way a bird might use a tree? (Birds perch in trees, build nests in trees, and/or roost (sleep or rest) in trees. Some birds eat a tree's fruit or nuts, or eat the insects that live in or on trees.)

4. How does a tree's bark help the tree? (Bark protects a tree from insects, diseases, cold weather, and other things that could harm it.)

5. Hold up a pine cone and ask, "What is this?"

6. Can you name a kind of food that people get from trees? (Apples, oranges, cherries, and other fruits; also walnuts, pecans, and many other nuts.)

7. Can you name a kind of animal that lives in trees? (Bats, birds, insects, spiders, squirrels, and other animals often live in trees.)

8. Is a tree a living thing?

9. Is a tree a plant or an animal?

10. Hold up some pine needles and ask, "What are these?"

11. What do a tree's roots do? (They absorb water and minerals and help hold the tree steady in the soil.)

12. What is a big group of trees all living in the same place called? (A woods or forest.)

13. Can you name something made from trees that people use every day? (Paper, pencils, and wooden furniture are just a few examples.)

14. When there are no leaves on a tree in winter, does it mean the tree is dead? (No. Trees that lose their leaves in fall stay alive all through the winter, but are in a kind of resting stage.)

15. Would trees be able to grow if the earth never got any sunshine? (No. Trees, like most plants, need sunshine to grow.)

16. What color are most trees' leaves most of the time? (Green.)

17. Can you name a color some leaves become in the fall? (Yellow, red, orange, purple, brown. The leaves of some trees stay green all year.)

18. When you grow up, will you be taller or shorter than most kinds of trees get to be when they're grown? (Shorter.)

19. How might an insect use a tree? (Some insects eat tree leaves, bark, seeds, and other tree parts. Some insects lay their eggs on or in trees. Some katydids and other insects "sing" from perches in trees.)

20. If there were tall trees all around your house, would you feel warmer or cooler in the house on a hot summer day? (Cooler.)

21. Hold up a piece of bark and ask, "Is this part of a tree?" (Also ask where bark is found on a tree (on the trunk, branches, and roots).)

22. If you lived in a place that was windy all the time and you planted some big pine trees around your house, how would it make a difference in the wind against your house? (Trees make good windbreaks.)

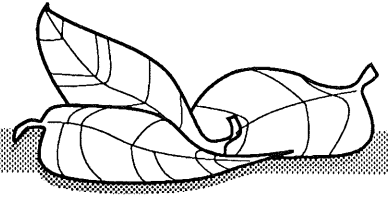
23. Hold up an orange and ask, "Is this part of a tree?" (An orange is the fruit of an orange tree.)

24. Hold up an acorn and ask, "What would this grow into if it were planted?" (An oak tree.)

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

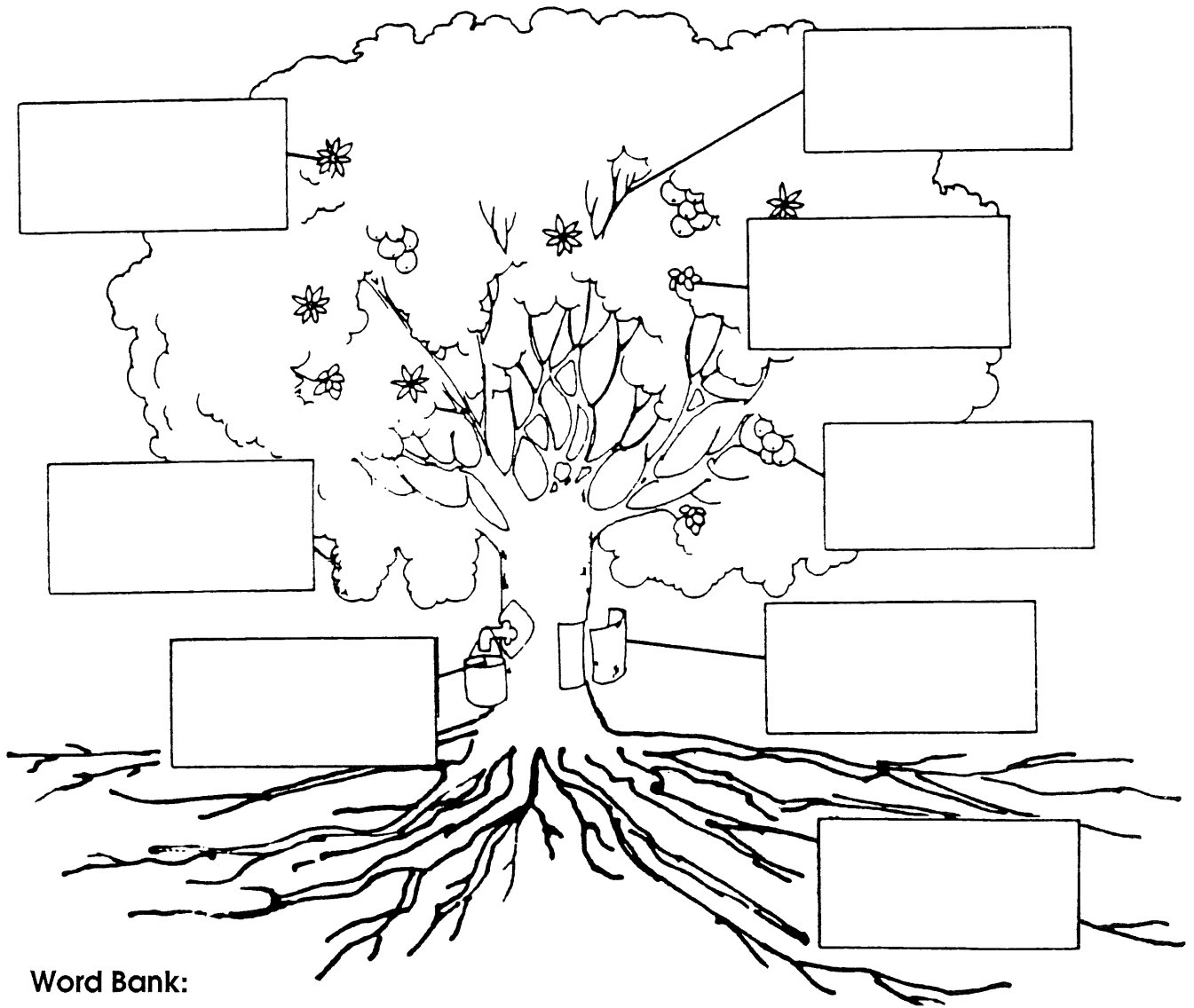


# Activity Sheet A



Rodney the Root says...

label the parts of a tree.



Word Bank:

twig  
roots

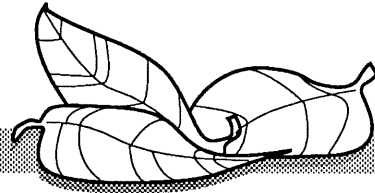
bark  
leaves

flowers  
fruit

nuts  
sap

Answers: See Activity 11, page 1-8.

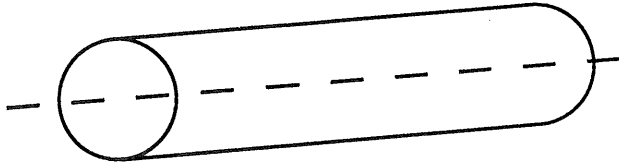
# Activity Sheet B



## 3-D Trees!

You'll need: large piece of construction paper, toilet paper or paper towel tubes, scissors, markers, crayons, yarn, glue, tape.

Your trunk: Cut your tube in half. Make both halves the same size.



Use markers or crayons to make bark and knot holes. Tape your halves end-to-end on your paper. Leave room for your crowns and roots!

Make paper leaves and yarn roots. Glue in place. Add grass, flowers, animals that might live in or near your tree.

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

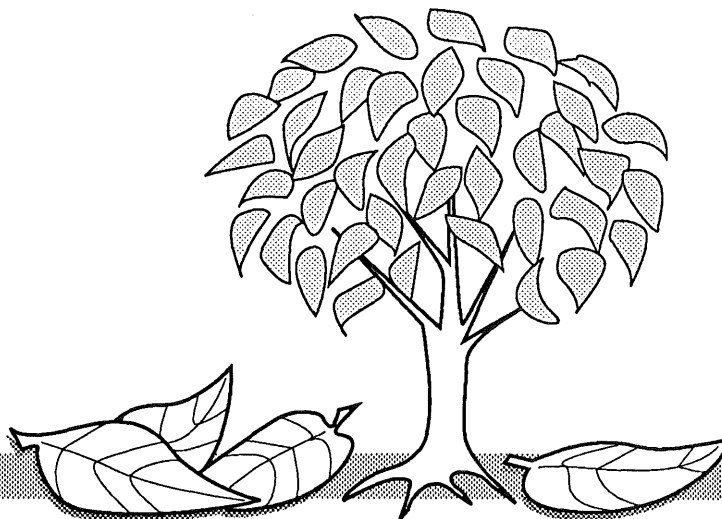
Sample sketch: See Activity 15, page 1-9.





# Grade 2

## Tree Life



### Objectives

- Students will gain a basic knowledge of a tree's life cycle.
- Students will develop appreciation for trees and be motivated to plant them.

### Background Information

Minnesota, like many parts of the world, has very cold winters. During this time, the ground is hard and seems lifeless under layers of snow and frost. But under all this cold lie the **seeds, roots, and stems** that will be next summer's plants. Each seed holds a tiny plant and some food that will feed the new plant. Roots and stems have tiny **buds** that will begin to grow when the weather warms. The cold earth is far from lifeless. Winter is simply a time of rest.

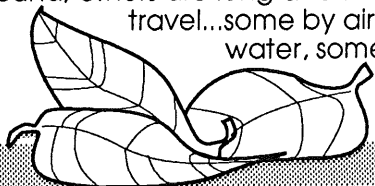
As spring arrives, the rays of the sun begin to warm the earth. Snow and frost melt. The moisture soaks the seeds and makes them swell. The tiny plants begin to grow. Buds and roots also begin to grow and soon we see new plant life.

Through the hot summer months, plants grow strong and sturdy. But at the end of the season, a plant's work is usually done. For some plants, it's the end of their lives. For others, it means going into a long rest as the autumn ground freezes and there is no more water. They will "sleep" (lie **dormant**) again until spring, when the **life cycle** will start all over again.

### It Starts With Seeds

They can be as large as a coconut or as small as the head of a pin. Some are flat, some are round; others are long and thin. Most

travel...some by air, some by water, some by quietly

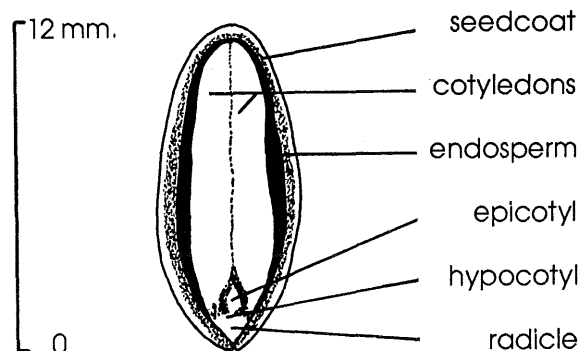


### Vocabulary Words

seeds	sapling	sapwood
roots	root tips	heartwood
stems	cambium	chloroplasts
buds	fibers	carbon dioxide
dormant	sap	photosynthesis
life cycle	cells	evergreen
oxygen	cellulose	broadleaf
chlorophyll	annual rings	deciduous
pollen	outer bark	ecology
seedling	inner bark	germinate

hitching a ride with a passing person or animal. Touch them with a bit of warmth and moisture, and the miracle of growth begins. What are they? Seeds, wonderful seeds!

Seeds look and feel very different from each other, but they're all alike in important ways. Each of them is a baby plant with its own food supply, all put together in one handy, self-sealing package. They all have the same needs for growth—moisture, warmth, sunlight, food, **oxygen**. And they all begin to grow in much the same way: Moisture soaks the outer shell of the seed until it becomes soft. The food inside expands as



Seed Cross Section

the water enters the seed. If warmth is also present, the shell breaks open and growth begins.

A seed contains everything that's needed to form a new plant. The cross-section on page 2-1 shows the parts of a Kentucky coffeetree seed.

As growth begins, a small root pushes out of the seed and down into the earth to search for water. A tiny stem pushes up through the soil reaching toward the sunlight.



As the plant grows underground, it uses the food stored in the seed. As soon as it pushes out of the ground into the sunlight, it begins to make its own food. Food is made by the leaves and the stem of the plant. A green material in the leaves' plant tissues -**chlorophyll**- acts together with water, air, and sunlight to make a kind of sugar that is food for the plant. The sugar flows from the chlorophyll throughout the plant so the whole tree is nourished.

Some tree species have unusual seed "containers." Think about coconuts, bananas, apples, pine cones. Pine cones vary, too. One kind is small and papery and full of tiny grains of **pollen** that look like yellow powder. The wind blows the pollen out of the cones. Another kind of cone is covered with wood scales that hold seeds. When a seed is ripe, the wind blows it off the scale. When it reaches the ground, the seed may take root and grow into a new pine tree.

The young tree that grows from a seed is called a **seedling**. After a tree reaches a height of six feet or more and its trunk is one to two inches thick, it is called a **sapling**. The tree grows taller and its trunk grows thicker every year. The tree continues to grow as long as it lives.

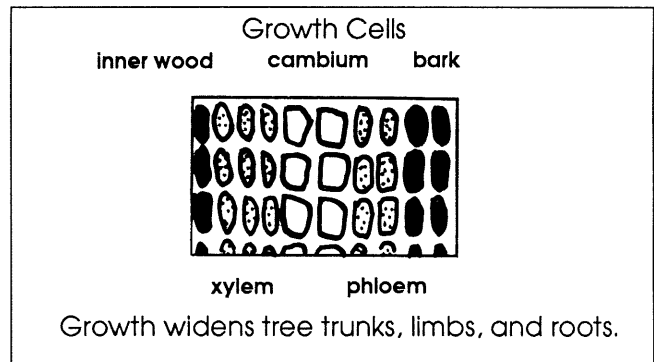
### Where Growth Takes Place

Trees have three different growing parts: the **root tips**, the **cambium** layer, and the buds. The root tips cause the roots to grow longer and spread out in search of more water and minerals. The cambium layer is a thin layer of cells between the bark and the inner wood. You'll find

cambium in the trunk, limbs, and roots. The buds on the limbs grow and get longer, making the tree taller and wider. This also makes it possible for the limbs to spread out to receive more sunlight.

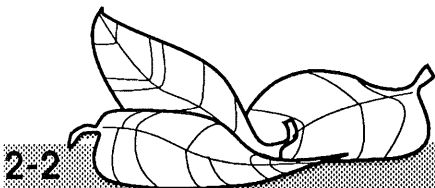
Wood is not solid material. It is made up of a lot of little **fibers** woven together that can be seen only under a microscope or very strong magnifying glass. Fibers vary from short to long.

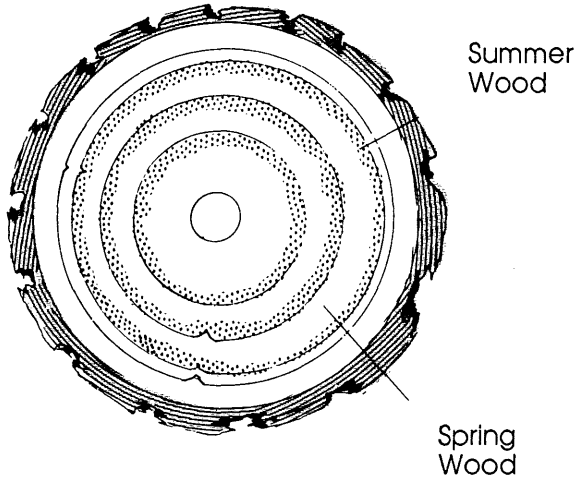
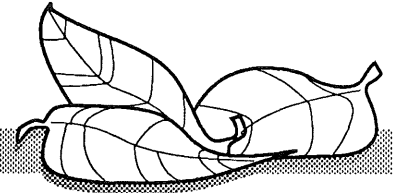
Little tubes carry plant foods up and down the trunk of the tree and through the branches as liquid called **sap**. These tubes, or pipelines, are made up of many small sections called **cells**. The cells are so small they can only be seen through a magnifying glass.



The ends of the cells are open, like a soda straw. A row of material called **cellulose** forms around the outside to strengthen the tube. A piece of wood, even as small as a pencil, contains millions of these cells.

By looking at the cross section of a tree trunk, you can see tree growth from the center towards the outside. Look closely at the top of a stump or the end of a log, and you can see rings in the wood. These rings are made by growing layers of wood; a new layer is added each year. Each layer is made up of a band of lighter colored wood called spring wood and a band of darker wood called summer wood. The spring wood band is usually wider than the summer wood band. These rings are called **annual rings**.





Tree Cross Section

The tree's age can be figured out by counting the rings on the stump. Remember, one light ring and one dark ring is one year's growth. Count only dark or light rings to learn the tree's age.

The covering on the outside of the stump or log is usually rough and does not look like the wood. This is called the **outer bark**. It is a layer of dead cells and is only a protective coat. Just inside the outer bark is a thinner, lighter colored layer called the **inner bark**.

The very thin layer of cells just inside the bark can't be seen by the naked eye. It is the cambium (discussed earlier).

Next is a wide band of lighter colored wood that is called **sapwood**. Notice the darker, dead, inactive wood in the center of a stump or log. It is called **heartwood** and it gives support and strength to the tree. For more information about annual rings, see Grade 6, pages 6-8 and 6-9.

The shape of a tree varies. Part of that is due to the kind of tree it is. Part is due to the tree's environment. When a tree stands in an open location, branches often grow low down on the trunk. They may spread out, almost sweeping the ground. When trees grow close together, like in a forest, the lower branches do not get enough light and soon die. The branches forming the crown at the top of the tree are sometimes the only ones that survive.

## The Leaves' Job

Sunlight comes into a leaf through the leaf's skin, which is clear like glass. Beneath the skin are millions of tiny "bags"—again called cells. These cells are like little balloons filled with water and living jelly. Inside the cells are small green packages called **chloroplasts**. The chloroplasts are green because they are filled with green chlorophyll. The chlorophyll catches some of the sunlight that falls on a leaf.

While the green packages are catching sunlight, other things are happening in the leaf. Air comes into the leaf through many tiny openings. Water, moving up from the roots far below, flows through the leaf. The air and water mix together and flow into the cells.

These cells are like little factories. Here, the green chlorophyll works away. Using sunlight as a source for energy, it changes water and a gas from the air (called **carbon dioxide**) into a form of sugar. This process is called **photosynthesis**. The sugar made by the leaves is food or energy for the growing parts of the tree and for storage. During photosynthesis, the leaves also produce oxygen, which is released into the atmosphere.

Some trees lose their leaves before winter; others do not. Why does this happen? Leaves make the food for the trees and they need water to do it. A tree gets water from the ground. The roots take it in, then the water travels up the trunk to the leaves. In late summer, a thin layer of cork grows over the leaf-twig connecting spot. Water can no longer pass into the leaf, so it dries up, dies, and falls off.

Another kind of tree, the **evergreen**, does things a bit differently. Its leaves are called needles and they fall off, but not all at once like the first trees (**broadleaf** or **deciduous**) we talked about. Evergreen needles are tough and don't freeze in winter, so they don't lose water as quickly as other kinds of leaves do. By holding onto the water that's in them, they stay alive and green even in winter.

## Seasons Come, Seasons Go

Seasonal changes bring a lot of variety to a forest. During the spring of the year, forest life is renewed. The flowering plants, including many trees and shrubs, display their showy flowers. The broadleaved trees and shrubs begin to cover

themselves with new leaves, while the evergreens develop new shoots, known as candles, that later flare out into new stems and needles. The male pollen-bearing flowers of evergreens are also colorful with their different shades of yellow and purple. Have you ever tapped the end of a pine branch when the pollen was ripe? If not, try it sometime; you will see a dense cloud of yellow or purple pollen drift away with the wind. The wind will carry some of this pollen to female flowers of the same tree or to neighboring trees that are the same kind. These female flowers will then begin producing new pine cones.

While all the forest plants are springing to life, fur-bearing mammals are giving birth to their young. Songbirds, game birds, predatory birds (hawks and owls), and scavengers (vultures, gulls, crows) are hatching their offspring. Along nearby ponds and lakes, waterfowl hatch their young. All this new plant and animal life is a wonderful form of beauty for people to enjoy.

During late spring and summer, all the new life that began in the spring is "growing up." Many flowers turn into showy fruits; young birds grow feathers and begin flight training; ducklings start to swim; young fur-bearing animals romp around and learn the serious business of hunting for food and hiding from their predators. While all this activity is going on, the trees in the forest are adding a new layer of wood around their trunks and spreading their branches wider and higher.

In the fall, the forest changes into a new kind of beauty. The leaves of broadleaved trees, shrubs, and other plants change to brilliant colors of red, yellow, and orange. Do you know why the leaves of broadleaved plants change color? Many people think frost causes this change. Actually, frost can cut down the brightness of autumn colors. The green color in leaves comes from the green chlorophyll. When exposed to light, chlorophyll starts the process of photosynthesis.

Carbohydrates are made during photosynthesis. These carbohydrates collect in the leaves and make other colors. In the fall, when temperatures are too low but not yet freezing, the

production of the green chlorophyll stops. The chlorophyll that is already in the leaves gradually breaks down until it is completely gone. The other colors in the leaves then show through in various shades of reds and yellows. After showing their beauty for several weeks, the colorful leaves fall to the ground.

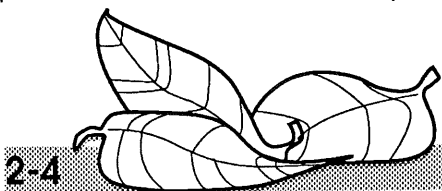
During the fall, some birds and waterfowl migrate to warmer climates. Squirrels and chipmunks are busy storing acorns, pine cones, and seeds of other plants to feed on through the long winter months. Bears and other hibernating animals prepare to "hole-up" for much of the winter. Most of the trees and other plant life shed their seeds before the snow flies so the seeds will be ready to sprout into new plants when the snow melts the next spring.

## Death Of A Tree

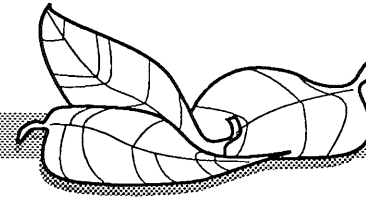
We are part of a living and dying world. Plants and animals are born, grow to maturity, age, and die. Their places, in turn, are taken by other plants and animals. As each living thing dies, decays, and returns to the soil, it affects the area around it and changes the environment. For example, one plant's death may make it possible for new plants to grow where they could not before. This is a part of the exciting process called **ecology**.

The Norway (red) pine shows the death/new life connection. Norway pine tree seeds need mineral soil to **germinate** and grow. When a Norway pine tree is growing, it covers the forest floor with litter, making it impossible for other pine seeds to reach mineral soil. This means Norway pine seeds cannot reproduce themselves in the dense forest. When the Norway pine dies and the litter is disturbed, though, other Norway pine seeds may fall on the mineral soil and start to grow.

Plants that like shade, like the sugar maple, can sprout and grow on rotten logs. Plants growing on rotten logs help the log decay back into the soil. Small animals find homes in the logs; these animals become food for other animals. And so, death brings new life to a forest.



# Grade 2



## Calendar

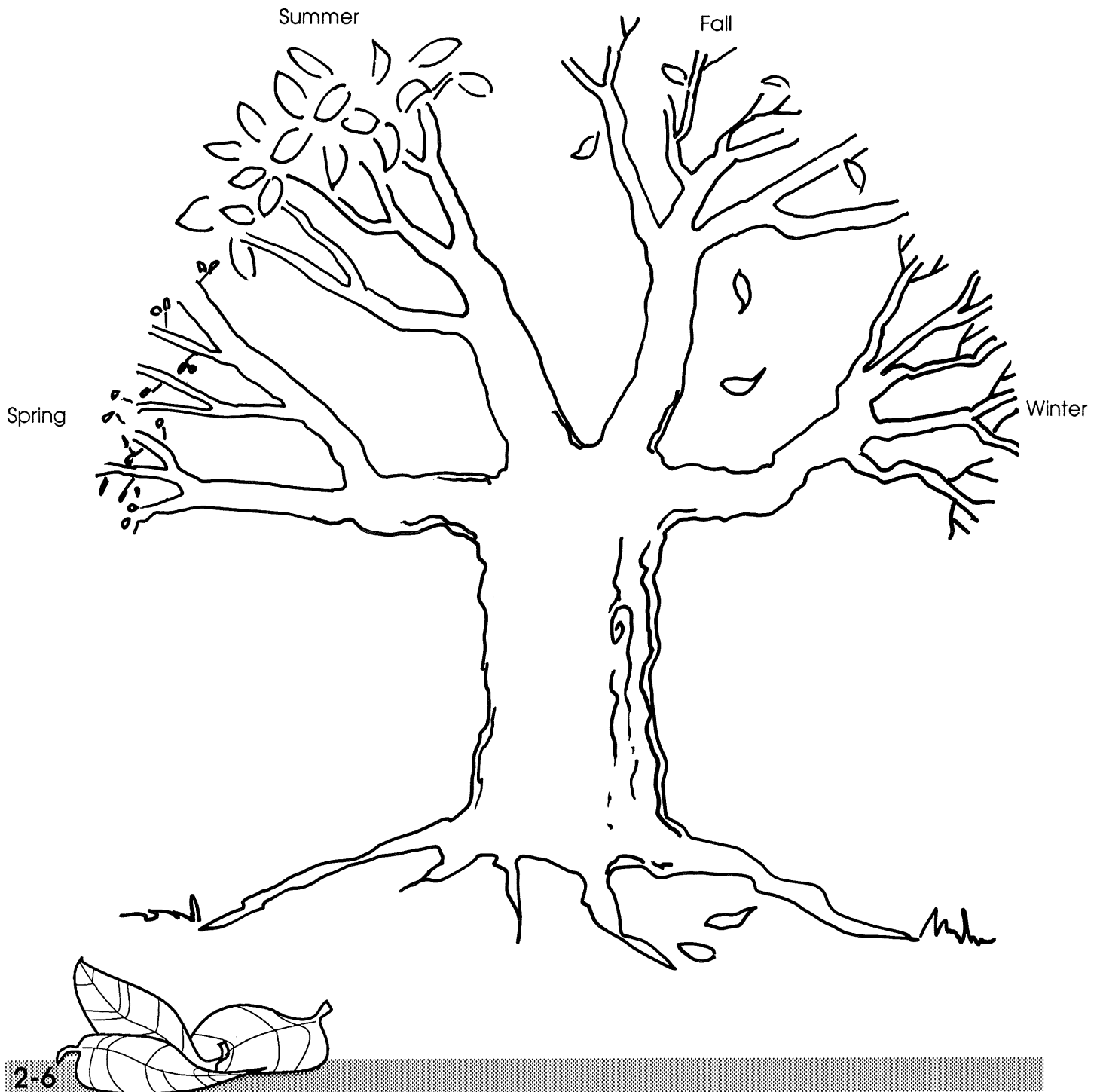
See activity details on pages 2-7 through 2-11.

<p>Do: Plant Kentucky coffeetree seeds!</p> <p>Science</p>	<p>1</p> <p>Create: Pine cone critters.</p> <p>Art</p>	<p>2</p> <p>Hike: Nature scavenger hunt.</p> <p>Science</p>	<p>3</p> <p>Write: "Life of a Leaf" stories.</p> <p>Language Arts</p>	<p>4</p> <p>Create: Tree monsters.</p> <p>Art</p>	<p>5</p>
<p>6</p> <p>Create: Hear the forest!</p> <p>Language Arts</p>	<p>7</p> <p>Discover: Treasures in rotting logs!</p> <p>Science/Social Studies</p>	<p>8</p> <p>Do: Stump rubbings.</p> <p>Art/Science</p>	<p>9</p> <p>Discover: Tree growth patterns.</p> <p>Science</p>	<p>10</p> <p>Write: Be a poet. Tell about those marvelous trees!</p> <p>Language Arts</p>	
<p>11</p> <p>Do: Rodney the Root's <i>Seed Search</i>. (Activity Sheet)</p> <p>Language Arts</p>	<p>12</p> <p>Listen: Woodsy literature and folklore.</p> <p>Language Arts</p>	<p>13</p> <p>Look for: Tulips blooming, bees pollinating, robins nesting.</p> <p>Science</p>	<p>14</p> <p>Discover: The number of pounds of paper your school uses!</p> <p>Math</p>	<p>15</p> <p>Listen: Shel Silverstein's delightful book, <i>"The Giving Tree."</i></p> <p>Language Arts</p>	
<p>16</p> <p>Research: What recycling has to do with saving trees.</p> <p>Science</p>	<p>17</p> <p>Discover: Dead leaf skeletons.</p> <p>Science</p>	<p>18</p> <p>Look for: Tree frogs. Discuss: If a tree falls in the forest and there's no one to hear it, does it make a sound?</p> <p>Science/Language Arts</p>	<p>19</p> <p>Look for: Crab apple trees blooming. <i>Fun Fact:</i> Banyan trees make their homes inside other trees.</p> <p>Science</p>	<p>20</p> <p>Discuss: How many species of trees can you name? How many grow in Minnesota?</p> <p>Science</p>	

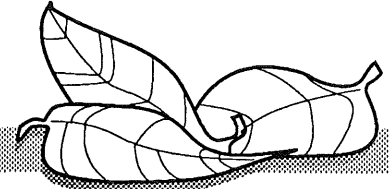
# Bulletin Board Idea

## A Tree For All Seasons

Make a basic tree trunk with branches.  
Divide the crown according to the four seasons.  
Students participate by adding appropriate parts  
(buds, leaves, etc.) to each season's section.



# 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 the following: Kentucky coffeetree seeds and planting supplies (Activity 1); pine cones (Activity 2); *"The Giving Tree"* by Shel Silverstein (Activity 15).

### Activity 1: Plant Kentucky coffeetree seeds!

*You'll need:* potting soil; sand paper; styro-foam or plastic cups (2 per student, 10 oz. - 12 oz. size or larger); seeds (order from: F.W. Shumacher, 36 Spring Hill Road, Sandwich, MA 02563).

*What you do:*

1. Scarify the seeds by rubbing gently on fine sandpaper until the seed coat is penetrated.
2. Fill each cup to within one inch of its top with potting soil.
3. Push seed about one inch into the soil. Cover the seed with soil and smooth the surface.
4. Water until soil is moderately moist.
5. Set cups on a window ledge or table in direct sunlight.
6. Check daily for moisture needs. If soil feels dry to the touch, add one or two tablespoons of water. Don't overwater. Your cup has no drainage system to get rid of extra water.
7. Watch for signs of germination (sprouting of the seed). Your sprout should appear in three to four weeks. Continue to water as needed. When the seedling has outgrown its container, transplant to a larger pot with good drainage. The seedling may be transplanted outdoors after one year.
8. To plant outdoors, see information in the Appendix, page 3. In addition to the Kentucky coffeetree seeds, try sprouting apple, peach, pear, avocado, orange, grapefruit, cherry trees. Or, try vegetable seeds. Beans are easy to grow and you'll see fast results; the bean sprouts appear in just a few days.

### Activity 2: Pine cone critters.

Have students collect pine cones and bring them to class. Look for a variety of sizes...they're out there somewhere! Glue pine cones together to make animal critters. Use pipe cleaners, construction paper, etc. to add finishing touches.

### Activity 3: Nature's scavenger hunt.

Give students bags and a list of things to find. Go outdoors to a safe and specific area in which to hunt. Set a time limit, and they're off! The list

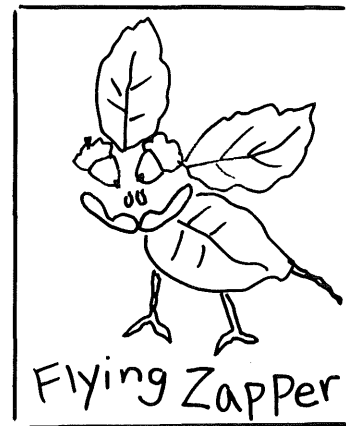
of items to find might include pine cones, acorns, maple tree seeds, a dandelion, pussy willows, a feather, leaf buds, etc. You may want to do a "dry run" in the hunt area first to find things to add to the list.

### Activity 4: Life of a leaf.

You are a leaf. What happens to you each season? When there is pollution in the air? When a hungry caterpillar decides you would make a tasty lunch? When you are chosen the most beautiful leaf in the school leaf collection? Write a story about yourself and your life as a leaf. Use plenty of details and describing words!

### Activity 5: Create: Tree monsters.

Tree monsters are lurking in your classroom! Go outside and gather items from trees that you could make a monster from. Glue these pieces onto a piece of construction paper. Add crayon or paint features and details. What is the name of your monster?



### Activity 6: Forest sounds.

Gather rhythm band and other instruments and create your own forest music. How does a forest sound? Which instrument(s) would you use to create the sounds of soft breezes through the leaves, strong wind through the needles or leaves, squirrels leaping from branch to branch, birds calling, a tree being chopped down or falling? How about feet shuffling through the fall leaves, a deer running through the bushes, a woodpecker pecking, a sleepy owl hooting? Would a forest sound different at night than during the day? Create your forest sounds with the instruments, tape recording your best efforts. Invite others to listen to your tape. Do others "hear" your forest the same way you do?



**Activity 7: Rotting treasures.**

One of the best ways to learn about the ecology of an area is to study a rotten log or decaying stump. The competition and cooperation among plants, animals, and other factors of local environment (moisture, air temperature, light) can all be studied in this exercise. While all these things are happening in a very minor part of our environment, such as the log, the same things are at work in the larger environment, like the forest.

Study a rotten log or decaying stump and you see a community at work. Just as in your community, city, town, or village, the same birth, life, and death forces are at work. A good example of cooperation and competition exists in the log community, too. What comparisons can students make between the log community and their own?

**Activity 8: Stump rubbings.**

Find the stump of a large tree. (Dutch elm and oak wilt diseases have affected many trees. Diseased trees have been removed, and their stumps are a good learning source.) Do a stump rubbing, using a strip of paper and a soft lead pencil or dark crayon. Figure out when the tree was cut and find important dates in your community, state, or nation's history by counting toward the center. (See Grade 6, page 6-8 for more information about reading annual rings.)

It might be fun to see who in the class can find the oldest tree stump, and who can pick out the most important dates.

**Activity 9: Tree stumpers.**

On the same stump (or stumps) find the good and bad growth years. Compare with the weather history of an area to see if there is a relationship. Compare stump rubbings from several trees to see if growth patterns are similar. If not, research what may have caused the differences, i.e., insects, disease, competition from surrounding trees, a roadway, sidewalk, or building, etc.

**Activity 10: Try being a poet!**

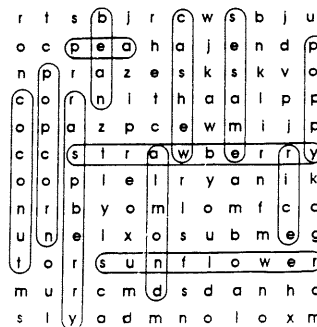
Write a poem about why trees are so special in our lives. As a group, brainstorm words that can be used. Then let the creative juices flow! Write about what trees and forests do for you... how they make you feel. Or imagine you are a tree. Talk about how things look from your point of view, or how you feel. What are some other ideas?

**Activity 11: Seed search.**

You'll need: Rodney the Root's *Seed Search* Activity Sheet A. (Page 2-10.)

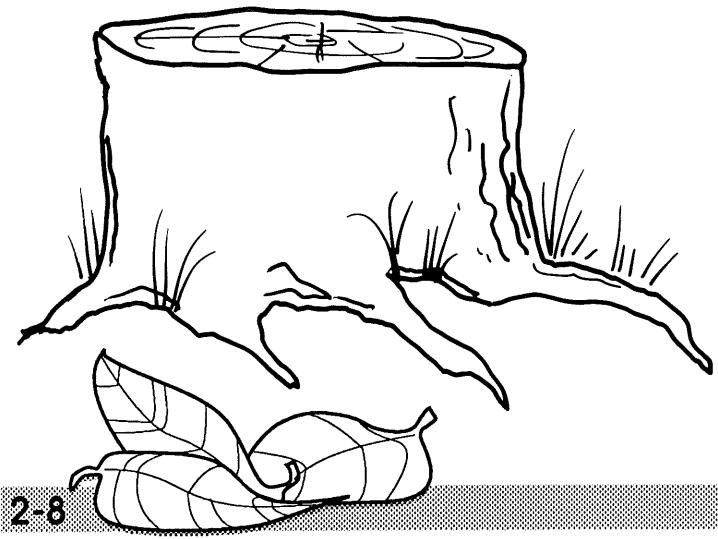
Discuss the activity sheet and do the word search.

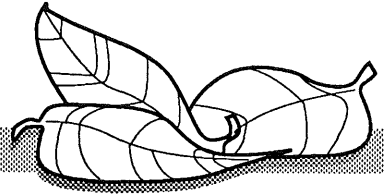
**Answers:**



**Activity 12: Literature and folklore.**

Literature is packed with fascinating folklore and legends about plants and trees. Your 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 Basoga of central Africa





sacrificed animals to each tree they were about to cut down. Scandinavian elves and trolls are tree lovers, too.

**Activity 13:** Look for: Tulips blooming, bees pollinating, robins nesting.

**Activity 14:** Pounds and pounds of paper.

How much paper do youngsters use in your school? Here's a survey with surprising results:

1. Each student weighs all the paper in his or her desk (books, notebooks, etc.) on a postage scale. Add each student's total for a grand total.
2. Divide to find the average weight of paper per student.
3. Multiply the average weight by number of students in the school. What's the grand total for your school?
4. A 16-inch diameter tree used in paper production yields 700 pounds of paper. How many trees did your school consume?

**Activity 15:** "The Giving Tree."

Read and discuss Shel Silverstein's delightful book, "The Giving Tree." What things did people do that were damaging to this tree? How did the tree keep "loving back" in spite of what happened to it? Did the story change your feelings about trees? About how people treat trees?

**Activity 16:** Become recycling sleuths!

What are some of the many ways we can recycle to help save our trees? (Recycle paper products, save newspapers for recycling centers, etc.) Where is the nearest recycling center for you? What other things will it recycle? Find out what it does with the recycled products. What can you do to recycle products? (Cut out magazine pictures to make greeting cards; use discarded mail as scrap paper; cut corners from envelopes and slip over pages for neat bookmarks, etc.) What are some other things you can think of?

**Activity 17:** Dead leaf skeletons.

You can find leaves late in the winter or early in the spring that have not fully rotted into rich soil. Look under bushes, in tall grass, or all over the ground in the woods. Dig through the layers of rotting leaves. You might find a leaf "skeleton" with just the harder veins left. Dig down and look for leaves on the bottom that have almost turned

to soil and you may find insects hiding from the cold.

**Activity 18:** Look for: Tree frogs.

Debate the age-old question: If a tree falls in the forest and there's no one to hear it, does it make a sound?

**Activity 19:** Look for: Crab apple trees blooming.

*Fun Fact:* Most trees grow from the ground up, but not most banyan trees. The banyan usually sprouts above the ground and grows down. Banyans are planted when birds, bats, or squirrels drop seeds into cracks in the branches of other trees, called hosts. When a banyan sprouts, its roots grow down from the host branches and into the ground, forming trunks. The banyan kills the host tree by preventing its trunk from growing. After the host dies, the banyan continues to grow and eventually, one tree appears to be an entire forest.

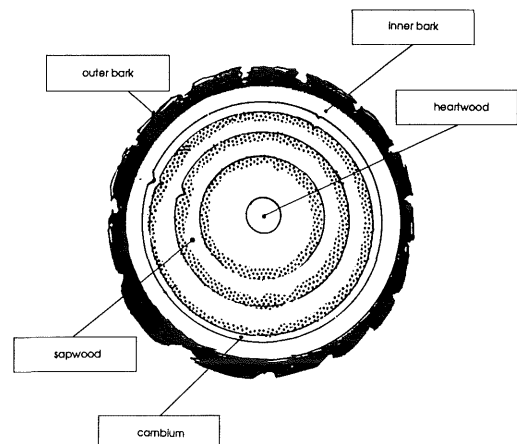
**Activity 20:** Brainstorm: All those trees!

How many different species of trees can you or your group list? Write the names on the chalkboard or on chart paper. Go through your list, circling those that grow in Minnesota and drawing lines through those that don't. Research to find where the others do grow.

## More Activity Fun

**Learn those layers!** See Activity Sheet B, page 2-11.

**Answers:**



# Activity Sheet A

Rodney the Root says...



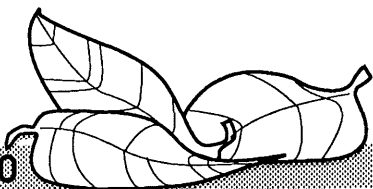
help me in a seed search.

How many plants can you name whose seeds are often eaten by humans? Check out the puzzle below. Names are up and down and across. Did you find all 12?

r t s b j r c w s b j u  
o c p e a h a j e n d p  
n p r a z e s k s k v o  
c o r n i t h a a l p p  
o p a z p c e w m i j p  
c c s t r a w b e r r y  
o o p l e l r y a n i k  
n r b y o m l o m f c o  
u n e l x o s u b m e g  
t o r s u n f l o w e r  
m u r c m d s d a n h o  
s l y a d m n o l o x m

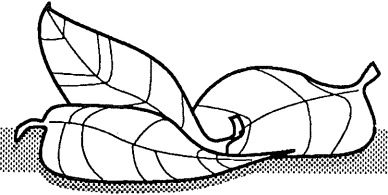
## Look for these seeds:

coconut    bean    cashew    sunflower    popcorn    pea  
sesame    almond    raspberry    strawberry    poppy    rice



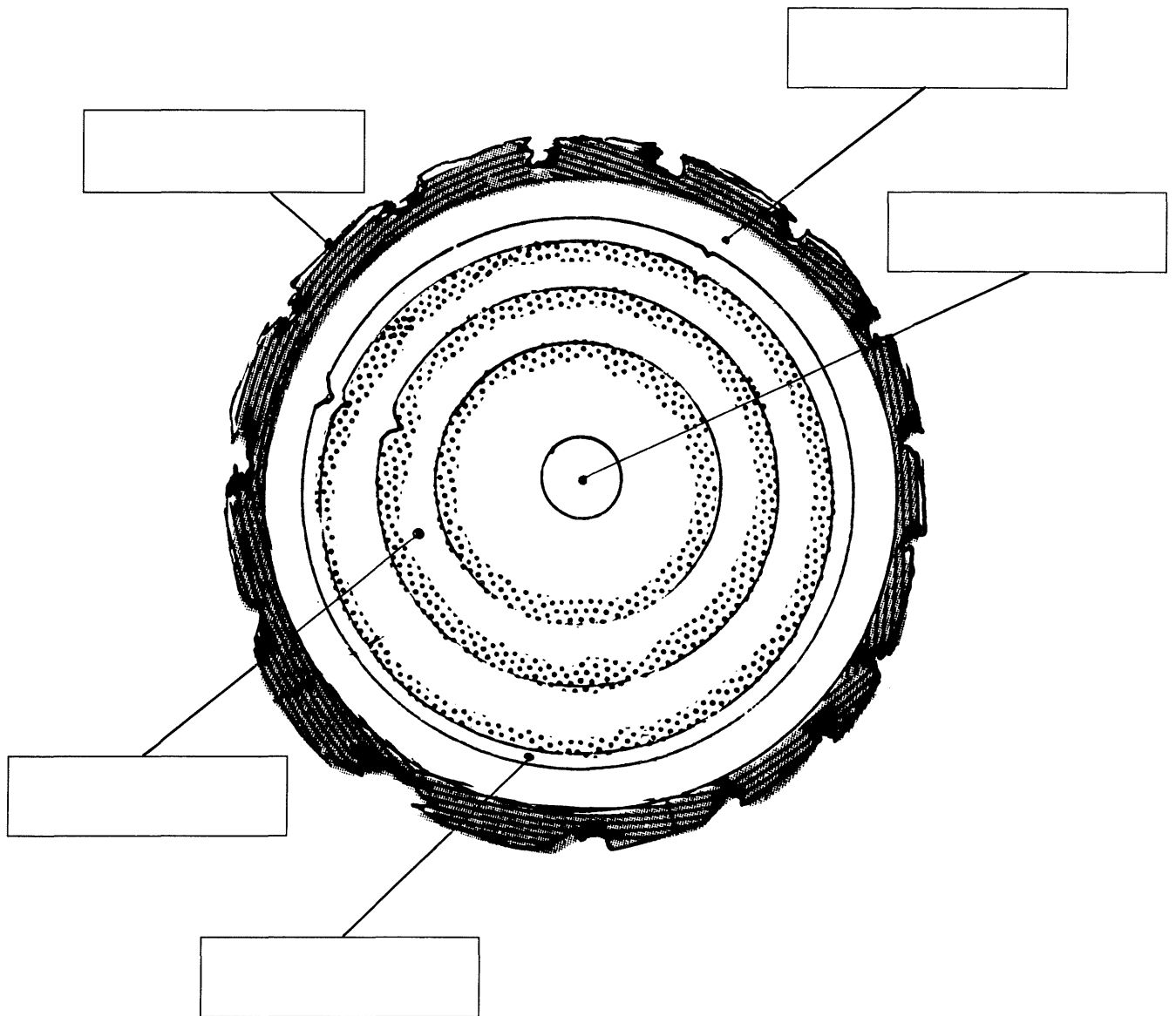
Answers: See Activity 11, page 2-8.

# Activity Sheet B



## Learn Those Layers

Can you label each layer? The layers you're looking for are:  
outer bark    heartwood    inner bark    cambium    sapwood

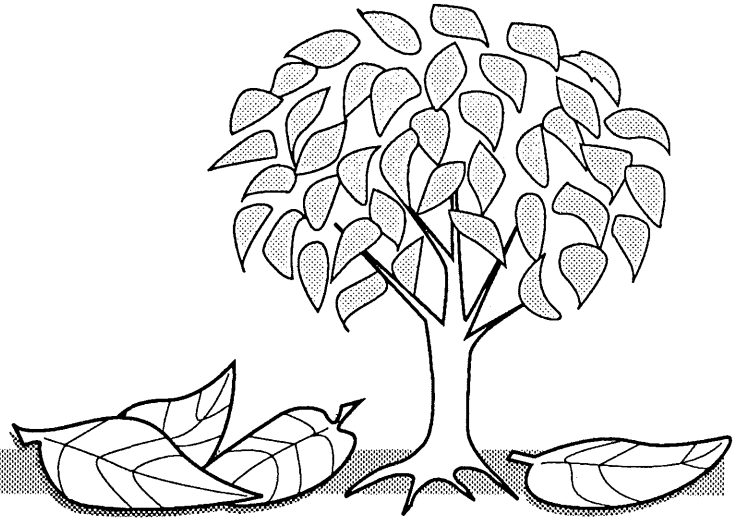


Answers: See More Activity Fun, page 2-9.



# Grade 3

## Tree Enemies



### Objective

- Students will understand some of the causes of damage to trees and what they can do to help prevent it.

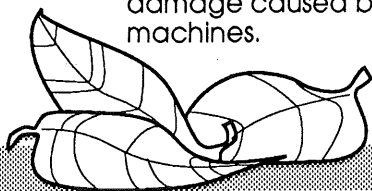
### Background Information

Our priceless friends, the trees, have many enemies. Fire, wind, ice, lightning, **pollution**, disease, insects, machines and vehicles, animals, and abuse from people all take their toll. Some of these, such as weather damage, we can't prevent. Others we can do much about. With good care and management, trees can continue to be **renewable natural resources**.

Trees give us many things. This includes fuel, lumber, wood pulp, fiber, and food for both humans and animals in the form of fruits, nuts, bark, and leaves. Trees are an essential part of the earth's environment because they absorb **carbon dioxide**, give off **oxygen**, hold water and soil in place, and return nutrients to the soil.

Forests are delicate. If disturbed, they can be destroyed. It is our job to protect, **conserve**, and manage the forests of the world rather than simply cut them for our uses today. Proper management of a lumber forest includes planting, growing, and reproducing trees to provide lumber in the shortest possible time. At the same time, forest managers must control **erosion**, guard **watersheds**, protect animals, allow for agriculture, and provide for recreation. Each of us has a responsibility to do what we can to save and protect trees, too.

In these lessons, we will discuss some of the natural causes of damage to trees, as well as damage caused by people and machines.



### Vocabulary Words

pollution	root grafts
renewable natural resources	blockages
carbon dioxide	sapwood
oxygen	chemicals
conserve	environment
erosion	girdling
watersheds	humus
fungus	kindling
elm bark beetles	

### Natural Causes of Damage

Did you know that trees, just like people and animals, can get diseases? They can...and it can be serious.

A **fungus** is a tiny plant that may be deadly to certain trees. Two diseases caused by fungus that have had huge effects on the trees in Minnesota are Dutch elm disease and oak wilt.

### Dutch Elm Disease

Dutch elm disease was first described in the Netherlands in 1919. It spread quickly in Europe and by 1934 was found in most European countries and the British Isles.

European **elm bark beetles**, which carry the disease, were reported in the United States, in Massachusetts, as early as 1909. The fungus that causes the disease came into this country in logs shipped from Europe. The logs contained both the fungus and the European elm bark beetles. The logs were shipped to factories in New York, Ohio, and Indiana. The bark beetles escaped from the logs as they traveled and carried the fungus to at least seven states.

Once in the country, Dutch elm disease spread rapidly. In 1930, new diseased elm trees were found in Ohio. The disease was reported around the port of New York in 1933. Dutch elm

disease is now found in 41 states, from southeastern Canada to Texas, west to Colorado and California, and north to Oregon. It is the most destructive shade tree disease in North America.

Minnesota's first case of Dutch elm disease was found in St. Paul in 1961. Later the same year, seven infected trees were found near Monticello, 40 miles northwest of St. Paul. Now the disease is found in nearly every one of Minnesota's counties, and has reached epidemic proportions in many areas.

### **How is the disease spread?**

Dutch elm disease is caused by a fungus. It spreads from tree to tree in two ways: First, elm bark beetles carry the fungus spores attached to their bodies and pass them into healthy trees when they feed on their branches. Second, the disease can be spread by **root grafts** (roots naturally growing together) when the roots of an infected tree happen to be grafted to the roots of a healthy tree.

Once in the tree, the Dutch elm disease fungus invades the water-conducting vessels of the elm. The fungus causes the tree to form **blockages**, in an attempt to stop the invader. Together with the fungus, these blockages stop the water-carrying vessels of the tree and stop water movement. This causes the tree to wilt and die.

### **What are the signs of the disease?**

The first sign of Dutch elm disease in a tree is wilting in one or more of the upper branches. Leaves on the branches turn dull green to yellow and curl, then become dry, brittle, and turn brown. Peeling bark from wilted branches of diseased trees shows light to dark brown streaks or solid blue to gray colored streaking of the wood beneath the bark. In a cross section of the branch, you'll see a broken brown ring in the outer **sapwood** of the wilting, dead, or dying branches.

Some trees die several weeks after becoming infected, while others wilt slowly and survive for a year or longer.

### **How can we prevent the disease from spreading?**

The best way to manage Dutch elm disease is to prevent it. The ways to prevent Dutch elm disease are de-

scribed as "sanitation." This includes catching signs of the disease early, and getting rid of all weakened, dying, or dead elm trees. Stripping the bark from elm wood takes away elm bark beetle breeding places and sources of the fungus. The steps in a sanitation program are:

1. *Catch the disease early.* Foresters carefully inspect elm trees in any area where the disease has been found. This inspection turns up trees showing signs of disease.

2. *Separate the tree from others.* Foresters disrupt root grafts between infected and healthy trees. Once a tree is known to be diseased, root graft barriers are set up so the diseased tree's roots cannot spread the disease to healthy trees through root grafts. This root graft blocking can be done by trenching around infected trees, or by putting **chemicals** in holes around the trees.

3. *Remove the diseased wood.* This means getting rid of all dead and dying elm material from the area of diseased trees. Dead and dying elm wood, including stacks of firewood logs, are breeding places for elm bark beetles. A piece of elm branch the size of a small fireplace log can produce up to 1,800 beetles. Left to stand, a complete tree can produce hundreds of thousands of beetles. If this tree is infested with the fungus, each beetle carrying the fungus spores can then carry the disease to healthy trees during feeding. This is why removal of diseased trees is so important.

4. *Destroy diseased wood.* This is done by chipping, debarking, burning, or burying elm material.

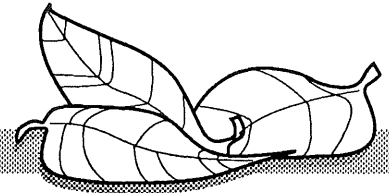
## **Oak Wilt Disease**

Oak wilt disease is found from Minnesota east to Pennsylvania, south to South Carolina and Tennessee, west to northern Arkansas and eastern Oklahoma. The disease probably has been in the North Central states for many years. Disease records as early as 1912 describe oak tree deaths in Minnesota and Wisconsin that were more than likely caused by oak wilt. Oak wilt had not been identified at this time however, so other causes, such as drought were blamed for the oak death. It was not until 1940 that a fungus was found to cause wilting and eventually death of oak trees.

Oak wilt has become a serious disease in southeastern Minnesota. It is found south of a line from St. Cloud to Taylors Falls all the way to







the Iowa border, and east of a line from St. Cloud to Mankato.

**How is the disease spread?**

Oak wilt disease is similar to Dutch elm disease in several ways. First, oak wilt is also caused by a fungus that gets into the tree's outer sapwood. It mainly affects those vessels that carry water and minerals from the roots to the leaves. To try to protect itself from the fungus, the tree forms blockages. They clog the vessels and cut off the tree's water supply. Without water, the oak wilts and dies.

Again as in Dutch elm disease, the fungus that causes oak wilt is carried from tree to tree in two ways. First, it is spread through grafted roots when the roots of a diseased tree are attached to the roots of a healthy tree. Second, the fungus can be spread by sap-feeding beetles. The fungus creates a fruiting or spore-bearing material between the bark and wood of a tree that cracks the bark open. That exposes the spore-bearing material that attracts the beetles. As the beetles crawl on the material, spores of the fungus stick to them. They then fly to other oaks that have been wounded and have exposed water conducting tissues, and infect the healthy trees.

**What are the signs of the disease?**

As in Dutch elm disease, the first sign of oak wilt disease in a tree is wilting. It usually starts near the top of the tree and then quickly involves the entire crown. You'll also see brown to black coloring in the outer sapwood of the diseased tree.

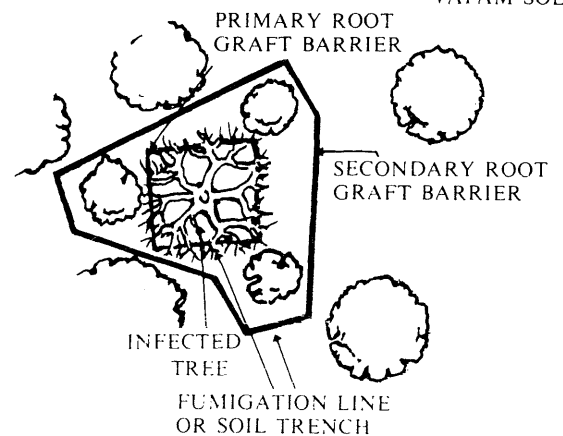
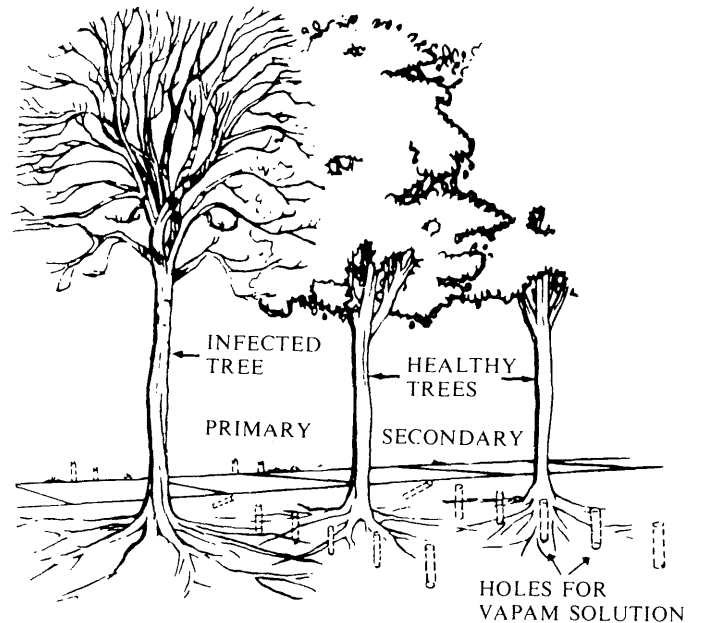
Another sign of oak wilt is leaf color changes. The leaves of red oaks turn dull green, bronze, or tan beginning at the outer edges of the leaf.

Unlike Dutch elm disease, oak wilt can be controlled without destroying every diseased tree. This is because the fungus only produces spores for a short time on a small part of the diseased tree. If these trees are treated so no spores will form on them, infected oak trees can be used for firewood and other purposes. Red oaks can be used only when they are beyond the stage of producing or harboring spores, however. If a red oak is not past this stage, it can be used as firewood only if the bark is removed.

**How can we prevent the disease from spreading?**

Some of the steps to prevent oak wilt disease

from spreading are similar to those of Dutch elm disease. First, the disease must be found, and diseased trees isolated from healthy trees through separating the root grafts. As with Dutch elm disease, root graft separation is done by mechanically trenching around infected trees or by using Vapam, a soil sterilizing chemical that kills living plant tissue.



A second way to prevent oak wilt from spreading is to protect oak trees from being wounded, especially between April 15 and July 1 each year. Trees should not be pruned during this time and working around trees should be avoided if at all possible.

## Insects

Insects can be good or bad for trees. Some are truly plant enemies. They are hungry little creatures that chew away day and night. If they eat all the buds or young leaves on a tree, or the water conducting tissue under the bark, the tree can die.

It is difficult to know how to control insects. Some people use chemicals that kill the bugs, but these chemicals can also cause other damage to the **environment**. Other folks try to combat some bugs with other bugs that like to eat them. This is more difficult, but better for the environment. Getting rid of harmful insect enemies is important, but it has to be done with care. All insects, even those that attack plants, help the balance of nature. The best protection for trees is to keep them healthy in the first place.

## Fire

Fire is another great enemy to trees. When a forest is very dry, thousands of acres can burn in a short time. Raging forest fires destroy valuable timber and threaten lives and property. They can also harm the soil and destroy the forest as a home for wildlife. Once they start, forest fires are hard to fight. Firefighters battle them with water and shovels of dirt. They might also chop down trees and dig up the ground to keep the fire from spreading. Some fires are caused by lightning, but most are caused by careless people.

Unusual as it may seem, fires are sometimes helpful to trees. They can help regenerate a forest.

## Pollution

Imagine a world that is plain, even ugly—a world without beauty. Imagine a world in which most of the trees are dead. It wouldn't be a very pleasant place to live. But many scientists fear that's what our world will be like if we don't do something about pollution. Both air and water pollution are tough on trees. Pollution can poison a tree's system, slow its growth, and even kill it. Pollution happens when human-made and natural wastes dirty the air or water. Human-made wastes are the main sources of pollution. The greatest air pollution comes from the burning of fuel to power motor vehicles, heat or cool

buildings, and run industry. Water pollution is most heavily caused by wastes from industry, chemicals and other poisonous substances, and household garbage.

## Other Human Actions

People can be a tree's best friend; they often are its worst enemy, too. Plants and trees need land to grow on. But people need roads, houses, factories, mines, fields, shopping centers, and parking lots. So trees are chopped down, and land is cleared and paved. Little by little, the world's great forests are disappearing.

Left alone, nature often renews itself. If we change too much land without renewing what we're taking away from it, we can upset or change the environment. Then all plant, animal, and even human life is affected.

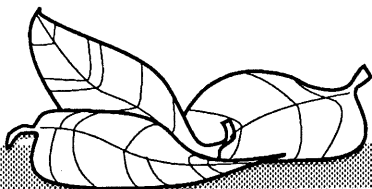
What can people do? Careful and thoughtful management of our resources is the key. People in government, industry, private groups, and individuals are working together to find ways to meet human needs today and also save our resources for future generations.

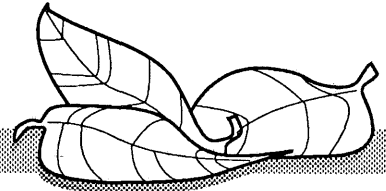
Sometimes we might think people who are cutting down forests and clearing land are the only culprits. Not true. People are wounding trees every day right in our own neighborhoods!

Trees are wounded in three ways—damage to roots, to bark, and to the structure itself (limbs, trunk, leaves). Serious damage to any of these parts of the tree can threaten its health or even kill it. Many tree wounds are caused simply because people do not realize their actions could be hurting trees. Trees seem so strong, so sturdy...sometimes we don't think about how vulnerable they are.

What are some ways each of the three sections of the tree can be injured by people? What effects do these injuries have on trees?

a. **Tree roots** are injured when they're cut into or cut off, choked off from needed moisture or nutrients, or poisoned. Lawnmowers, digging or grading equipment, and even shovels can create serious root-cutting problems. Packing the soil above the roots limits air and moisture flow and can damage delicate roots. Dumping





chemicals and other toxic substances near the root system of a tree can cause poisons to enter the conducting vessels of the tree, damaging and killing tissue. Since the root of the tree is the first step in its food system, damage to roots can close down the tree's ability to get water and nutrients. Without these essentials, the tree will die.

b. **Damage to bark** happens through cutting or carving, ramming, fire, animal activity, people chaining or attaching things to the tree. Lawn mowers and weed eaters do their share, too. Bark has an outer dead layer and an inner living layer. The outer layer is the "skin" of the tree, protecting the soft inner parts of the tree from damage. The inner layer of bark carries food made by the leaves to other parts of the tree. Bark is a fascinating material that stretches and separates as the tree gets larger. The grooves are created when the bark cracks and dries as it's forced to stretch to fit the growing tree. Bark damage makes the tree more open to disease, rot, animal and insect invasion. It also destroys some of the water conducting tissues.

If bark injuries aren't too serious, uninjured parts of the tree can carry food and water supplies. Bark damage that goes most of the way or all around the tree is called **girdling**. Girdling usually kills the tree. Tree guards or mesh shields can help protect against girdling damage from animals and careless humans.

c. **Damage to the structure of the tree** comes through cutting, carving, breaking off, improper pruning, climbing, etc. This type of damage ruins the beauty of the tree. If there are bark injuries or open cuts, the tree faces the same health threats it did in b, above.

What can we do to help protect trees? A lot! Here are just a few suggestions:

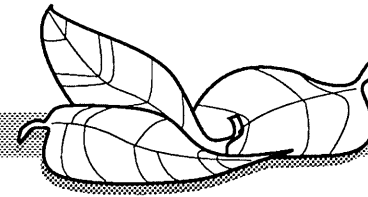
- *Recycle newspapers and wastepaper.* Boy Scouts, Girl Scouts, and other groups often collect old paper. Many cities also recycle it. It can be sent to places that make new paper from it. This means fewer trees will be cut down to be made into paper.

- If you have a lawn, help your family rake the leaves that fall on it in autumn. Don't burn them - that pollutes the air. Instead, rake them into an out-of-the-way pile. Flatten the top of the pile

and leave it where rain can soak into the pile. The leaves will rot and turn into dark, muddy-looking **humus** (soil). Spread the humus on your lawn and it will make the soil richer for the grass and other plants.

- Don't peel the bark from trees. The outside bark protects a tree from insects and fungi. The inner bark moves food from the leaves to the roots. Peeling off a tree's bark is like taking off its skin. It may cause the tree to die.

# Grade 3

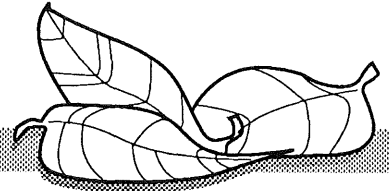


See activity details on pages 3-8 through 3-13.

## Calendar





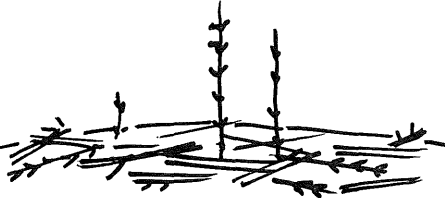
<p>Interview: Visit city hall to learn about your community's trees.</p> <p>Social Studies</p> 	<p>Research: Learn about Dutch elm and oak wilt diseases.</p> <p>Social Studies/ Science</p> 	<p>Hike: Is there a doctor in the forest? Take a nature hike and check it out.</p> <p>Science</p> 	<p>Create: See trees through "the eyes of the beholder."</p> <p>Art</p> 	<p>Discover: Which forest products do you think are most important?</p> <p>Science</p> 
<p>Discuss: Are forest products necessary or just nice? Talk it over!</p> <p>Language Arts/Science</p> 	<p>Interview: Get to know conservation groups.</p> <p>Social Studies</p> 	<p>Record: Go on a wood-finding tour.</p> <p>Science/Math</p> 	<p>Research: Look for: Lilac bushes and apple trees blooming.</p> <p>Science</p> 	<p>Research: What's happening to your community's trees? Newspapers and guest speakers can help you check it out.</p> <p>Social Studies/Science</p> 
<p>Look for: Bees pollinating.</p> <p>Science</p> 	<p>Research: Discover what fast food containers have to do with trees.</p> <p>Social Studies</p> 	<p>Do: <i>How do people wound trees?</i> (Activity Sheet)</p> <p>Social Studies/ Science</p> 	<p>Hike: Be damage detectives! Take a nature hike to gather information.</p> <p>Science</p> 	<p>Do: <i>Trees Have Many Enemies.</i> (Activity Sheet)</p> <p>Language Arts/ Science</p> 
<p>Discover: How much paper does your school use?</p> <p>Math</p> 	<p>Research: Explore forest fires.</p> <p>Science/Language Arts</p> 	<p>Research: Meet nifty naturalists John Muir and Sigurd Olson.</p> <p>History</p> 	<p>Listen: Enjoy Shel Silverstein's delightful book, <i>"The Giving Tree."</i></p> <p>Language Arts</p> 	<p>Look for: Tulips blooming, sugar maple and red oak leaves.</p> <p>Science</p> 

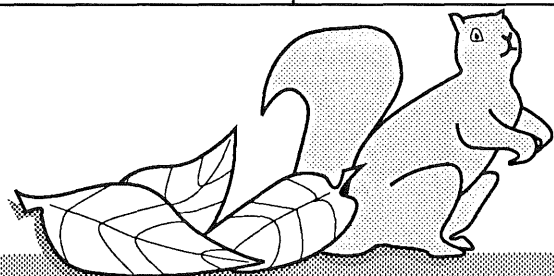
# Bulletin Board Idea



## Tree Enemies

Create a cause and effect chart that includes both natural and human hazards for trees. Students participate by finding or drawing pictures to match each category. If appropriate in some categories, students might also draw or find pictures that offer solutions to the problems.

Cause	Effect	Solution
<p>Insects</p> 		
<p>Fungi</p>		
<p>Humans</p> 		
<p>Pollution</p>		
<p>Fire</p>		



# 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 the following: mail-order catalogs (Activity 8); newspaper articles about things that are affecting local trees (Activity 10); National Geographic magazine, February 1989 (Activity 17); "The Giving Tree" by Shel Silverstein (Activity 19).

### Activity 1: Take a field trip.

Arrange to have your class visit your community's local government offices (city hall, county courthouse) to learn answers to these questions:

1. What department is in charge of the trees in the community?
2. How much money does this department spend each year on tree care?
3. Has the community planted any trees? Where did they get their planting stock (trees)? What species of trees were planted? Why were these species selected? Have the plantings been successful? Did the trees survive?
4. How does the department in charge of trees decide which species will be planted in the community?
5. Who decides where and when trees will be planted? Does the department listen to suggestions from local citizens on when and where to plant? Can local citizens plant trees on the community's property? If they can, how do they go about doing so?

Have students identify a location in their community where they think a tree or trees should be planted. Based on the information they have learned, attempt to get the tree or trees planted.

Note: Instead of visiting the local government office, it may be easier to ask a representative of the department in charge of the community's trees to visit your class to be questioned by students. Questions should be prepared in advance, and if possible, given to the representative before his or her visit.

*Adapted from information: Copyright 1975 The American Forest Institute, Inc. Reprinted with permission.*

### Activity 2: Trees get "sick" too!

Discuss the Dutch Elm and Oak Wilt sections of the Background Information part of this unit. Then assign students to one or more of these activities.

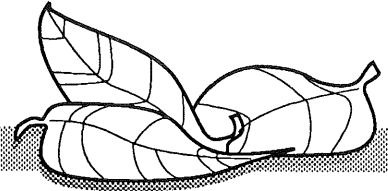
1. Contact your local tree inspector or city forestry department. How serious is Dutch elm or oak wilt disease in your community or neighborhood? How is it being managed? What is being done with trees that are cut down and removed?
2. Is there an area in the community where diseased trees are standing? Visit that area and look for symptoms of Dutch elm or oak wilt disease on the trees. If trees have been recently removed from the area, inspect the stumps. What symptoms of the disease do you see?
3. Think of ways in which your community could prevent a problem like Dutch elm disease and oak wilt disease in the future. (For example, a variety of trees could be planted so disease in one particular species would not spread so quickly.)

### Activity 3: Is there a doctor in the forest?

Take your students on a walk to find one tree that looks healthy and another that looks unhealthy. Encourage them to look closely at the growing conditions, for signs of insects (eggs on trunk, larva eating leaves, etc.), and for damage caused by people.

Ask students how they know the difference between healthy trees and unhealthy ones. Back in class, ask them to draw pictures of a healthy tree and an unhealthy one.





Discuss: What things make trees unhealthy? Include such things as disease, insects, fire, wind, lightning, pollution, lack of proper moisture, and poor growing conditions. Can students suggest actions people might take to help trees stay healthy? For example, people can protect trees from forest fires and remove diseased trees so that they won't infect others. They can also water and mulch trees regularly.

**Activity 4:** Another point of view.

After discussion, based on additional research if necessary, ask students to think about how each of these individuals might view a healthy and an unhealthy tree. Ask the students to choose one of the individuals listed, then draw pictures of healthy and unhealthy trees as they think this individual might see it — or might use it.

- an artist
- an ecologist
- a landscape architect
- a forester
- a bird who lives in the trees
- a tree farmer
- a tree inspector
- a homeowner
- a gypsy moth
- a logger
- a camper

Create a gallery of these drawings, with the students serving as guides for each other, pointing out the differences in the way the various people and animals might view healthy and unhealthy trees.

*Adapted from Project Learning Tree,  
From Teachers' Guide for Arbor Day in New  
Hampshire.*

**Activity 5:** Which is most important?

Allow 15 minutes for each student to list ways he or she uses paper and other forest products in a year. Students then draw a line through items on their lists they believe are least important to them and circle three items they consider most important.

Next to each of the three top priority items, students write down a product or material that could replace it. For example, instead of using paper to record thoughts, cassette tapes could be substituted.

Discuss the merits of the ideas they suggest.

1. Is the environment affected? If so, how?
2. Does the substitute serve the same purpose as well and as inexpensively?
3. Is the substitute made from a renewable or a non-renewable raw material?
4. Will the substitute require more or less energy to produce than the original forest product?
5. Is the substitute recyclable?

**Activity 6:** Necessary or just nice?

Brainstorm a list of forest product uses in these areas of home living:

1. Kitchen (cutting board, knife handles...)
2. Interior (furniture, shutters, coat hangers...)
3. Maintenance (broom handle, vacuum cleaner bags...)
4. Food (vanilla, nuts, wild game...)
5. Exterior (fence post, picnic table...)

Divide the class into small groups. Students use the list for discussion to answer these questions:

1. Which of the items listed are necessary for human survival?
2. Which of the items are wasteful? Which show sound conservation practices? Why? Which of the wasteful products are you willing to eliminate or find a substitute for? What would be the environmental effect if everyone avoided the wasteful products?
3. Look at the items you decided were essential. Are there materials available that could be substituted for the forest products used? Do you think the substitute material would serve as well as the forest product?

**Activity 7:** Get to know conservation groups!

What are some organizations that work for conservation and protecting the environment? (The American Forestry Association, Izaak Walton League, Greenpeace, National Wildlife Federation, Sierra Club, the Wilderness Society, nature conservatories, and state conservation agencies are some.) Contact one of the organizations in your community. Can someone come out to talk to the students about their work? Or, do they



have brochures and educational materials for young people? Some organizations are already geared to youth - Boy and Girl Scouts, 4-H, Camp Fire Girls, FFA, etc.

**Activity 8: Go on a wood-finding tour!**

Make a class visit to a local department store or use mail-order catalogs in the classroom.

First, the class makes up a survey sheet for recording information. Divide the class into teams of three or four students each and ask each team to name one of its members as "recorder." The recorder writes team observations on its survey sheet.

Assign each team to a particular department in the store or a section of the catalog. Students are to identify and record as many items as they can that use wood or other forest products. More information such as cost and place of origin also may be gathered.

After information has been collected and tabulated, discuss these questions:

1. Count the total number of wood/forest products found.
2. How would your lifestyle change if forest products suddenly became unavailable?
3. How many items listed are basic survival needs? How do you decide which are needs and which are only wants?
4. What is your own favorite forest product? Why?

**Activity 9: Look for: Lilac bushes and apple trees blooming.**

*Fun Fact:* Lilacs are grown and loved all over the world. A color has even been named after them!

**Activity 10: What's happening to our neighborhood trees?**

Find newspaper articles about things in your community that are affecting the community trees. Report your findings and post the clippings on your bulletin board display. Guest speaker: Invite a nursery, landscape, or tree-pruning professional to speak to your group about how to care for and protect trees.

**Activity 11: Look for: Bees pollinating.**

**Activity 12: Check out containers.**

Contact a local fast food business and find out what their food trays and containers are made from. Are they recyclable? Write letters and perhaps draw pictures expressing your concern and encouraging them to help save our trees. If they aren't using recyclable containers, suggest that they do so!

**Activity 13: How do people wound trees? Activity Sheet A (page 3-12).**

Do the activity sheet and learn more.

**Activity 14: Damage detective tour.**

Take a walk around the neighborhood and look for different forms of damage to trees. Scars, broken branches, misshapen trees are clues. Discuss:

- a. What caused the damage?
- b. Is this an old injury? A new one? How can you tell the differences between old and new injuries?
- c. What causes tree "bleeding"? How does this compare to scabs people get when they cut themselves?
- d. Why are trees pruned and trimmed? Can pruning help a tree? Hurt a tree? How can you learn proper ways to prune a tree?

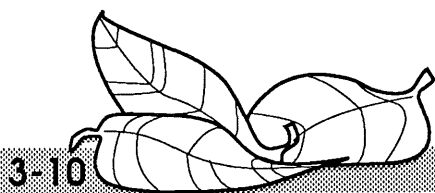
**Activity 15: Trees Have Many Enemies. Activity Sheet B (page 3-13).**

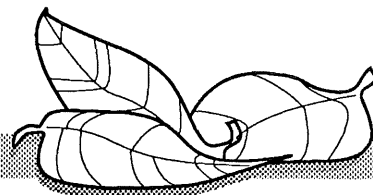
**Answers:**

o d d y m d p d s z z o l t f g e y  
 w e e k m j t l g m l h m x v y j z  
 x w h g f v a x y v h g n w g a i m  
 x e w n k m r m a u c h r o g z e a  
 y l x i l m d z m h t x y l o s t b  
 r p n n x x p s e x a f l z a r m l  
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**Activity 16: Pounds and pounds of paper!**

How much paper do youngsters use in your school? Here's a survey with surprising results:





a. Each student weighs all the paper in his or her desk (books, notebooks, etc.) on a postage scale. Add each student's total for a grand total.

b. Divide to find the average weight of paper per student.

c. Multiply the average weight by number of students in the school. What's the grand total for your school?

d. A 16-inch diameter tree yields 700 pounds of paper. How many trees did your school consume?

*Fun Fact:* An average of over 600 pounds of paper is used each year by every man, woman, and child in the United States!

**Activity 17:** Is there such a thing as a good forest fire? Fire is usually an enemy to a forest, but sometimes fire can be helpful. For example, there was a great fire in Yellowstone National Park in the summer of 1988. (For a very informative article about this fire, see National Geographic, Feb. 1989). The summers are very short in this park, so there is little time for dead trees to decay. In 1988, there were great amounts of dry wood lying around like great piles of **kindling**. (Make sure children understand the meaning of this word.) Why would a fire have an easy time taking off during a dry summer? How might this fire have been helpful? (The fire cleaned out old forest and opened space for new growth and meadows. It encouraged growth of different types of vegetation. This in turn brings in animal life. If you can get the National Geographic article, discuss whether or not this fire should have been allowed to burn. What do you think should have been done?)

**Activity 18:** Nifty naturalists.

John Muir and Sigurd Olson are two names to know for inspiration about appreciating and preserving the outdoors. Sigurd Olson was a fellow Minnesotan who had a lot to do with creating our famous Boundary Waters Canoe Area (BWCA). John Muir's love of nature led him to persuade President Theodore Roosevelt to set aside 148 million acres of forest reserves. Muir also founded the Sierra Club, an organization dedicated to protecting the environment. You can be a naturalist, too! Start a nature journal to write about things you would like to do to help preserve the environment. You're sure to notice things when you take a walk, drive along the roads, or even stare out a window. What new

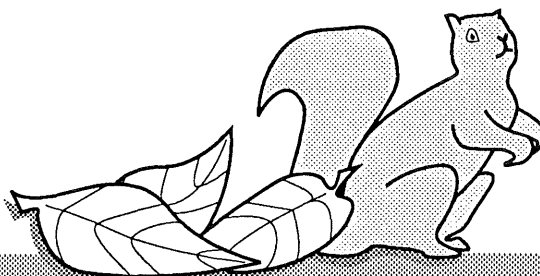
habits or practices can you begin right away? Who can help you put your other ideas into action?

Use your journal to write about natural wonders you'd like to explore in your lifetime. Are they being cared for so future generations can enjoy them?

**Activity 19:** "The Giving Tree"

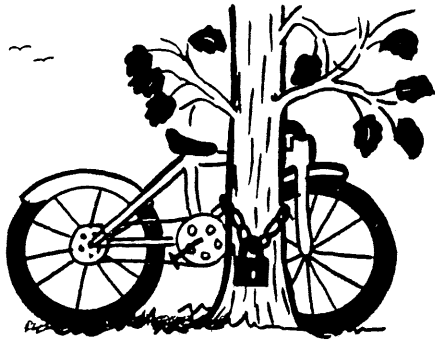
Read and discuss Shel Silverstein's delightful book, "The Giving Tree". What things did people do that were damaging to this tree? How did the tree keep "loving back" in spite of what happened to it? Did any parts of the story make you feel uncomfortable? Why do you suppose many people think this is a sad story?

**Activity 20:** Look for: Tulips blooming, sugar maple and red oak leaves!



# Activity Sheet A

## How Do People Wound Trees?



What happens to the tree?

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What happens to the tree?

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What happens to the tree?

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What happens to the tree?

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What happens to the tree?

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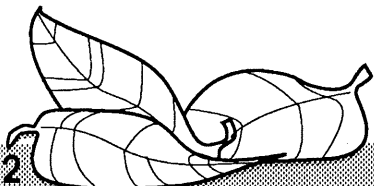
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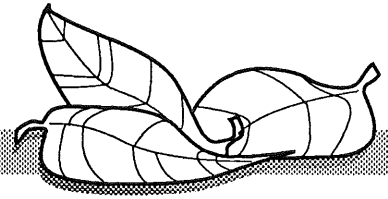
What happens to the tree?

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# Activity Sheet B



## Trees Have Many Enemies



o d d y m d p d s z z o l t f g e y  
w e e k m j t l g m l h m x v y j z  
x w h g f v a x y v h g n w g q i m  
x e w n k m f m a u c h r o g z e q  
y l x i i m d z m h t x y l o s t b  
r p n n x x p s e x a f l z a r m l  
w o a t a d e m f l e y z e j w j h  
q e y h g l i a h x w i s d u q f y  
r p s g c c w a y e r i f k d t r z  
h x o i a k y l l l d v c o h n b i  
s b h l a w n m o w e r s e s c i m  
f e s p l f q t s k i p o z g n n w  
v u n h k u s i q g x b t u s p s b  
r q h i n g t n u o k j f y g b e k  
d z v j h g n i v r a c y l h h c m  
u h t l k c w k o z v b p w g f t c  
s y x d i u a g b n a c z l h z s g  
s g b e n r t m o j i v l v x e u r

### Can you find these words?

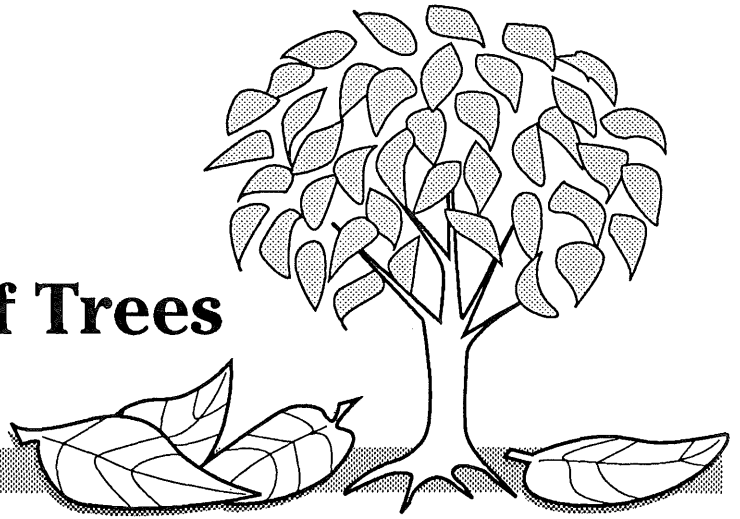
lawnmowers    chemicals    pollution    lightning    vehicles    machines    animals  
carving    drought    insects    disease    people    wind    fire    ice

Answers: See Activity 15, page 3-10.



# Grade 4

## Interdependency of Trees and Us



### Objectives

- Students will be able to list ways in which American lifestyles depend upon forest products.
- Students will recognize trees as a renewable resource.

### Vocabulary Words

interdependent	renewable resource
goods	seed orchards
economy	evergreens
lifestyle	deciduous
consumer demand	

### Background Information

Have you ever thought of yourself as **interdependent** with trees? Probably not. Yet, humans depend on trees in many ways - and trees depend on humans, too. The forest industry is much like every other industry based on a major natural resource. It gives us **goods** that are important to our country's **economy** and **lifestyle**. But how can we be sure we will have a continuing supply of those important goods? We help the forest and the forest helps us. That's where intelligent management of the forest comes in.

People who manage forests must always keep in mind the **consumer demand** for products and services. Government studies say the demand for paper and wood products will double between now and the year 2030. Luckily, trees are a **renewable resource**. The forest industry, Minnesota's second largest manufacturing industry, is planning and planting trees now for the future.

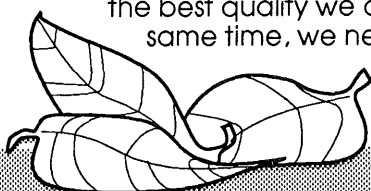
Companies that work in the forest industry and our Minnesota state government are working together to protect and manage this renewable resource. We're making steady progress in growing better trees—faster growing, straighter, more disease- and pollution-resistant. The goal is to increase the amount of timber and make it the best quality we can. At the same time, we need to make sure there are

more and better trees for future generations to use and enjoy.

**Seed orchards**, where improved seed is the valuable "fruit," are one way to increase growth rate. Twenty-eight seed orchards in Minnesota are producing trees that will grow up to 15% faster than the stock seed used now.

An example of industry and government working together to manage trees is Lake Superior Paper Industries. Opened in 1988, this new leader in non-polluting paper-making is located on 92 acres in Duluth. In one year it will produce 230,000 tons of paper. But that requires 45 truckloads of spruce and balsam trees each day. Before the plant was built, the balsam and spruce supply had to be guaranteed. Through good forestry management, we are now able to depend on a steady flow of those trees in coming years. Trees are necessary not only as the raw material for making the paper, but also to fuel the power plant generating the plant's electricity. Each year, that fuel will take the amount of wood in a woodpile four feet wide and four feet high running from International Falls south to the Iowa border!

In every chapter of this book, you'll find information about how people depend on trees. President George Bush, in a speech in Sioux Falls, S.D. (September 1989) called them "the oldest, cheapest, most efficient air purifiers on



Earth." They produce oxygen and provide shade, beauty, protection against wind and erosion, and food and homes for wildlife. They give us fuel, food and wood products, quiet a highway's noise, and much more.

Our job is to help trees grow healthy and strong, to protect them against disease, injury, and too much cutting. When we do our job well, we enjoy all the benefits of trees—and trees benefit too.

### Minnesota Tree Products

Minnesota's rich soils and variety of climate is an ideal home to many different kinds of trees. (See Minnesota Forest Regions map, Appendix page 13.) What are some of the forest products these different trees bring us? Read on...

Minnesota tree types are either **evergreens** or **deciduous**. Our evergreens include white pine, jack pine, red pine, balsam fir, black spruce, white spruce, and white cedar. Leading deciduous trees include elm, oak, aspen, cottonwood, birch, basswood, ash, and maple.

Here are just a few of the many products trees bring to our lives: (Note—**This information may be used as a listening activity with Activity Sheets A and B on pages 9 and 10 of this unit.**)

**Paper Birch:** This tree has a white, papery bark that stands out against the dark bark of other forest trees. Its wood is used for firewood and furniture.

**Ash:** Strong, hard wood. Green ash is an athlete's special friend. Used for baseball bats, hockey sticks, as well as handles, firewood.

**Aspen:** Once considered rather useless, the aspen is now the most commercially used tree species in the state. It's used in panel types of boards and to make paper.

**Basswood:** Light, soft wood. Used for carving, inexpensive furniture, even inner parts of shoes.

**Maples:** Beautifully grained hardwood, popular for furniture and moldings. Sugar maples provide sap for maple syrup. This is one of fall's most colorful trees.

**Oak:** Heavy, hard, strong wood. Used for heavy construction, beams and support braces, paneling, furniture.

**Tamarack or larch:** Hard, heavy wood. Used for telephone poles, railroad

ties, posts.

**White spruce:** Soft wood used for paper and for things that must be strong like furniture and canoe paddles. This is also a popular Christmas tree.

**Red pine:** Coarse-grained hard wood, good for building and construction. Minnesota's state tree.

**Balsam fir:** Soft wood used for paper and Christmas trees.

**White pine:** Wood for lumber, building and construction.

**White cedar:** Fragrant wood with "outdoors" scent that repels moths. Used for posts, poles, cedar closets.

**Cottonwood:** Soft, light wood. Used for making paper.

**Elm:** Heavy, hard wood. Favorite for furniture and boat building.

**Black spruce:** Grows in moist soil and bogs. Soft wood used mostly for pulp.

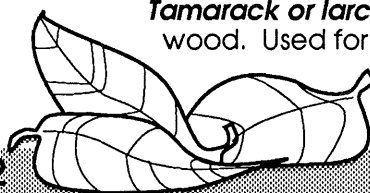
### Trees: A Renewable Resource

What does it mean to be a "renewable resource"? To renew means to begin again, to restore or revive. A resource is something that is a source of help or of value. Resources can give us things we need, or they can be sold to bring us money.

Trees are a renewable resource because you can use them and yet grow a new crop to give more trees in the future. This is different than some of our other natural resources. Silver and gold, oil and gas for example, are mined out of the ground. When they're gone, they're gone for good.

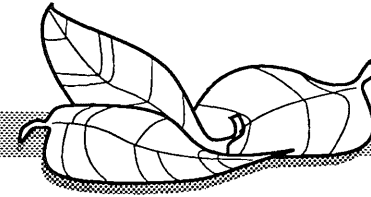
Renewable resources depend on people. We need to conserve and protect our present trees and plant a lot of new ones to keep the cycle going.

The activities in this lesson explore some of the many ways we depend on forest products.

























# Grade 4



See activity details on pages 4-5 through 4-11.

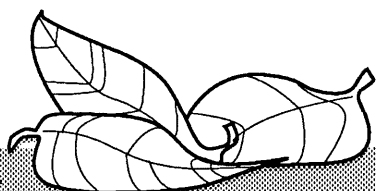
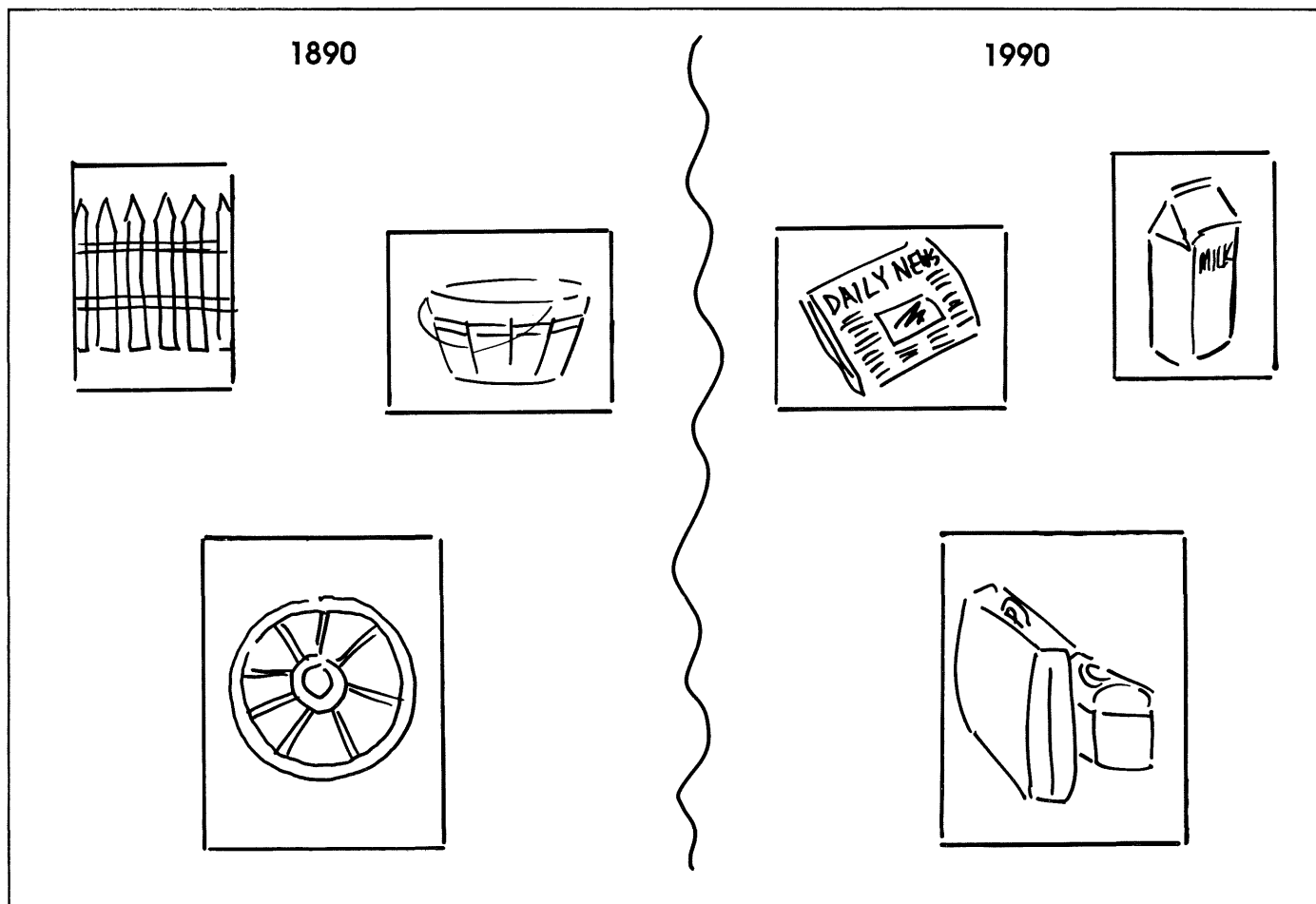
## Calendar

<p>Discuss: In what ways did people of Minnesota use wood in 1890? How do we use wood today?</p> 	<p>Look for: The "green tinge" in the tree canopy. Create: "Things Made From Trees" bulletin board display.</p> 	<p>Create: Post wood product pictures on the bulletin board. Discuss: Each item.</p> 	<p>Look for: Tulips and daffodils blooming. Discuss: Any new wood product additions for your bulletin board.</p> 	<p>Do: Ask students to bring a variety of nuts (in their shells) to school. <i>Fun Fact:</i> A bushel of pine cones represents about 55,000 new trees - enough to plant over 73 acres of forest land!</p> 
<p>Look for: Crab apple trees in bloom. Research: Where do the trees of Brazil nuts grow?</p> 	<p>Classify: Nuts that were brought to school and label each. Research: Where do the trees for pine nuts grow?</p> 	<p>Research: Where do the trees for hickory nuts and almonds grow?</p> 	<p>Research: Where do the trees for cashew nuts and filberts grow? <i>Fun Fact:</i> A pound of pine cone seeds represents 55,000 new trees.</p> 	<p>Research: Where do the trees for English walnuts and black walnuts grow? Do: Have a "seed tasting" party!</p> 
<p>Discuss: Which wood products are most important?</p> 	<p>Look for: Leaves sprouting on the sugar maple and red oak trees. Listen: <i>Minnesota Tree Products</i> (Activity Sheets)</p> 	<p>Look for: Lilac bushes and apple trees blooming. <i>Fun Fact:</i> Minnesota has 56 state forests and 46 state forest campgrounds and day-use areas!</p> 	<p>Listen/Create: "The Sugar-Plum Trees." <i>Fun Fact:</i> For every ton of wood produced, trees consume 1.41 tons of carbon dioxide and release 1.07 tons of oxygen.</p> 	<p>Do: Pounds and pounds of paper activity.</p> 
<p>Look for: Elm and silver maple seeds falling. Hike: Collect seeds.</p> 	<p>Look for: Bees pollinating. Discover: Nifty Naturalists!</p> 	<p>Create: Leaf and seed bug pictures.</p> 	<p>Create: Complete art project. <i>Fun Fact:</i> If all the 17 million acres of forest land in Minnesota were covered with a healthy young forest, we could supply oxygen for 32 million people.</p> 	<p>Look for: Monarch butterflies.</p> 

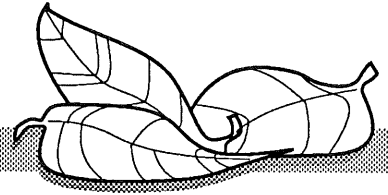
# Bulletin Board Idea

## Things Made From Trees

Students participate by bringing pictures or drawing pictures of things made of wood used in 1890 and in 1990—to show the differences in lifestyles and differences in wood uses.



# 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 the following: magazine or newspaper pictures showing things made of wood used in the 1890s (approximately) and today; a variety of whole nuts still in the shell; seeds and plant parts; *Roots* magazine, Fall 1982 and *Cricket* magazine, August 1987 if possible.

**Activity 1:** Brainstorm: In what ways did people of Minnesota use wood in 1890? How do people of Minnesota use wood products today, in the 1990s?

See: Teacher's guide and worksheet "From Paper to Plastic," Appendix page 10 for information and ideas.

See also: "Timber," *Roots* magazine, Fall 1982. Minnesota Historical Society Publication.

Trees give us wood products. Did you know a person uses, in a lifetime, the wood produced by 300 mature trees? In a year, the average U.S. citizen uses 600 pounds of paper, 224 board feet of lumber, and hundreds of other forest products that all come from trees! Much of the timber harvest goes into homes and furniture, newspapers, books, writing paper, film, frozen food cartons, corrugated boxes...not to mention other valuable wood products like turpentine, alcohol, plastics, rayon, fuelwood, sugar and syrup, barrel staves, shingles, printing ink, baseball bats, chewing gum, musical instruments, dye, shatterproof glass, shoe polish.

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

Cover a bulletin board with paper and a border. Students create the appropriate border for the bulletin board. (Perhaps a variety of wood products such as different kinds of paper cut into strips or patterns or a border of paper cartons or small boxes.) Be creative!

**Activity 3:** It all comes from trees!

Put all the pictures brought to school, drawn, or cut from magazines on the bulletin board and discuss each product. Many will be surprised

when things like chewing gum, printing ink, and shatterproof glass show up on the board.

**Activity 4:** Look for: Tulips and daffodils blooming.

Continue to discuss the bulletin board.

**Activity 5:** Bring nuts.

Ask students to bring from home or the grocery store 10 to 12 whole nuts still in the shell. Suggest a variety such as: pine nuts, Brazil nuts, hazelnuts, hickory nuts, almonds, cashews, filberts, English walnuts, black walnuts, macadamia nuts, coconuts, pecans, and pistachios.

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

Research: Where do the trees of Brazil nuts grow?

(Answer: Brazil and Venezuela.)

**Activity 7:** Which nut is which?

Examine and identify the nuts in the shell that were brought to school. Label each and create a display counter for them. As each growing area is discovered, add the information to your display.

Research: Where do the trees of pine nuts grow?

(Answer: North America and Europe.)

**Activity 8:** Discover hickory nuts and almonds.

Research: Where do the trees for the hickory nuts and almonds grow? (Answer: Hickory nuts - Southern and Eastern United States, Eastern Canada, Mexico, China; Almonds - Mediterranean Basin countries, China, Iran, California.)

*Fun Fact:* In the past five years, Minnesota's forest industries have planted enough seedlings to produce at maturity enough boards 1" thick and 12" wide to extend around the world more than 11 times.

**Activity 9:** Discover cashew nuts and filberts.

Research: Where do the trees for the cashew nuts and filberts (also called hazelnuts) grow?

(Answer: Cashews - South America, other tropic areas; Filberts - produced commercially in Mediterranean countries and Oregon.)

*Fun Fact:* It takes a bushel of pine cones to produce less than a pound of seeds, but each pound of seeds represents about 55,000 new trees, enough to plant over 73 acres of forest land.

**Activity 10:** Discover English walnuts and black walnuts.

Research: Where do the trees for the English walnuts and the black walnuts grow?

(Answer: English walnuts - many Northern Hemisphere regions; Black walnuts - Northern and Central United States and South America.)

With all the "nuts" that have gathered in your classroom, have a "tree seed" tasting party.

**Activity 11:** Group decision making.

Divide the class into groups of three or four. The task is to focus on the 1990s side of the bulletin board, "Things Made from Trees." Which five products are the most important? Each group must decide and agree which items it would eliminate if they needed to eliminate all but five products. Each group comes up with a statement of why it feels those five items are the most important and should be left on the board. Each group then presents its decisions to the class. During its presentation, the group will take down from the bulletin board all but the five items it chose to leave. The following questions may help stimulate thinking:

1. What would happen if suddenly this product was unavailable?
2. Would this product's disappearance affect any of the essentials necessary for survival as, for example, food or shelter? What things are truly necessary for survival?
3. Is the product's current use wasteful? Why? Should the use be eliminated? What would be the impact if it were?
4. Could we find a substitute for this forest product? Is the substitute made from a renewable or non-renewable raw material? What would be the environmental and economic impact of the substitute? Would it use more or less energy to produce than the original forest product?

**Activity 12:** Look for: Leaves sprouting on the sugar maple and red oak trees.

Continue the debate about the most valuable tree products. Listening Activity: *Minnesota Tree Products* (Activity sheets A and B, pages 4-9 and 4-10.)

**Answers:**

**Paper Birch:** firewood, furniture.

**Green Ash:** baseball bat, hockey sticks, tool handles, firewood.

**Quaking Aspen:** panel



board, paper.

**Basswood:** carving wood, inexpensive furniture, inner soles of shoes.

**Sugar Maple:** syrup, furniture, colors to enjoy in autumn.

**Bur Oak:** heavy construction beams, paneling, furniture.

**Tamarack:** posts, telephone poles, railroad ties.

**White Spruce:** canoe paddles, paper, furniture, Christmas trees.

**Red Pine:** building, construction.

**Balsam Fir:** paper, Christmas trees.

**White Cedar:** posts.

**Activity 13:** Look for: Lilac bushes and apple trees blooming. Make a special note of the wonderful aroma in the air while these trees are blooming.

*Fun Fact:* Minnesota has 56 state forests and 46 state forest campgrounds and day-use areas to enjoy. For more information see Resources page 3.

**Activity 14:** The Sugar Plum Trees.

Read to the class Eugene Field's fanciful bedtime poem, "The Sugar-Plum Trees."

Encourage the children to listen carefully to the poem as you read it to them. Can they "see" the poet's picture in their mind's eyes as you read? It may take a couple of readings. Perhaps they have younger brothers and sisters who would especially enjoy the words of the poem. Have the students illustrate the poem for a younger child. Provide a copy of the printed poem to attach to the back or beside the illustration.

Source for "The Sugar Plum Trees:" *"Oxford Book of Children's Verses,"* by Iona & Peter Opie, Oxford Press 1973.

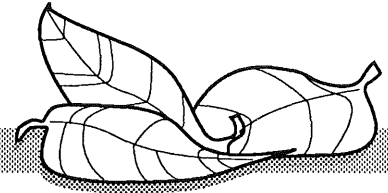
**Activity 15:** Pounds and pounds of paper!

How much paper do youngsters use in your school? Here's a survey with surprising results:

a. Each student weighs all the paper in his or her desk (books, notebooks, etc.) on a postage scale. Add each student's total for a grand total.

b. Divide to find the average weight of paper per student.

c. Multiply the average weight by number of students in the school. What's the grand total for your school?



d. A 16-inch diameter tree used in paper production yields 700 pounds of paper. How many trees did your school consume?

**Activity 16:** Look for: Elm seeds and silver maple seeds falling.

Spring hike: Take a spring hike and look for seeds and other interesting plant material to take back to the classroom.

**Activity 17:** Look for: Bees pollinating.

Discover Nifty Naturalists: John Muir and Sigurd Olson are two names to know for inspiration about appreciating and preserving the outdoors. Sigurd Olson was a fellow Minnesotan who had a lot to do with setting up our famous Boundary Waters Canoe Area (BWCA). John Muir's love of nature led him to persuade President Theodore Roosevelt to set aside 148 million acres of forest reserves. Muir also founded the Sierra Club, an organization dedicated to protecting the environment.

You can be a naturalist, too! Start a nature journal to write about things you would like to do to help preserve the environment. You're sure to notice things when you take a walk, drive along the roads, or even stare out a window. What new habits or practices can you begin right away? Who can help you put your other ideas into action?

Use your journal to write about natural wonders you'd like to explore in your lifetime. Are they being cared for so future generations can enjoy them?

**Activity 18:** Leaf and seed bugs.

From the materials gathered on the spring hike, have your students create some leaf and seed bugs. For more specific instructions see Cricket magazine, August 1987, pages 48-49.

**Activity 19:** Work on leaf and seed bug art project.

**Activity 20:** Look for: Monarch butterflies. Finish art project.

## More Activity Fun

1. **Take a wood-finding tour!** Get permission from a store manager and make a class visit to a local department store, or use a mail-order catalog in the classroom.

As a preliminary step, the class should make up a survey sheet for recording information. Divide the class into teams of three or four students each and ask each team to name one of its members as "recorder." The recorder will log team observations on its survey sheet.

Assign each team to a particular department in the store or a section of the catalog. Students are to identify and record as many items as they can that use wood or forests and the environment.

Ask your students to brainstorm a list of environmental things affected by the forests. This list might include such things as water quality, air quality, and landscape aesthetics.

Each student chooses one item from the list and creates a poster advertising its value to humans, other organisms, and/or the biosphere. Display your posters for all to enjoy!

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2. **We All Need Forests** (Activity Sheet C, page 4-11.)

**What would you do if you were in charge of 20,000 acres (8000 ha) of forest?** If you owned a paper company, you would probably plant a species of fast-growing pine or other "paper tree" and manage as much of the forest as you could for pulpwood. If you were a wildlife biologist, you would try to manage the forest in a way that would provide the best habitat for the different species of wildlife you wanted to protect. And if you were a recreation planner, you might manage the forest to provide good campsites, hiking trails, ski paths, fishing streams, bike paths, and wildlife study areas.

Although most people don't realize it, most of the forests in this country are managed. *How a*

forest is managed depends on what it will be used for. In the past, most forests were managed for only one type of use, such as for raising pulpwood trees. But today, many more are being managed for several different uses at a time through the practice of *multiple use management*.

In this activity, your group will get a chance to discuss different forest uses and how some of these uses compete. They will also learn why multiple use management is so important.

Start off the activity by asking your group to name ways that they or their families use forests (for hiking, birding, hunting, fishing, camping, and so on). List the uses they come up with on the chalkboard or a large sheet of easel paper. Review again that forests are also important because they provide habitat for many types of wildlife and contain important natural resources. Next, ask someone to define the word *manage*. Explain that in order for people to use forests in different ways, forest managers must manage forests in different ways.

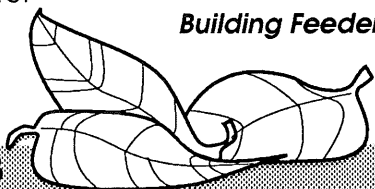
Pass out copies of *We All Need Forests*, page 4-11. Tell students this page lists some of the things that many forests are managed for. Ask them to look at the three rows on the page. Starting with the first row, labeled "**wildlife**," discuss some of the ways forests are *managed* to help protect different species of wildlife. This background information will help explain how forests are managed for wildlife:

**Saving Snags:** One way people manage for wildlife in a forest is by leaving dead trees, or snags, standing instead of cutting them down. Snags provide nesting cavities for many birds and mammals, such as owls, woodpeckers, wood ducks, bluebirds, raccoons, and squirrels.

**Building Brushpiles:** By building brushpiles in a forest and along forest edges, forest managers help provide hiding and nesting sites for many animals that live on the ground such as foxes, rabbits, wood thrushes, and chipmunks.

**Letting Logs Lie:** Many types of animals use logs for nesting and hiding places. By not removing logs, managers can help provide homes and feeding areas for many kinds of wildlife.

**Building Feeders and Nesting Boxes:** Putting up nesting



boxes in forests that have limited nesting sites can help attract wildlife. So can setting up feeding stations for birds and mammals.

**Burning:** For some species, the only way to maintain the right kind of habitat is to burn the area on a regular basis to get rid of undergrowth.

**Picking the Right Plants:** By planting certain types of trees and shrubs in a forest area, wildlife managers can provide habitat for specific types of wildlife.

Now have the students look at the row labeled "**recreation**." Compare this list with the list the children came up with. Discuss the fact that the forest is an important place for people to relax, learn more about and enjoy nature, and exercise.

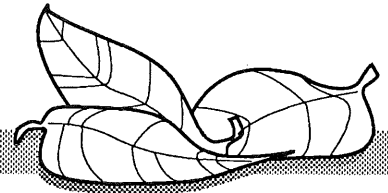
Explain that some of the ways people use forests for recreation compete with the needs of wildlife and can also disrupt the plants that grow there. For example, to build ski slopes in a forest, heavy equipment must come in and cut down trees to make the runs. Roads and parking lots must be built so that people can get to the slopes and park. Many times ski lodges and other facilities are also built.

Ask students to think of other ways recreational uses of the forest can harm the wildlife. The role of many forest managers is to balance the uses of a forest so that wildlife can be protected and people can use it for recreation, too.

Finally, have students look at the row labeled "**products**." Many forests are used for commercial purposes. Some forest areas are managed for lumber, some are managed for pulpwood, and some are opened up for oil, gas and mineral uses. These uses can upset the forest community and compete with wildlife and recreational uses. For example, you probably wouldn't want to camp near a strip mine in a forest or hike along an area that is being harvested. Why is it important to have commercial uses in a forest? (People need forest products.)

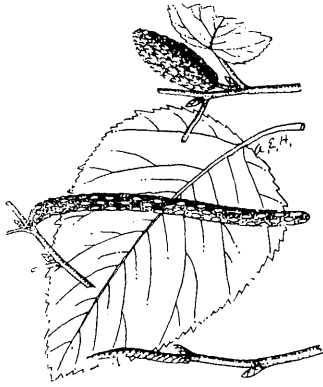
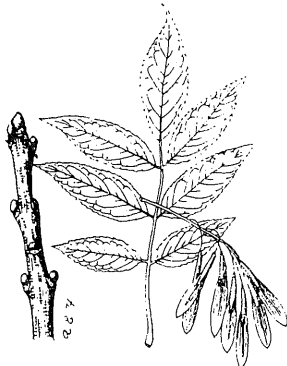
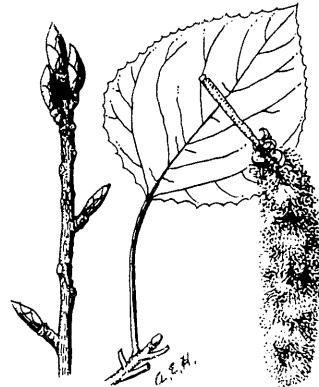

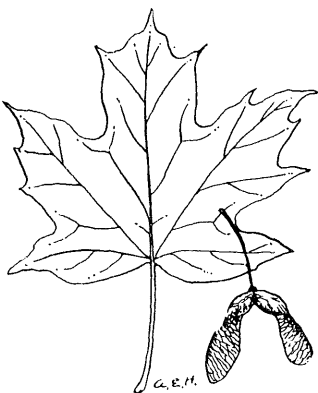
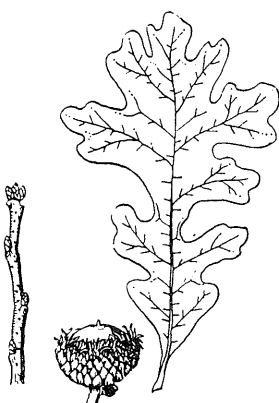
*Adapted from Ranger Rick's Naturescope: "Trees are Terrific." Used with permission.*

# Activity Sheet A



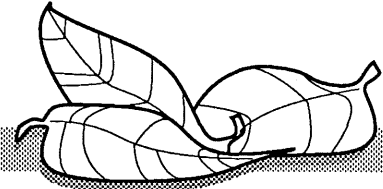
## Minnesota Tree Products

**Listening Exercise:** Listen as someone reads to you about Minnesota tree products. Make a list of the products for each tree as you hear them. Most, but not all of the trees you hear about, are shown on these pages. Then go back and draw pictures of those products.

 <p>Paper Birch</p>	 <p>Green Ash</p>
 <p>Quaking Aspen</p>	 <p>Basswood</p>
 <p>Sugar Maple</p>	 <p>Bur Oak</p>

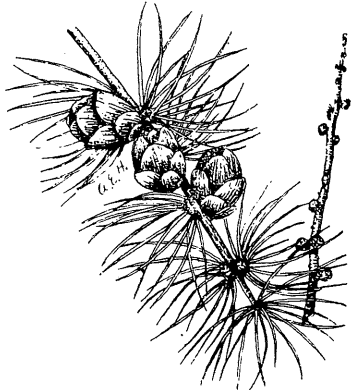
Answers: See Activity 12, page 4-6. Read-to-Kids Information: Minnesota Tree Products page 4-2.

# Activity Sheet B



## Minnesota Tree Products

**Listening Exercise:** Listen as someone reads to you about Minnesota tree products. Make a list of the products for each tree as you hear them. Most, but not all of the trees you hear about, are shown on these pages. Then go back and draw pictures of those products.



Tamarack

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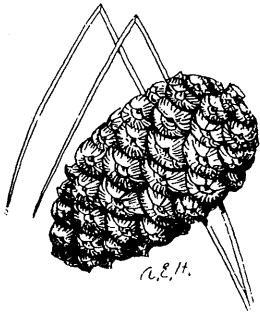


White Spruce

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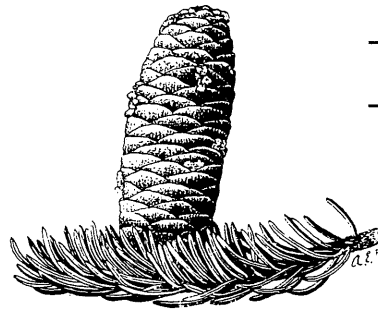


Red Pine  
(Minnesota's State Tree)

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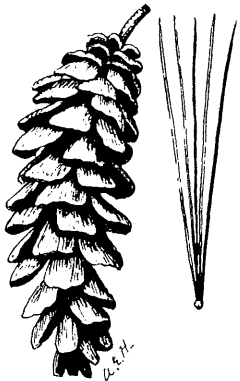


Balsam Fir

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White Pine

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White Cedar

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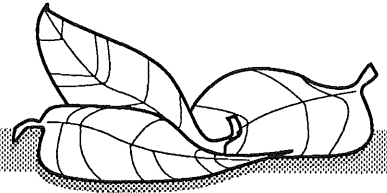
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Answers: See Activity 12, page 4-6. Read-to-Kids Information: Minnesota Tree Products page 4-2.



# Activity Sheet C CopycatPage



## We All Need Forests

**WILDLIFE**

nesting boxes  
brushpiles  
logs  
snags  
feeders

**RECREATION**

hiking  
camping  
fishing  
skiing

**PRODUCTS**

lumber  
paper  
charcoal  
gas and oil

The 'WILDLIFE' section features a central illustration of a forest landscape. On the left, there is a pile of brush labeled 'brushpiles' and a wooden nesting box on a post labeled 'nesting boxes'. In the middle ground, there are logs on the ground labeled 'logs' and a dead tree trunk labeled 'snags'. On the right, a squirrel is shown in a tree trunk, and a bird is perched on a feeder hanging from a branch, with another feeder on a table below labeled 'feeders'.

The 'RECREATION' section is divided into four panels. The first panel shows a group of people hiking on a trail, labeled 'hiking'. The second panel shows two people sitting around a campfire with a tent in the background, labeled 'camping'. The third panel shows a person fishing with a net in a lake, labeled 'fishing'. The fourth panel shows two people on skis with poles, labeled 'skiing'.

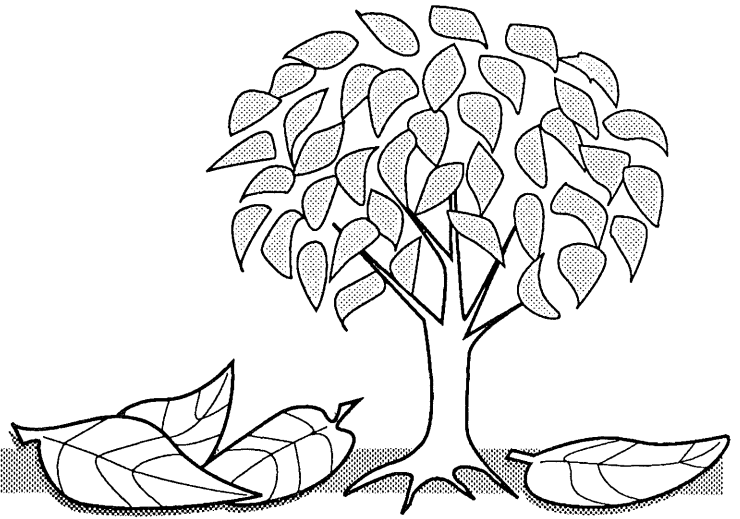
The 'PRODUCTS' section is divided into three panels. The first panel shows a lumber mill with a forklift and stacks of lumber, labeled 'lumber'. The second panel shows stacks of paper, a carton of milk, and a tub of ice cream, labeled 'paper'. The third panel shows three people gathered around a table with charcoal, labeled 'charcoal', and a tall oil derrick in the background labeled 'gas and oil'.

From Ranger Rick's Naturescope, "Trees are Terrific." Used with permission.



# Grade 5

## Forest Wildlife and Recreation



### Objectives

- Students will become familiar with the interdependence of forests and wildlife, and the kinds of wildlife in Minnesota forests.
- Students will become aware of the beauty and the recreational contributions forests make to Minnesota.

### Vocabulary Words

predators	conifers
vegetation	hardwoods
cover	aesthetics
species	recreation
habitat	forest regions
wetlands	
clearcutting	
controlled or prescribed burning	

### Background Information

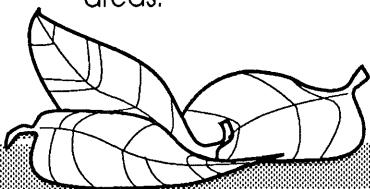
There's a close relationship among soil, water, plants, and wildlife. Each depends on all the others. **Predators** take care of surpluses of other animals. Deer, rabbits, and others eat certain plants. Birds and squirrels distribute the seeds of plants so they will reproduce. Water gives life to all.

But people can, and do, change or alter the environment. Through carelessness, not knowing the facts, or simply putting their own wants and desires before nature's needs, people disturb or destroy soil, water, and **vegetation**. This in turn destroys wildlife.

Forests provide food, **cover** (protection), and nesting places for wildlife. The number of wildlife and the variety of wildlife **species** in an area depends on the number and variety of plants (flowers, weeds, vines, shrubs, and trees) in the area. No two species of wildlife have exactly the same needs.

### Wildlife Habitat

A wildlife **habitat** is a place or area where wildlife live - where they feed, nest, hide, and play. Habitat includes both land and water areas.



Each species of wildlife has its own habitat requirements. Most species need a variety of plants. Pheasants and quail like to feed in the farmer's corn and grain fields and return to the forest borders near the farm crops to rest, nest, and hide. Fox venture out into these fields and meadows to catch the unwary quail, pheasants, rabbits, or field mice and then return to their dens in the forest. Hawks soar over these same fields for the same food and return to their nests in the forest. The coyote might be seen ready to pounce on a rodent while its competitor, the badger, does the digging that chases the rodent out.

The wood duck feeds in water and returns to its home in a hollow forest tree. The greater the variety of vegetation and water areas, the greater the variety of wildlife species.

Swamp or marsh areas (**wetlands**) are necessary habitats for moose, muskrats, beavers, geese, ducks, and many songbirds. Draining wetlands destroys the habitat for these wildlife species. Because these areas are water holding areas, draining them can also result in floods downstream.

Forests located upstream from marshy areas hold back some of the water from rainfall and snow melt so the marshes do not overflow. The

water that does reach the marsh is clean, clear water. If it were not for the forests, this water would pick up soil particles along the way and gradually the soil would build up in the marsh. Then it would hold less water, and that water would be muddy. Forests are very important in maintaining a habitat for wetland wildlife.

## Wildlife Food

The greatest variety of wildlife is found along the shrubby edges of forest growth. That's where the greatest variety of food plants grow. Some species of wildlife such as quail, pheasants, and sharptail grouse prefer to feed near forest edges. These edges are found along the outside forest borders, beside roads or logging roads, along vegetation on stream banks, and in farmstead shelterbelts.

Snowshoe and cottontail rabbits feed on bark and twigs of shrubs and small trees. Porcupine feed on bark of valuable forest trees, while beaver feed on the bark of the less valuable aspen, willow, and birch.

Bears, raccoons, and many songbirds eat the berry-type fruits of wild plants such as strawberry, raspberry, blackberry, high-bush cranberry, blueberry, cherry, and hawthorn. The ruffed grouse eats these berries as well as wild strawberry leaves, wintergreen, and rose hips. During the winter, ruffed grouse eat buds and catkins of birch, hazel, and aspen.

Deer prefer leaves and young twigs of northern white cedar, red osier dogwood, and mountain maple. They also eat red maple, basswood, white pine, jack pine, willow, and aspen. When these plants are scarce during the winter months, deer will feed on spruce, tamarack, alder, and hazel. They will starve, however, if this is the only food available. Deer need forest plants. Their digestive systems are different from cattle; they would starve on a diet of hay.

The forester can help the deer by **clearcutting** forest areas or by **controlled** or **prescribed burning**. Clearcutting removes the older, larger trees, whose branches are out of reach for deer. Burning removes dead trees, older brush, and tree parts left behind by logging. Both cutting and burning make room for the new shrubs and young trees that provide food

for deer. The next time you see a clearcut or control-burned forest area, do not automatically think it is a poor forest practice because it is unsightly. Remember, clearcutting or control burning (1) creates the best conditions for growing new tree species as jack pine and aspen; (2) makes more forest edges, which are preferred by a variety of wildlife; and (3) provides food for deer.

## Wildlife Cover

Wildlife will seek cover for (1) a place to hide; (2) shelter or protection from storms and wind; (3) shade on hot sunny days; (4) a place to nest or rest; (5) privacy during their mating seasons; (6) a place to build their nests; and (7) a safe place where their young can play and learn how to protect themselves.

It makes sense...more variety of tree and other plant species means more variety of cover. Raccoons, squirrels, and wood ducks will use hollow trees for their homes. Grouse, pheasants, quail, and rabbits use brush piles of tree branches, low shrubs, or tangled grapevines to hide and build their nests. Songbirds build their nests in dense trees or shrubs. Most of this cover is found along the forest borders where tree branches grow near the ground.

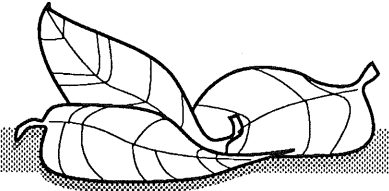
Trees and shrubs in a farmstead windbreak or a field shelterbelt also give excellent cover. They are animal roadways too, making protected travel lanes for game birds, songbirds, fox, rabbits, deer, and skunks. Good cover is important to smaller animals because their enemies live in the same animal community.

The forest is also home for predators such as hawks, owls, fox, and wolves that feed on smaller animals.

Scavengers such as vultures and crows also live in the forests. They have a special role. They help keep the forests clean by clearing away and feeding on dead forest animals.

Are all trees good for cover? Not really. In general, **conifers** provide good shelter and some food while **hardwoods** provide good food and some shelter. A forest that has a mixture of conifers and hardwoods is ideal for wildlife. Forests are different in types of soil, topography, climate, and plant species. Different types of



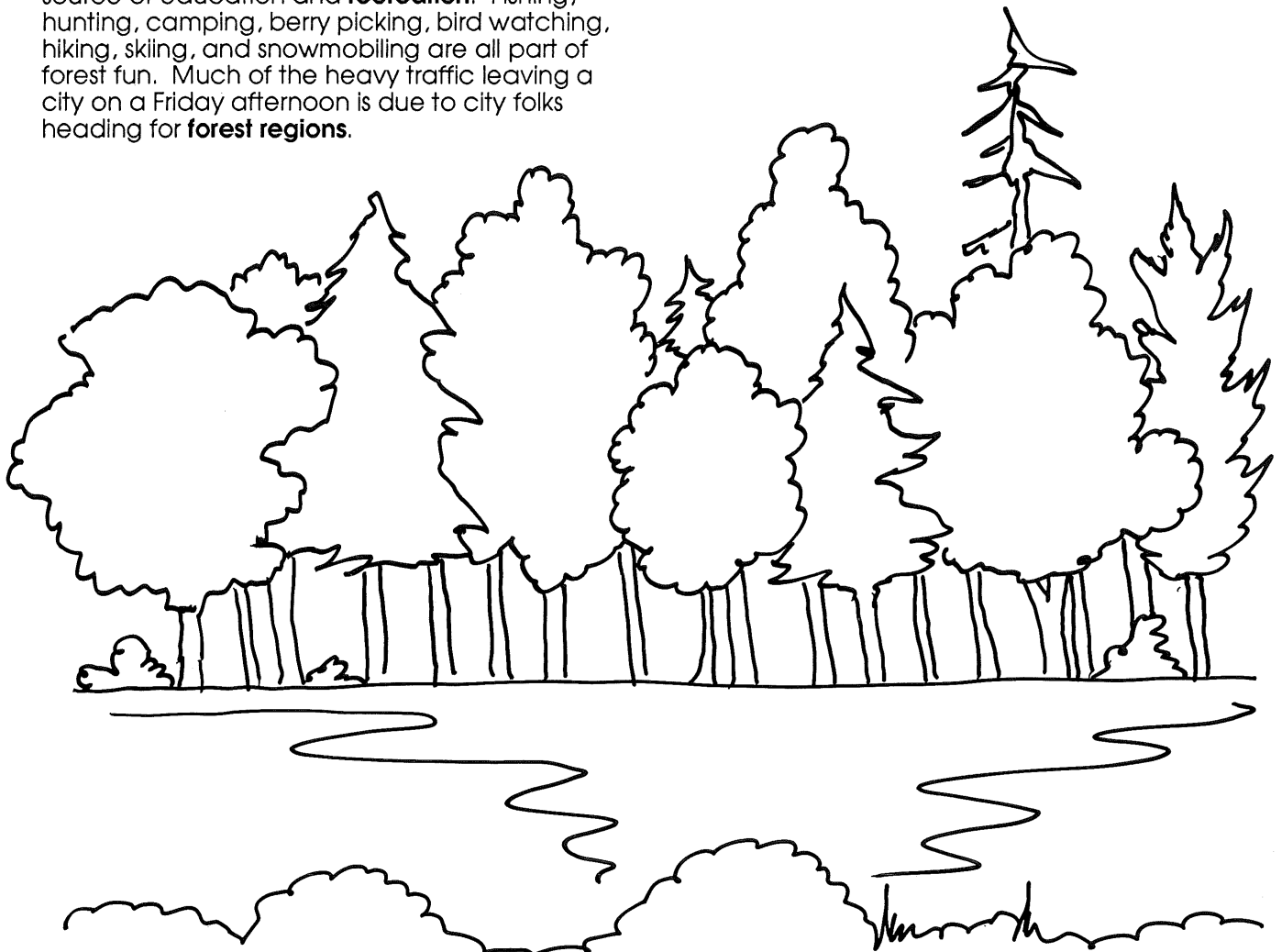


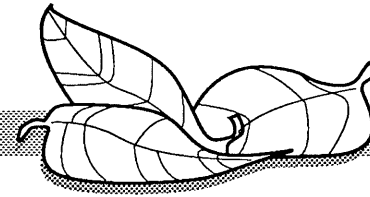
forest communities provide habitat for different species of wildlife.

### Forest Aesthetics and Recreation

Throughout the ages, poets, writers, and painters have praised the forest as a place of great beauty. Trees have given strength and a sense of peace to people in all walks of life. Forest **aesthetics** - the beauty of the forest and the plant and animal life in the forest - are enjoyed by youngsters and adults alike. The sight of a moose with its nose under water, grazing on the bottom of a stream flowing along the edge of a forest, inspires awe and wonder in almost everyone.





















Since the forest is a place of beauty and peace, it is only natural that it also is a great source of education and **recreation**. Fishing, hunting, camping, berry picking, bird watching, hiking, skiing, and snowmobiling are all part of forest fun. Much of the heavy traffic leaving a city on a Friday afternoon is due to city folks heading for **forest regions**.



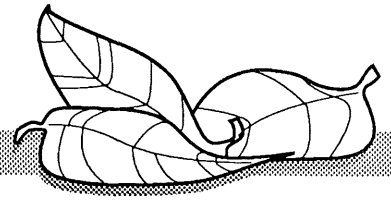


See activity details on  
pages 5-6 through 5-11.

## Calendar

<p>Discuss: Stages of the forest. Which animals live in certain parts of the forest?</p> <p>Science</p> 	<p>Look for: The "green tinge" in the tree canopy. Build: Start your "Stages of the Forest" bulletin board.</p> <p>Science/Art</p> 	<p>Discuss: Where does each animal of the forest nest and feed? Build: Place animals on the bulletin board.</p> <p>Science/Art</p> 	<p>Build: Continue work on "Stages of the Forest" mural. <i>Fun Fact:</i> Minnesota has 56 state forests!</p> <p>Science/Art</p> 	<p>Build: Finish "Stages of the Forest" mural. Read: "Wildlife Watcher" by Jim Arnosky.</p> <p>Science/Language Arts</p> 
<p>Look for: Crab apples in bloom. Do: Crossword puzzle: <i>Tree-mendous</i> (Activity Sheet).</p> <p>Science</p> 	<p>Discover: The squirrel-nut-tree relationship! Do: Students bring acorns to school.</p> <p>Science</p> 	<p>Discover: Acorn inhabitants.</p> <p>Math</p> 	<p>Read: Magazine article "Life in a Nutshell." (National Geographic, June 1989)</p> <p>Science/Language Arts</p> 	<p>Discuss: List facts in Activity 9. <i>Fun Fact:</i> There are more than 600 species of oaks!</p> <p>Science/Math</p> 
<p>Hike: Collect things to create springtime landscapes.</p> <p>Art</p> 	<p>Look for: Leaves forming on sugar maple and red oak trees. Create: Springtime landscapes.</p> <p>Science/Art</p> 	<p>Look for: Dandelions. Create: Springtime landscapes.</p> <p>Science/Art</p> 	<p>Write: Haiku or cinquain poems about your springtime landscape.</p> <p>Language Arts</p> 	<p>Look for: Lilac bushes and apple trees in bloom. Read: Share your poems from Activity 14.</p> <p>Science/Language Arts</p> 
<p>Look for: Bees pollinating. Discuss: Forest recreation.</p> <p>Science/Social Studies</p> 	<p>Look for: Falling silver maple and elm seeds.</p> <p>Science</p> 	<p>Look for: Bridal wreath blooming. Discover: Trees - living works of art.</p> <p>Science/Math</p> 	<p>Read: "Little Raccoon" by Suzanne Noguere, or "Trees" poem by Joyce Kilmer.</p> <p>Science/Language Arts</p> 	<p>Look for: Monarch butterflies.</p> <p>Science</p> 

# Bulletin Board Idea



## Stages of a Forest

Students participate by drawing and painting the stages of a forest. Include an oat field and water as part of the background scenery. After the painting is finished, students draw and paint animals to fit in the scene in the appropriate places on the mural. Make them removable so students can take them off and put them back on again. Some animals may appear in more than one place. Example: Pheasants feed in meadows or cornfields and nest in brush in woods. Hints for a happy fit: Talk about proportion and relative sizes of animals *before* starting this part of the mural.



# Activites

## 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 the following: "wildlife" magazines that can be cut apart for pictures; a large jar; acorns; "Wildlife Watcher" by Jim Arnosky; National Geographic magazine, June 1989; Cricket magazine, May 1988; art books; "The Little Raccoon" by Suzanne Noguere or the poem "Trees" by Joyce Kilmer.

### Activity 1: Stages of the forest.

Discuss: Which animals live in each "stage" of the forest? Ask students to bring "wildlife" magazines to school that can be cut apart. Some titles to suggest are Field and Stream, Outdoor Life, National Wildlife, Ranger Rick.

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

Students put white backing paper on the bulletin board and start to work on the mural. Animals to be researched and drawn in proportion to one another might be: skunks, woodpeckers, pheasants, quail, fox, rabbits, hawks, coyotes, wood ducks, geese, muskrats, deer, song birds, raccoons, squirrels.

### Activity 3: Discuss: Forest homes.

Where does each animal of the forest nest and feed? Place each animal in a proper place to show its habitat. Why does the animal need that particular habitat?

### Activity 4: Continue work on the "Stages of the Forest" mural.

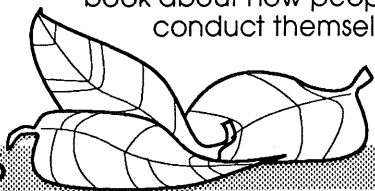
Add additional animals from Activity 2 or research more of your own.

*Fun Fact:* Minnesota has 56 state forests and 46 state forest campgrounds and day-use areas to enjoy.

### Activity 5: Finish the "Stages of a Forest" mural.

Read the book "Wildlife Watcher," by Jim Arnosky, Lothrop 1983. This book is also found in Cricket magazine, Sept. 1985. It is a non-fiction book about how people should

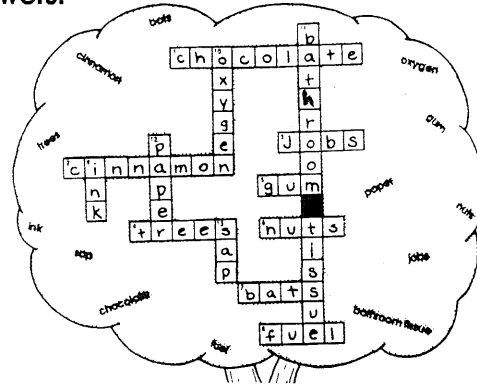
conduct themselves in the forest if they wish to watch wildlife.



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

Do the crossword puzzle - *Tree-Mendous* - Activity Sheet A (Page 5-10).

### Answers:



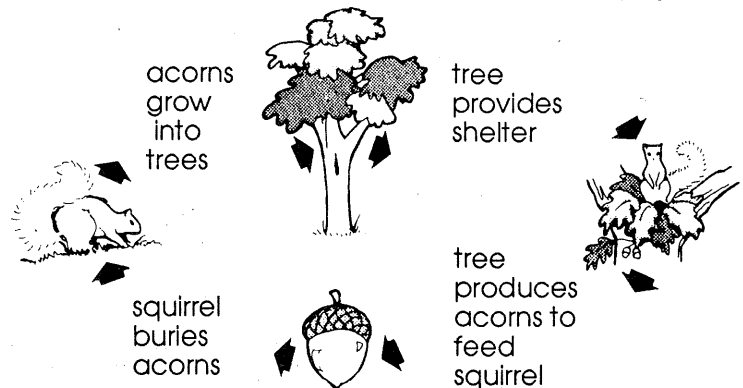
Ask students to bring acorns to school from their yards, parks, and the school yard. At this time of the year, suggest looking under oak trees where there are still many leaves on the ground. Look for acorns that have fallen on top of the leaves. These will probably be whole and not partially decomposed. Provide a large jar for the students to put acorns in.

### Activity 7: Forest relationships

Draw the squirrel-nut-tree relationship cycle on the board, or reproduce it for each student. Discuss what this diagram means. Ask the following questions; encourage students to ask questions, too!

- Does every acorn grow into an oak tree? How do you know?
- What happens to the acorns that do not grow into oak trees?
- Does anything live in an acorn? How do you know?

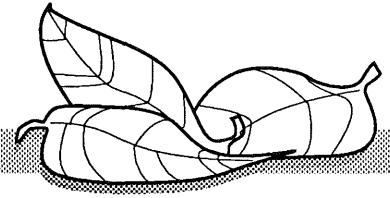
List all the facts students know about acorns.



The Squirrel-Nut-Tree Relationship

U.S. Department of Agriculture Forest Service.





**Activity 8:** Examine acorns students have brought to school.

Are the acorns different in any way? Are there any holes in the shells? What might this mean?

Give each student one acorn. Have him/her crack open the acorn; warn not to crush it. Each student then carefully examines the inside of his/her acorn. Is there anything in the acorn besides the nut? Count the number of acorns that have something else inside. What is the percent of inhabited acorns compared to the total number of acorns examined?

Estimate how many acorns are left in the classroom jar. Record each person's estimate, then have one or two people count the acorns in the jar. Have students guess the number of those acorns they think might have inhabitants. Ask volunteers to explain how they arrived at their calculation. If no one has done so after several explanations have been given, offer the mathematical way to calculate percentages (based on your earlier findings). To check your estimation accuracy, examine all the acorns. If there are live critters in any of the acorns, you might want to save that acorn and see if the critter develops.

**Activity 9:** Life in a Nutshell.

Share the magazine article "Life in a Nutshell," National Geographic, June 1989. On a large sheet of paper attached to a bulletin board, have students write the facts they learned about acorns and acorn inhabitants from the article. This sheet might be titled "Life in a Nutshell."

**Activity 10:** Read some of the facts that have been written on yesterday's sheet and discuss.

*Fun Fact:* There are more than 600 species of oaks, all of which grow naturally only in the Northern Hemisphere.

**Activity 11:** Take a hike!

Collect nature things for a springtime landscape. (See Activity 12.) Encourage each person to include at least one tree part.

Be sure everyone understands that cutting buds, leaves, and branches off trees or picking blooming tulips and certain other flowers is not acceptable.

**Activity 12:** Look for: Leaves forming on sugar maples and red oak trees.

Create springtime landscapes. Using the "natural treasures" collected on your hike, combine illustration, design, and bits of nature to create scenes of springtime. Consider dioramas, or three-sided scenes constructed in boxes, too. Natural elements to choose from include stones and pebbles, twigs, bark, leaves, catkins, pine cones, nuts.

**Activity 13:** Look for: Dandelions.

Work on springtime landscapes.

**Activity 14:** Write haiku or cinquain (five stanza) poems about your springtime landscape. If you can get it, Cricket magazine, May 1988 has information.

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

Share poems from Activity 14.

**Activity 16:** Look for: Bees pollinating.

As a group, list as many recreational activities as students can think of that take place outdoors. From cut-up copies of magazines, have students find as many outdoor recreation pictures as possible. Set the guideline beforehand that any picture selected must include at least one tree. Make a recreation collage on a large piece of paper or a poster board to display the pictures. How many of the students have done each of the recreational activities themselves? Which are group favorites? Share tales of adventures in forest recreation!

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

**Activity 18:** Look for: Bridal wreath blooming.

Check out any art gallery and art books where you're sure to see lots of landscape and scenic art. What do you see as a main feature of beauty in many of the scenes? Trees, of course! Why do you think artists and photographers find trees such interesting objects? How do trees make you feel when you're looking at them in real life? In a painting or photograph? How can they set a mood for us?

**Activity 19:** Read the book "Little Raccoon," by Suzanne Noguere or the poem "Trees" by Joyce Kilmer.

**Activity 20:** Look for: Monarch butterflies.

# More Activity Fun

## We All Need Forests

What would you do if you were in charge of 20,000 acres (8000 ha) of forest? If you owned a paper company, you would probably plant a species of fast-growing pine or other "paper tree" and manage as much of the forest as you could for pulpwood. If you were a wildlife biologist, you would try to manage the forest in a way that would keep the best habitat for the different species of wildlife you wanted to protect. And if you were a recreation planner, you might manage the forest to provide good campsites, hiking trails, ski paths, fishing streams, bike paths, and wildlife study areas.

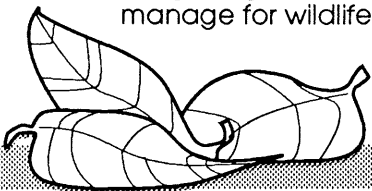
Although many people don't realize it, most of the forests in this country are managed. How a forest is managed depends on what it will be used for. In the past, most forests were managed for only one type of use, such as for raising pulpwood trees. But today, many more are being managed for several different uses at a time.

In this activity, you will get a chance to discuss different forest uses and how some of these uses compete. You'll also learn why managing for different uses is so important.

Ask your students to name ways they or their families use forests. (For hiking, birding, hunting, fishing, camping, and so on.) List the uses on the chalkboard or a large sheet of easel paper. Then explain that forests are also important because they provide habitat for many types of wildlife and contain important natural resources. Next ask if someone can tell you what the word *manage* means. Explain that in order for people to use forests in different ways, forest managers must manage forests in different ways.

Next pass out Activity Sheet B (Page 5-11). This page lists some of the things that many forests are managed for. Ask students to look at the three rows on the page. Starting with the first row, labeled "**wildlife**," discuss some of the ways forests are managed to help protect different species of wildlife. Use this background information to explain how forests are managed for wildlife:

**Saving Snags:** One way people manage for wildlife in a forest is by leaving dead trees, or



snags, standing instead of cutting them down. Snags provide nesting cavities for many birds and mammals, such as owls, woodpeckers, wood ducks, bluebirds, raccoons, and squirrels.

**Building Brushpiles:** By building brushpiles in a forest and along forest edges, forest managers help provide hiding and nesting sites for many animals that live on the ground, such as foxes, rabbits, wood thrushes, and chipmunks.

**Letting Logs Lie:** Many types of animals use logs for nesting and hiding places. By not removing logs, managers can help provide homes and feeding areas for many kinds of wildlife.

**Building Feeders and Nesting Boxes:** Putting up nesting boxes in forests that have limited nesting sites can help attract wildlife. So can setting up feeding stations for birds and mammals.

**Burning:** For some species, the only way to maintain the right kind of habitat is to burn the area on a regular basis to get rid of undergrowth.

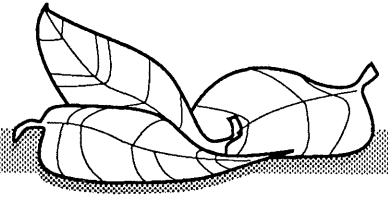
**Picking the Right Plants:** By planting certain types of trees and shrubs in a forest area, wildlife managers can provide habitat for specific types of wildlife.

Now have the students look at the row labeled "**recreation**." Compare this list with the list the children came up with. Discuss the fact that the forest is an important place for people to relax, enjoy nature, and exercise.

Explain that some of the ways people use forests for recreation compete with the needs of wildlife and can also disrupt the plants that grow there. For example, to build ski slopes in a forest, heavy equipment must come in and cut down trees to make the runs. Roads and parking lots must be built so that people can get to the slopes and park. Many times ski lodges and other facilities are also built.

Ask students to think of other ways recreational uses of the forest can harm the wildlife. The role of many forest managers is to balance the uses of a forest so that wildlife can be protected and people can use it for recreation, too.

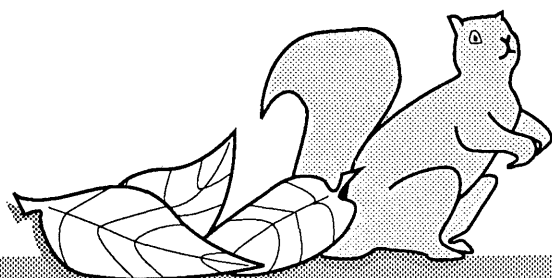
Finally, have students look at the row labeled "**products**." Many forests are used for commer-



cial purposes. Some forest areas are managed for lumber, some are managed for pulpwood, and some are opened up for oil, gas, and mineral uses. These uses can upset the forest community and compete with wildlife and recreational uses. For example, you probably wouldn't want to camp near a strip mine in a forest or hike along an area that is being lumbered. Why is it important to have commercial uses in a forest? (People need forest products.)

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

If you haven't already made a group collage in Activity 16, invite individual students to make forest collages showing all the different uses of a forest. They can cut pictures from magazines, draw their own pictures, and tape or glue on pieces of real forest items, such as toothpicks, paper, seeds, and roots. Have each person write a short paragraph explaining his or her collage, then hang the collages around the room.

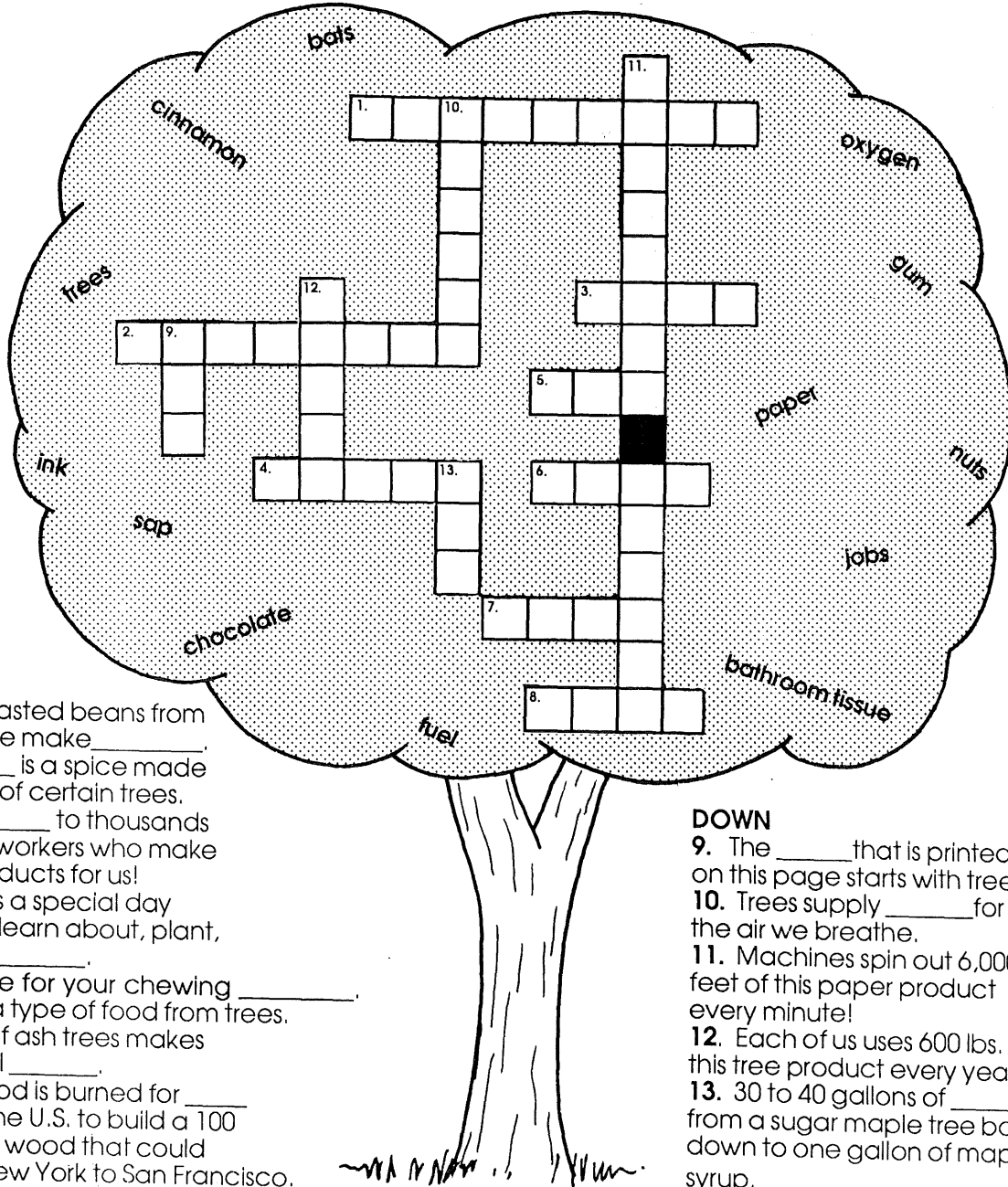


# Activity Sheet A

## Tree-Mendous

Tree (tre)n. A woody plant that is at least 20 feet tall when fully grown; trees grow taller, live longer, and become more massive than any other living thing; trees grow in many sizes and shapes; they serve us many ways.

You'll think trees are tree-mendous when you see some of the things they give us! Use these words to fill in the "crossword puzzle"...then you just might want to pat a tree on the bark!



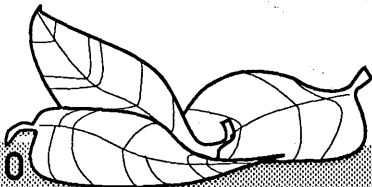
### ACROSS

1. Ground, roasted beans from the cocoa tree make \_\_\_\_\_.
2. \_\_\_\_\_ is a spice made from the bark of certain trees.
3. Trees give \_\_\_\_\_ to thousands of Minnesota workers who make these tree products for us!
4. Arbor Day is a special day when people learn about, plant, and care for \_\_\_\_\_.
5. Thank a tree for your chewing \_\_\_\_\_.
6. \_\_\_\_\_ are a type of food from trees.
7. The wood of ash trees makes great baseball \_\_\_\_\_.
8. Enough wood is burned for \_\_\_\_\_ each year in the U.S. to build a 100 foot tall wall of wood that could stretch from New York to San Francisco.

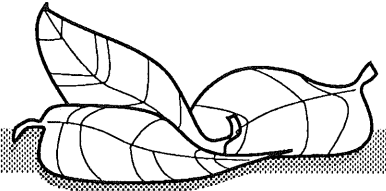
### DOWN

9. The \_\_\_\_\_ that is printed on this page starts with trees.
10. Trees supply \_\_\_\_\_ for the air we breathe.
11. Machines spin out 6,000 feet of this paper product every minute!
12. Each of us uses 600 lbs. of this tree product every year.
13. 30 to 40 gallons of \_\_\_\_\_ from a sugar maple tree boil down to one gallon of maple syrup.

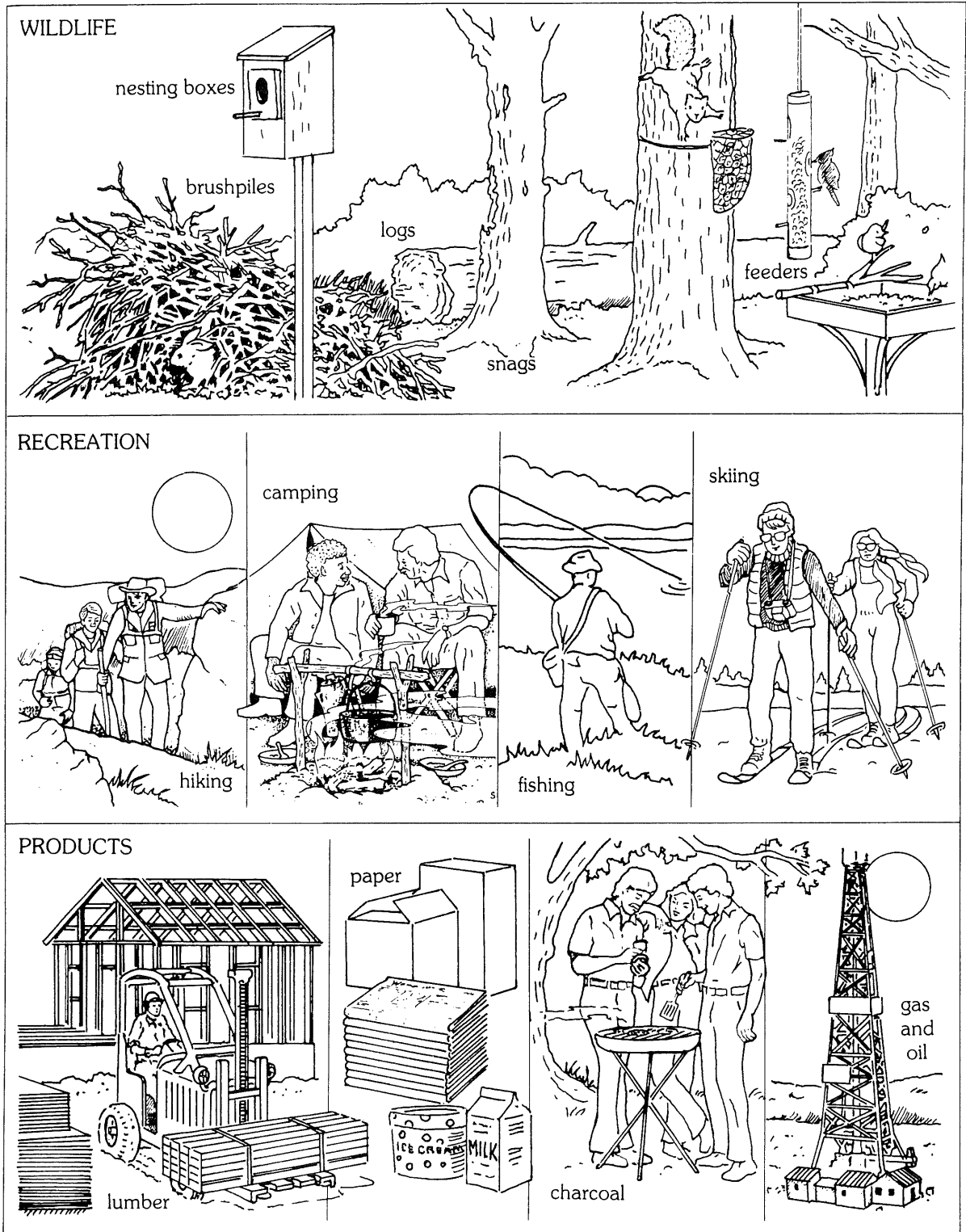
Answers: See Activity 6, page 5-6.



# Activity Sheet B CopycatPage



## We All Need Forests



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



# 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 Minnesota 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.

### 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

### Vocabulary Words

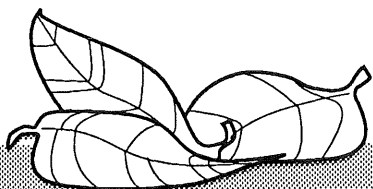
annual rings	prevailing winds
girth	evergreen
conducting vessels	deciduous
environment	photosynthesis
competition (in forests)	drought
farmstead shelterbelts	species
erode	urban forest
field windbreaks	

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 simply counting the annual rings. If you know the year the tree was cut, you can count backwards and figure out the year the tree began growing.

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 of these growth-affecting things can be seen in stump or log cross sections. Many interesting and educational clues help us explore the history of a tree or the forest it came from.

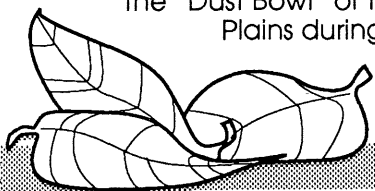
## Trees in Our History

Imagine yourself as an early settler along the eastern seaboard. Just getting through the trees was hard work! As people worked their way westward, getting rid of trees was a major problem. Trees were in the way; they had to be cut down to clear land for agriculture, building, and travel.

When the westward movement reached the Great Plains, the land ran out of trees. Now there were only grasses as far to the west as the eye could see. There was no tree clearing problem; the land was ready for the plow. But the settlers were immediately faced with a new problem. There was no lumber for buildings or fuelwood for heating and cooking. Unless they hauled in logs and fuelwood from the eastern forests, settlers had to cut sod for homes and livestock shelters. Buffalo and cattle dung were used for heat and cooking fires.

It wasn't long before the settlers realized that the treeless prairies 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 settlers began to plant trees around their farm buildings and feedlots. These plantings are called **farmstead shelterbelts**.

Settlers continued to break up the prairie sod to grow crops. Millions of acres were plowed. Animals continued to graze the grasslands; more and more bare soil was exposed to rain and wind. Without grass to hold it in place, valuable prairie topsoil began to **erode** away. This was not from water runoff; the prairies are quite flat and the total rainfall is low. Windstorms caused the problem. Dry, wind-blown topsoil became the "Dust Bowl" of the Great Plains during the 1930s.



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

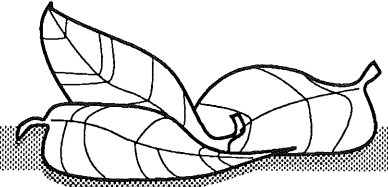
Winter's **prevailing winds** in Minnesota are from the northwest. The ideal farmstead planting, then, is an L-shaped belt of trees and shrubs on the north and west sides of the farmstead area. The design of the planting depends on the number and location of buildings and feedlots on the farmstead. The 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.

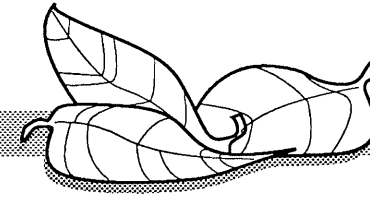
**Trees supply the oxygen we need to breathe.** Trees make their food through **photosynthesis**; carbon dioxide and water are combined with sunlight energy to make sugars (tree food) and oxygen. Enough oxygen is produced by a single acre (about the size of a football field) of young growing trees to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

# 6-4 Grade 6

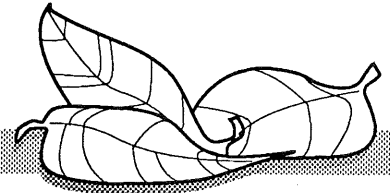


See activity details on pages 6-7 through 6-13.

## Calendar

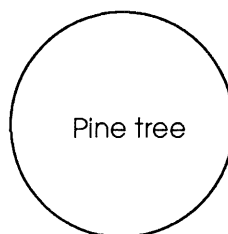
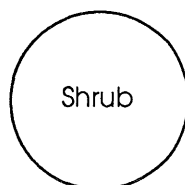
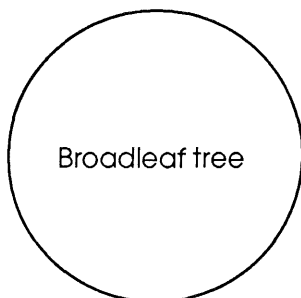
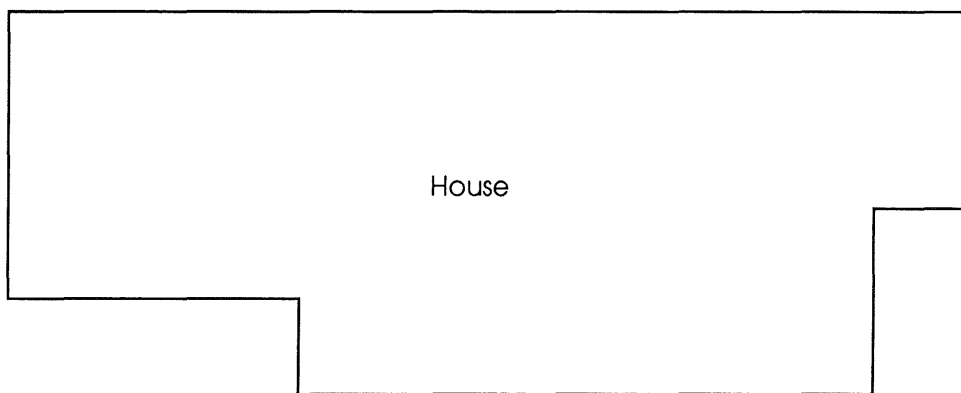
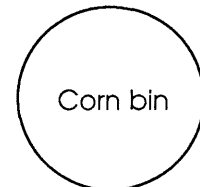
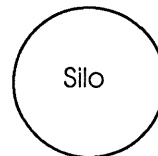
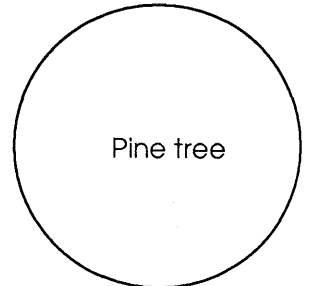
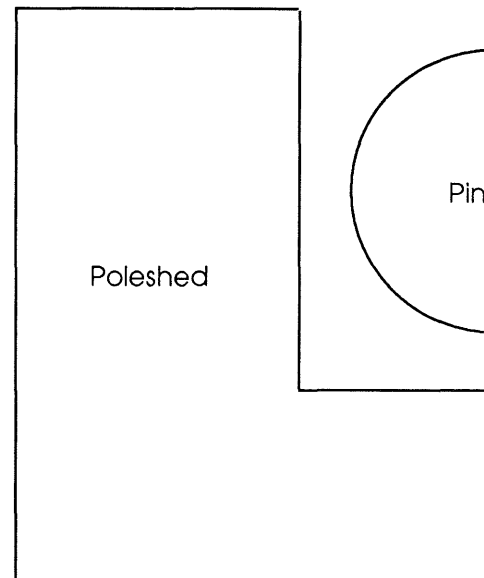
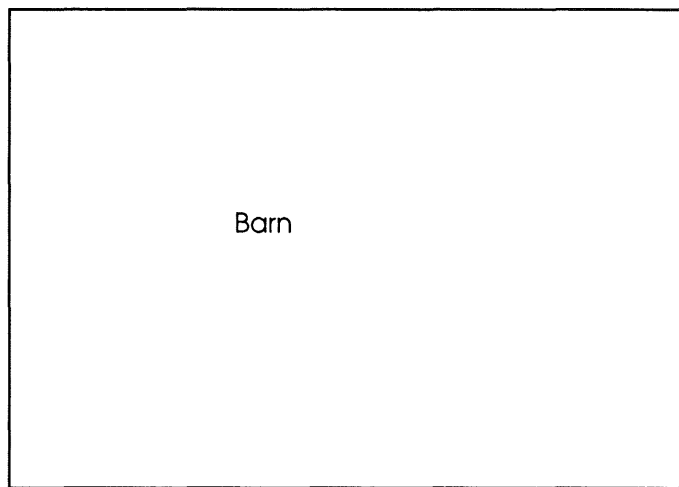
<p>Research: The "Dust Bowl" of the mid 1930s. </p> <p>Social Studies/History</p>	<p>Look for: The "green tinge" in the tree canopy. </p> <p>Science</p>	<p>Discuss: Farmstead shelterbelts and field windbreaks. Create: Background and symbols for bulletin board.  Science/Art</p>	<p>Look for: Tulips and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

# Bulletin Board Idea

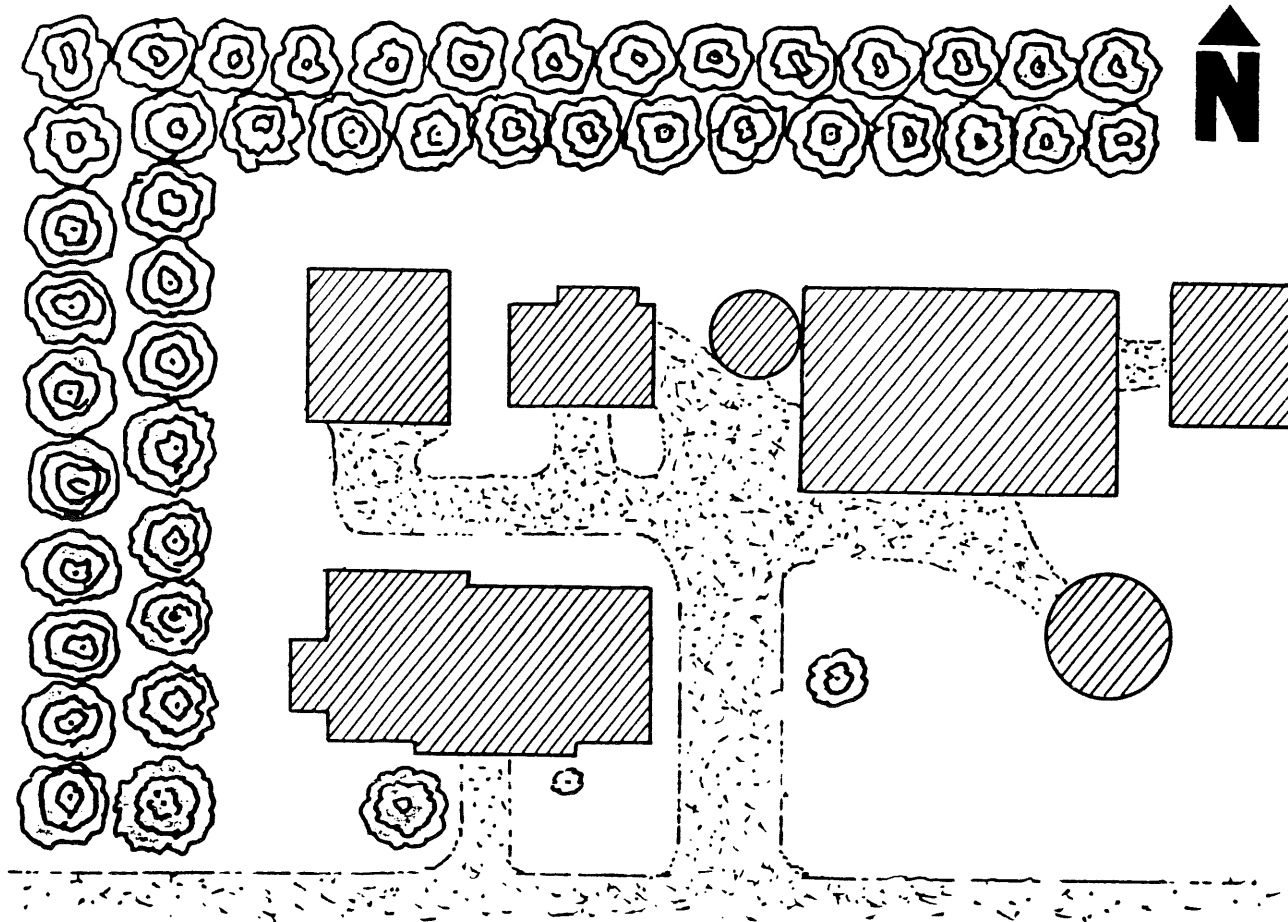


## Designing Shelterbelts and Windbreaks

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.



# Bulletin Board Idea Continued

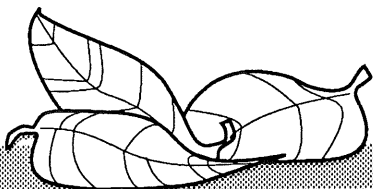


Key: 1" = 25'

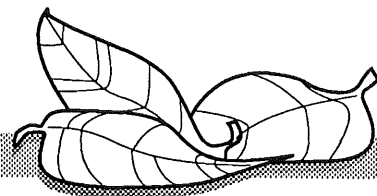
## A sample windbreak design for farm headquarters:

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. Water and wind erode more than enough tons of good topsoil each year from Minnesota's land to bury both sides of I-94 twelve feet under from Minneapolis to Miles City, Montana (704 miles). That's more than enough to fill 42 Metrodomes.

### 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, game birds, and small wildlife mammals. During recent winters in Minnesota, 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.

### 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 Minnesota. Although western Minnesota is on the eastern fringe of the prairie lands and did not suffer as much soil loss as the western prairie states, there were, and still are, many farms that require tree plantings in the field to cut down soil loss.

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.

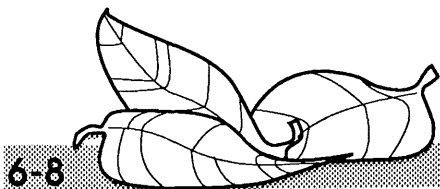
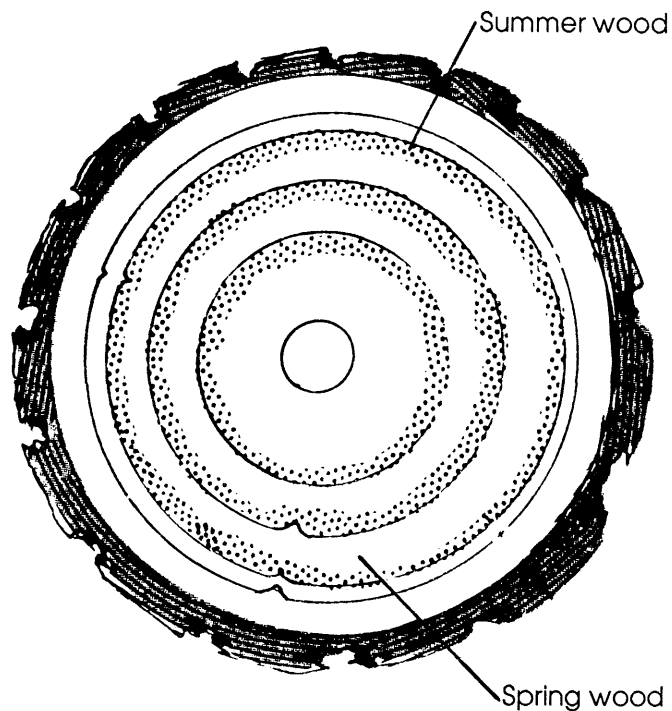
Have two or more groups display their sketches and give the reasons for their decisions.

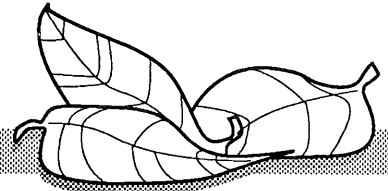
**Activity 8:** Farmstead sketches, continued.

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

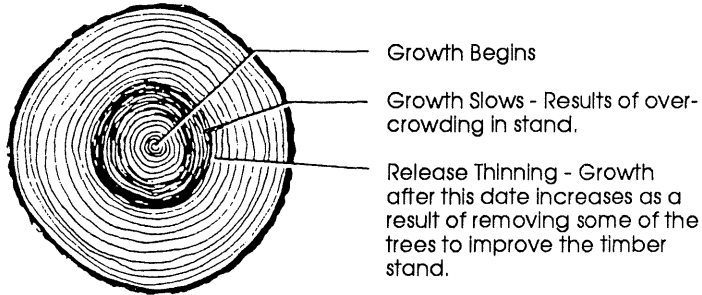
**Activity 9:** Stump spies.

Bring a freshly cut tree stump or branch cross section into the classroom. Invite several students to each 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 backward from the present year, starting at the outer ring (newest ring) just inside 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.

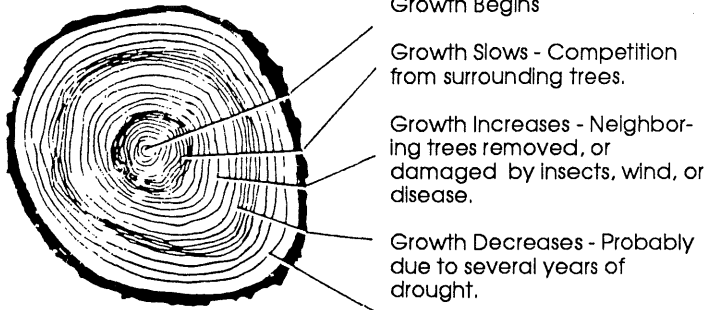




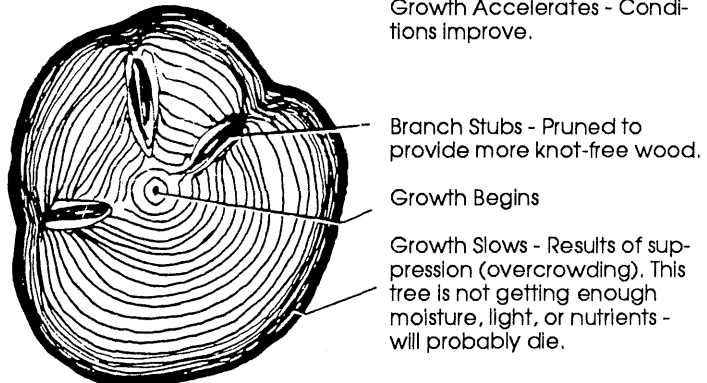
Examine these ring patterns. What stories do they tell? How are the growth patterns alike? How are they different?



Growth Begins  
 Growth Slows - Results of over-crowding in stand.  
 Release Thinning - Growth after this date increases as a result of removing some of the trees to improve the timber stand.



Growth Begins  
 Growth Slows - Competition from surrounding trees.  
 Growth Increases - Neighboring trees removed, or damaged by insects, wind, or disease.  
 Growth Decreases - Probably due to several years of drought.



Growth Accelerates - Conditions improve.  
 Branch Stubs - Pruned to provide more knot-free wood.  
 Growth Begins  
 Growth Slows - Results of suppression (overcrowding). This tree is not getting enough moisture, light, or nutrients - will probably die.

**Activity 10:** Look for: Leaves forming on sugar maple and red 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:

- How do the annual ring patterns of different **species** of trees vary?
- Which tree is the oldest?
- 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).

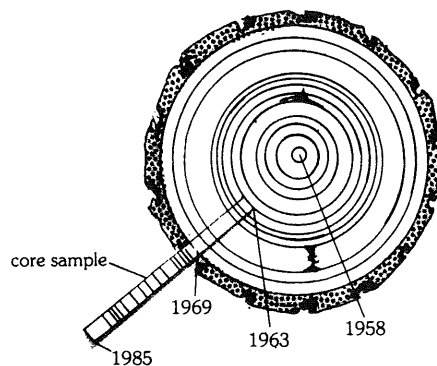
Cross Section C: The mark beginning in year six is all that's left of a branch that died and fell off (picture 7). Eventually the tree's trunk grew around the remains of the branch and covered it. (The branch could also have been broken or cut off.)

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.)

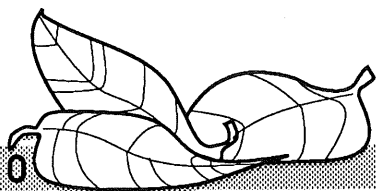
Then have the students assign dates to some of the events in the tree's life. What year did fire scar the tree? (1915). How many years did it take for the tree to grow around the remains of a dead branch? (10 years). How long did the drought that began in 1912 last? (two years).

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

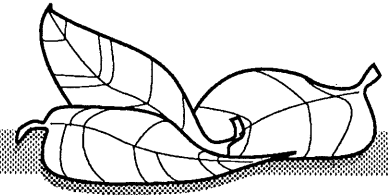
*Adapted from Ranger Rick's Naturescope "Trees are Terrific." Used with permission.*

#### **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 Basoga 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.

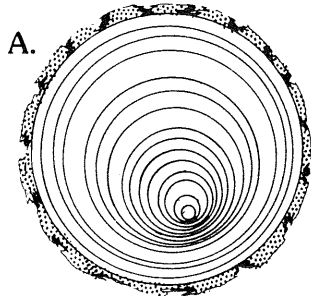
**Activity 19:** Guest speaker: Forester, parks manager, public groundskeeper, etc.

**Activity 20:** Look for: Monarch butterflies.

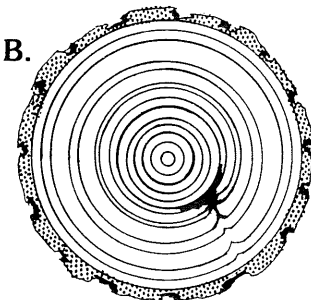
Write thank you notes to your guest speaker, noting new things learned from his/her visit.

# Activity Sheet A CopycatPage

## Reading The Rings - Part 1



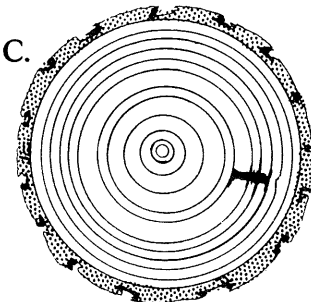
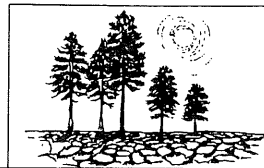
1. Fallen tree



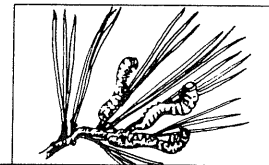
2. Fire



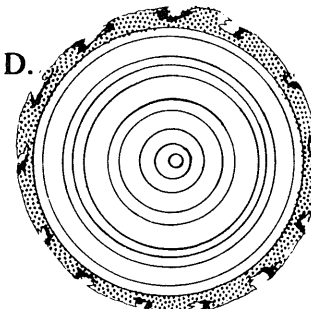
3. Drought



4. Insect attack



5. Construction



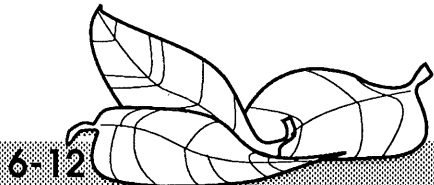
6. Growing on slope



7. Dead branch

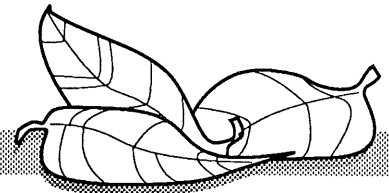


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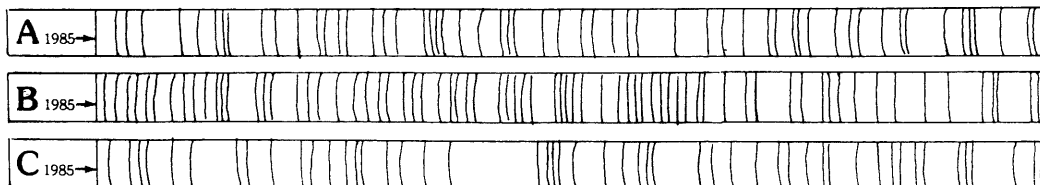
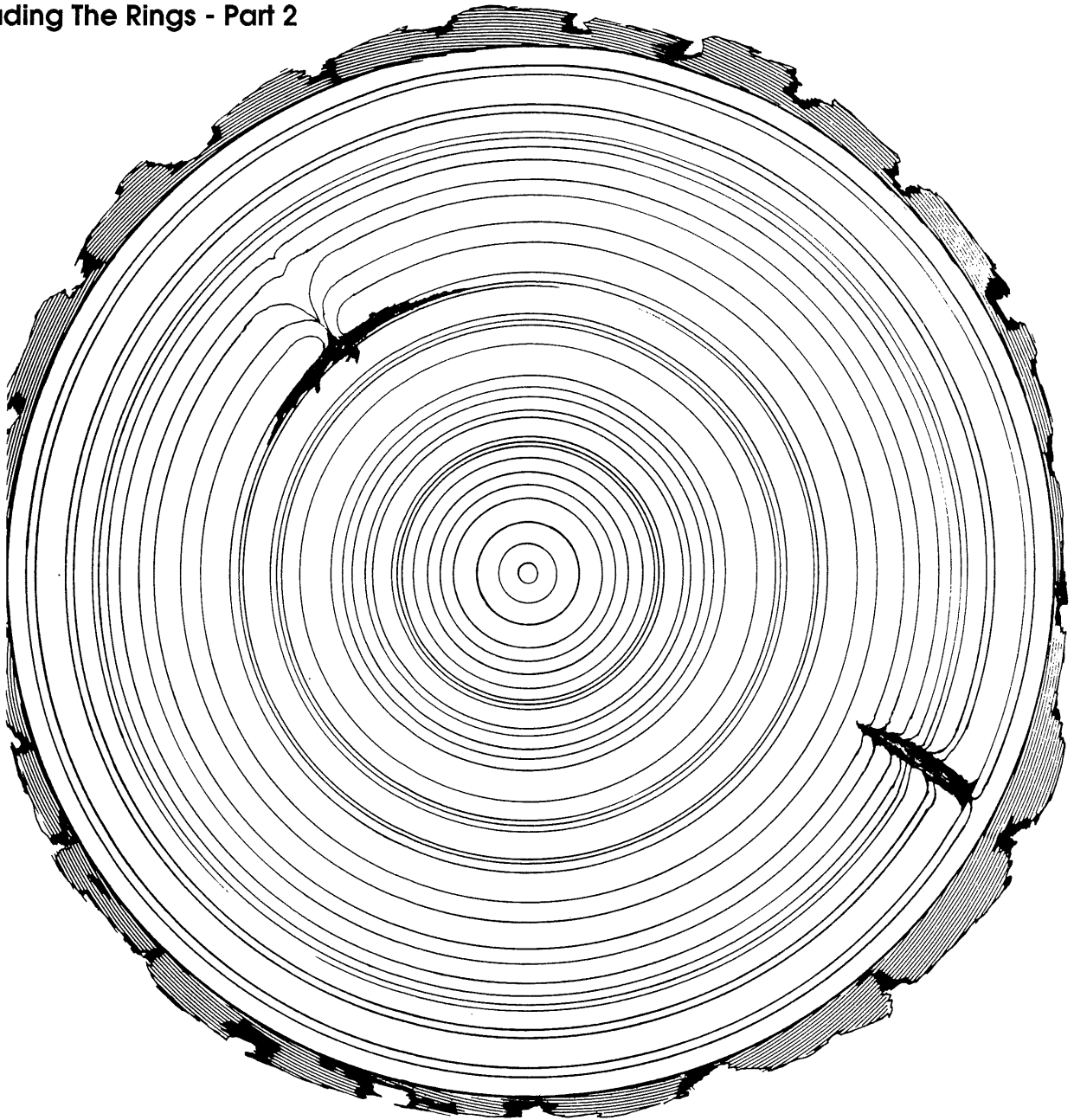


Instructions - See Activity 13, page 6-9.

# Activity Sheet B CopycatPage



## Reading The Rings - Part 2



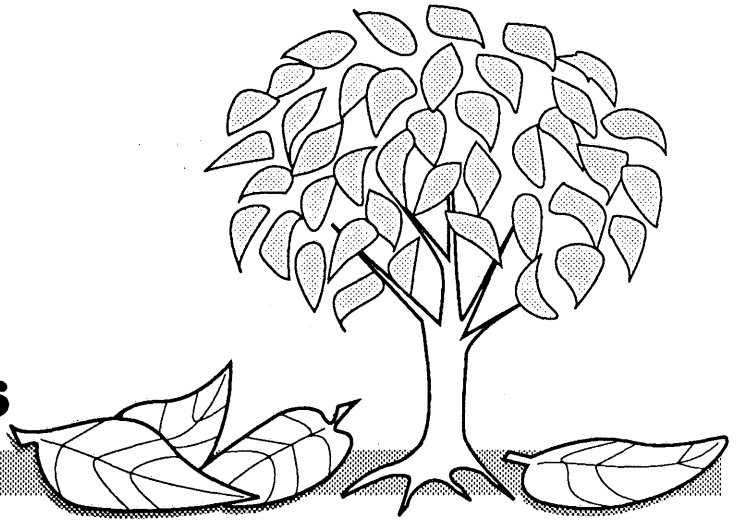
**Instructions - See Activity 13, page 6-10.**

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



# Grades 7 - 9

## Minnesota's Forests



### Objectives

- Students will become familiar with the history of Minnesota forests and be aware of their importance in the economy of the state and the country.
- Students will identify and research information about careers relating to forestry during the 1800s in Minnesota and today.

### Vocabulary Words

vegetation	deciduous
evergreen	flood plains
hardwood	sawmill
prairies	pulp
broadleaf	pulpwood
coniferous	urban forest
seedlings	photosynthesis

### Background Information

The history of Minnesota forests is much like that of forests throughout the United States. Forests have been exploited; now many are being rebuilt. Most are now managed so both our generation and future generations can enjoy things that only the forests can give us.

### Minnesota's Forest Regions

The forests of Minnesota developed after the glaciers retreated about ten to twelve thousand years ago. Those great ice sheets left soils and land features that were well suited for certain types of **vegetation**. With the warming of the climate after the glacial period, plants gradually built up on these soils. By the time humans arrived on the scene, there were three distinct natural plant regions: the **evergreen** forest in the northeast, the **hardwood** forest of the east central and southeast, and the **prairies** in western and southwestern Minnesota. (See Minnesota Forest Region maps, past and present, Appendix pages 13 and 14.)

### Evergreen Forest

The northeastern evergreen forest was the largest region of forest. The original forest included white, red (also known as Norway), and jack pines; black and white



spruce; balsam fir, tamarack, northern white cedar; and some **broadleaf** trees (notably the aspens and paper birch) that grow with **coniferous** trees. These trees did not grow in one big mixture, but tended to appear in definite areas. Soil and moisture conditions and the fire history of the area all affected which trees grew where.

After the first cutting of the evergreen forests, particularly the pines, many forest fires swept the regions. These fires destroyed seed trees and young conifers. They helped the growth of some broadleaf trees. Today most evergreen forest area has a mixture of aspen and birch, and in places, oaks and other hardwoods. They stand together with young pine, spruce, and fir wherever fires and logging did not completely eliminate these trees, or where new forests have been planted.

Some conifers, such as balsam fir, are now gradually moving into aspen and birch forests. Balsam can grow in the shade and compete with these trees. If fire is kept out, part of the aspen-birch forests will in time be replaced by fir and spruce. Unfortunately, the pines are not successful in aspen and birch stands because these **seedlings** do not grow well in shade.

## Hardwood Forest

The original hardwood forest region of south-east and east central Minnesota had stands of both hardwood and **deciduous** tree species such as oak, elm, ash, black walnut, basswood, butternut, Kentucky coffeetree, maple, cottonwood, willow, aspen, and many others. But these trees grew on soils that were good for growing agricultural crops.

As the settlers moved into Minnesota, much of the hardwood forest area of southeastern and east central Minnesota was cleared for agriculture. From 1820 to about 1920, many of the trees of the original forests were used to build homestead and farm buildings. The trees that were not used were often just cut, gathered into piles, and burned. Today, remnants of this hardwood forest still stand along the rivers and in many small woodlands. Today's trees are the same types of trees that originally covered the area, but the more valuable species such as black walnut and oak are not nearly as common as they once were.

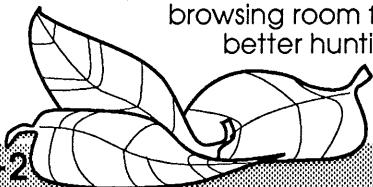
## Prairie Region

In the prairie region of western and southwestern Minnesota, the original forests grew along the valleys and **flood plains** of rivers and streams. The trees found here included willow, cottonwood, ash, boxelder, elm and occasionally oak, maple, basswood, or other hardwoods. This area of Minnesota receives less moisture than the evergreen and hardwood forest regions. That's the main reason all the land in western and southwestern Minnesota was not covered by forests. There was very little cutting of trees in this area, and today's forest is much like the original forest.

## Forest Uses—Then and Now

The forests of Minnesota were used by Native Americans long before European explorers discovered the area. The forest was a place for shelter, and for medicine and forest products such as birch bark, poles, firewood, and foods (maple syrup, wild plums, berries, etc.) It was a place to hunt game. The forest was also sometimes a hindrance to Native Americans. Occasionally, they burned areas to create open

space. This space meant more browsing room for game and better hunting grounds.

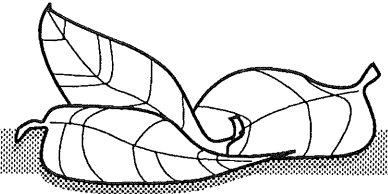


As more and more settlers arrived, the forests were exploited for timber products and cleared to grow agricultural crops. The first big cutting of trees was probably by army troops stationed at Fort Snelling, where the state's first **sawmill** was built in 1821. The first commercial sawmill was built in 1837 at Marine-on-the-St. Croix. The white pine lumber industry grew quickly in Minnesota from 1890 to 1930. For many years, Minneapolis-St. Paul was the largest sawmill center in the United States.

Wood was in great demand for all types of building and for fuelwood, so tree cutting was encouraged. Agriculturists believed practically all of Minnesota would "go under the plow" and that farming would be the main activity in all areas of the state. To make way for farming, those trees had to go! Logging became big business. After logging, the stumps and logging leftovers were burned. This burning to clear lands for agriculture led to some huge forest fires.

Fires play a big part in the history of forestry in Minnesota. In 1894, the Hinckley Fire, which covered a large area in Pine County, killed 418 people. The Chisholm Fire in 1908 and the Baudette and Spooner Fires in 1910 swept huge parts of northern Minnesota and caused much suffering and loss. The last big forest fire in Minnesota was in the Cloquet-Moose Lake area in 1918. It caused the deaths of 438 people.

The heavy logging of Minnesota's pine forests continued. People tried to farm what was not very productive land until about 1930. By that time, most of the original forests in northeastern Minnesota had been cut. Only a few places of the virgin pine forests missed the axe or the flame. One of these areas became our first state park (Itasca) in 1891. The protection of this beautiful area of old-growth virgin white and red (also known as Norway) pine was a cooperative effort by state agencies, university professors, and the forest industries. This park, which includes the headwaters of the Mississippi River, is today one of the finest parks for its size in our nation. It is also a reminder to us of the original forest of northern Minnesota.



## Minnesota's Forest Types Today

Today, aspen and birch tree types cover over one-third of the commercial forested area of Minnesota. The spruce-fir forest covers about 15 percent. Moving down in percentages are the lowland hardwoods, pines, oaks, northern hardwoods, tamaracks, and cedars. Minnesota now grows more wood than it is harvesting. Public agencies, Minnesota's forest industries, and small woodland owners have planted over 500 million trees, mostly evergreens, to reforest areas where trees once grew.

## Minnesota Forests Products Today

Minnesota **pulp** and paper mills produce and sell products that bring over \$900 million into the state each year. Nine mills employ more than 5,000 men and women.

Each year we also harvest about 330 million board feet of lumber and logs; over five million Christmas trees and wreathes; 28,000 cords of matchwood and veneer logs; 500 thousand posts and poles; and one million cords of fuelwood. These forest products (excluding **pulpwood**) have a value of over \$220 million. Other forest products include wild berries, nuts, fruits, maple syrup, and pine cones.

Over 54,000 people are employed by our forest industries. Minnesota's forest products and their distribution are worth over \$4.5 billion each year. Forestry is Minnesota's second largest manufacturing industry. It's one-fourth the size of agriculture and four times larger than mining.

The value of the forest goes far beyond its products. Think about its use in recreation, in protecting our soils and water, and in creating wildlife habitat. And there's no way to measure the great beauty and peace forests bring to our lives.

## The Future Of Minnesota's Forests

In years to come, we expect even greater use of our forests for products, recreation, and environmental protection. People will want more products from our trees. This will mean using tree parts previously thought of as unsalable, such as branches and leaves. Scientists at the Forest Products Laboratory in Madison, Wisconsin, the Minnesota College of Natural Resources in St. Paul, Minnesota, and in many research laboratories are studying how we can best manage our

rich forest resources. Environmental quality of our soil, water, and air must be protected.

The future of the forests of Minnesota is in the hands of our citizens. Minnesotans have an important role. We are guardians and stewards of a wonderful forest heritage!

## Special Minnesota Trees

Over 40 tree species are native to Minnesota. Three of them are described below. Are any of them near your school, your home, or in your community?

### Red (Norway) Pine

This beauty was named Minnesota's official state tree in 1953. The inner wood and bark are reddish. "Norway" may have been used by early English explorers who thought the red pine was the Scotch pine of Norway. Today, Minnesota is the only state in the U.S. that uses the term Norway.

The Norway pine is the most commonly planted species in Minnesota. In 30 years, a Norway pine is a marketable size for pulpwood to make high grade printing and wrapping paper. It can also be grown 100-150 years for large sawlogs. The Norway pine is quite resistant to disease and fire, and is an outstanding timber producer. It's planted for erosion control, shelterbelts, windbreaks, Christmas trees, and wood for lumber, poles, cabin logs, railroad ties, pulpwood, and fuel.

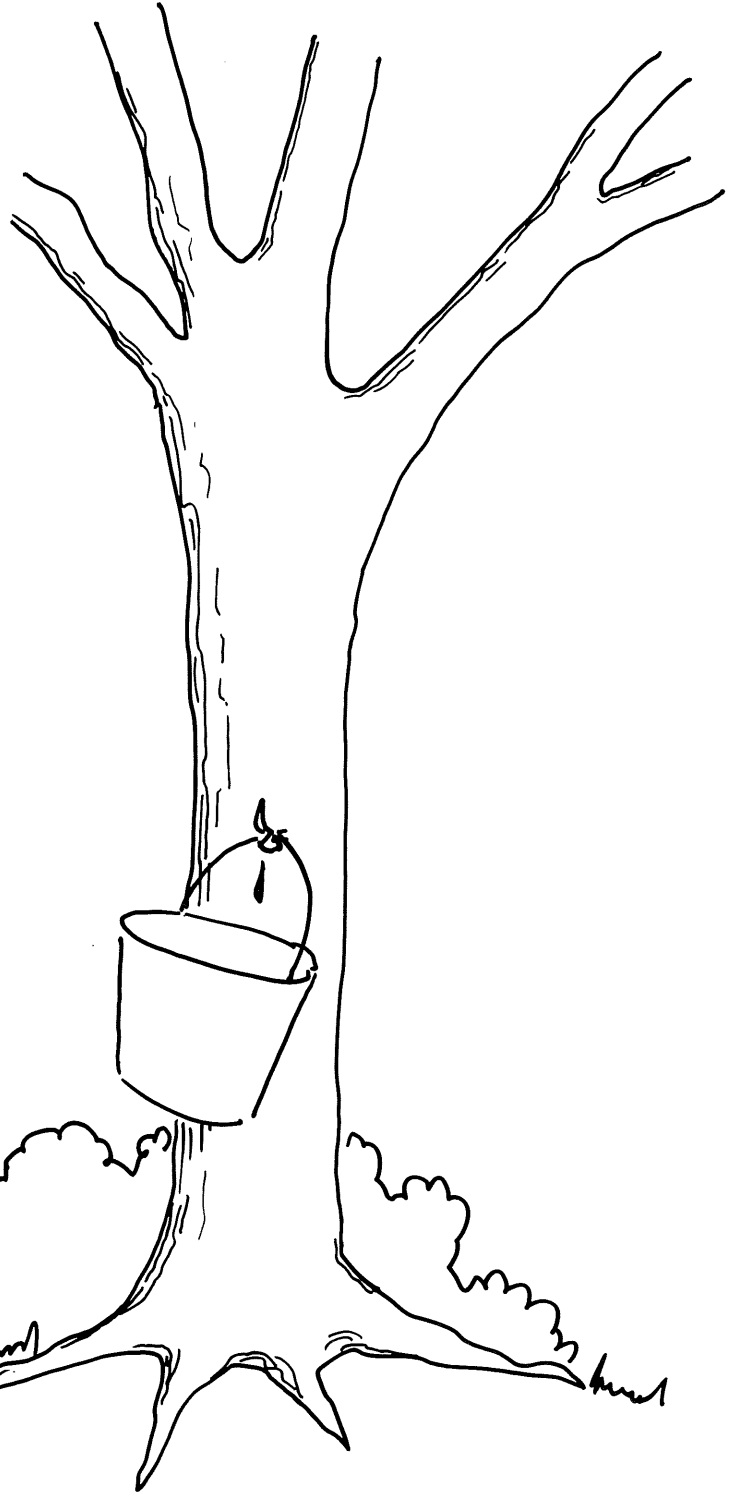
The Minnesota state record for a Norway is a 120-foot-tall tree with a 116-inch circumference. You'll find it in Itasca State Park.

### Tamarack

Tamaracks are also called Eastern Larch. They are Minnesota's only native conifer that is deciduous. Their needles turn deep yellow and drop in autumn. The tamarack grows slowly and naturally on stagnant bogs like those of northern Minnesota. Change its soil and location, though, and it grows rapidly. Tamaracks may be 50-100 years old before reaching pulpwood size. Tamarack wood is durable and strong, but difficult to work with tools. It's used for posts, poles, ties, and pulp for making strong, tough papers and fiberboard.

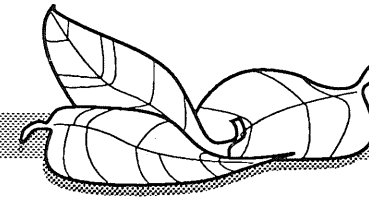
## Sugar Maple

This is the prized tree that produces the breathtaking crimsons and golds of autumn. One of Minnesota's finest trees, a sugar maple grows to heights of 80 feet or more. The trunk may reach a diameter of more than three feet. It grows slowly but isn't troubled by insects. It is called sugar maple because its sap has much sugar in the spring of the year. People bore a hole, and collect the sap in a bucket hung on the spout. The sap is boiled...and boiled and boiled! Finally, it thickens and becomes syrup. It takes about 40 gallons of maple sap to make one gallon of syrup. Cook it even longer until all the water has boiled away, and it turns into maple sugar. If a maple tree is bored carefully, it may be tapped for many years. The wood from maples is a special forest treasure, too. It makes great firewood and beautiful hardwood flooring and furniture.

























# Grades 7-9



See activity details on pages  
7-9-7 through 7-9-12.

## Calendar

<p>Create: Prepare the bulletin board background. Discuss: Forest regions of Minnesota.</p> 	<p>Look for: The "green tinge" in the tree canopy. Research: Forest-related jobs in the 1860s.</p> 	<p>Write: Job information cards for forest-related jobs in Activity 2. Post on bulletin board.</p> 	<p>Look for: Tulips and daffodils. Research: Modern-day forest-related jobs. Write: Job information cards.</p> 	<p>Discover: Forests in your own community. Define: Urban forest.</p> 
<p>Look for: Crab apple trees in bloom. Do: <i>Forest Puzzlers</i> Crossword. (Activity Sheet)</p> 	<p>Discuss: The many things trees bring to our lives.</p> 	<p>Research: The Hinckley Fire of 1894.</p> 	<p>Research: What do Minnesota forests produce today?</p> 	<p>Discover: Modern-day forestry careers. Listen: Guest speaker-Forestry-related worker.</p> 
<p>Research: Cambium cells. Create: A presentation about how a tree grows and cambium cells. Science/Art/Language Arts</p> 	<p>Look for: Leaves forming on sugar maple and red oak trees.</p> 	<p>Create: Continue to work on cambium presentations.</p> 	<p>Present: Cambium cell projects. <i>Fun Fact:</i> It is estimated that millions of trees in the world are accidentally planted by squirrels who bury nuts and then forget where they hid them. Science/Language Arts</p> 	<p>Look for: Lilac bushes and apple trees blossoming. <i>Fun Fact:</i> A large apple tree in full leaf may absorb as much as 95 gallons of water a day. Science</p> 
<p>Look for: Bees pollinating. Listen: Guest speaker-A historical society representative telling about the Interpretive History Center in Grand Rapids. History/Science</p> 	<p>Look for: Silver maple and elm tree seeds falling. Create: Natural dyes. Science/Art</p> 	<p>Look for: Bridal wreath blooming. Create: Dye fabric or clothes the "natural" way! Science/Art</p> 	<p>Discuss: Who owns and manages Minnesota forests? Science/Social Studies</p> 	<p>Look for: Monarch butterflies. Learn how to make a butterfly garden! Science</p> 

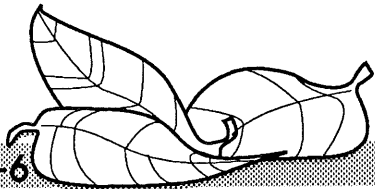
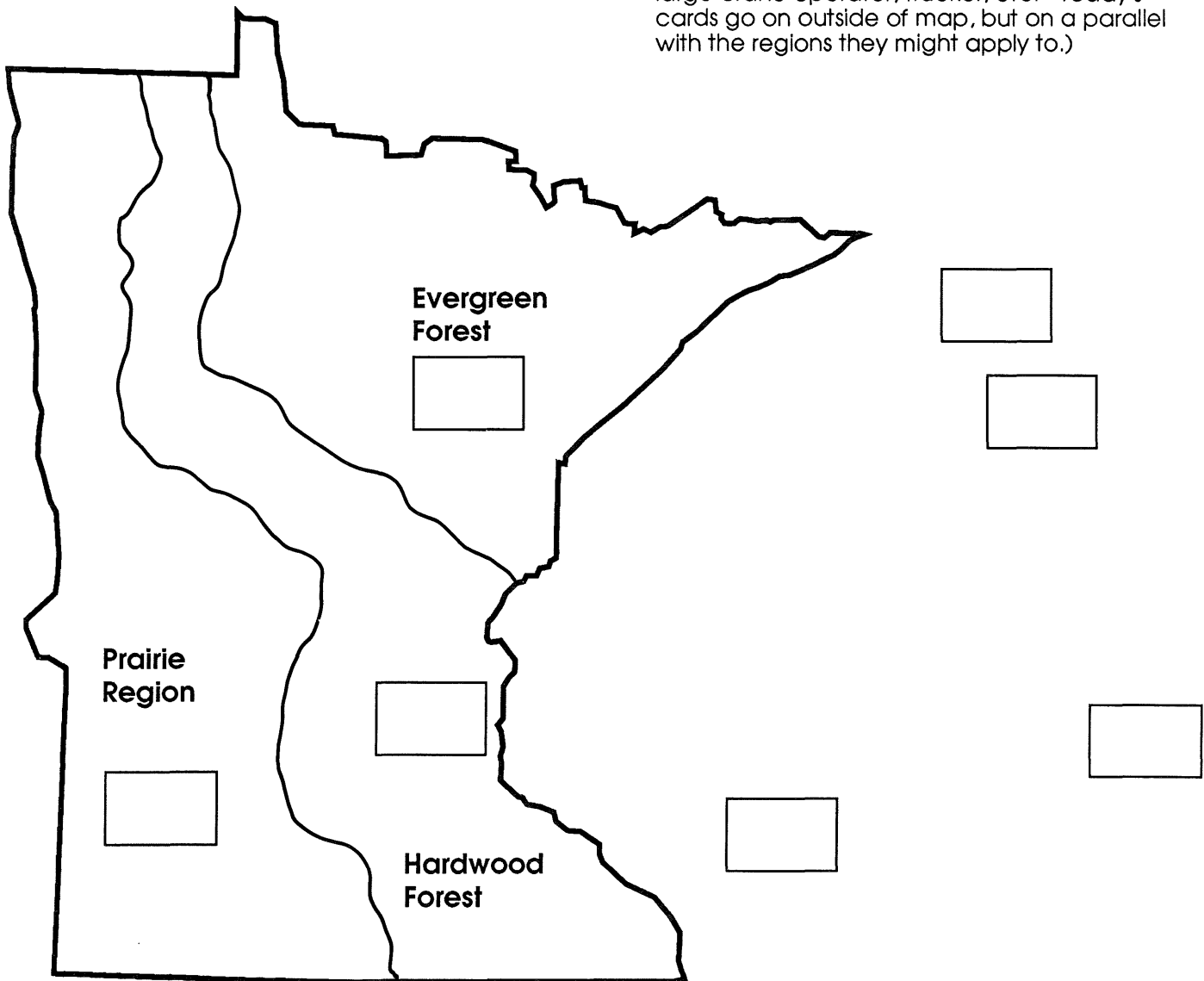
# Bulletin Board Idea

## Trees and Careers

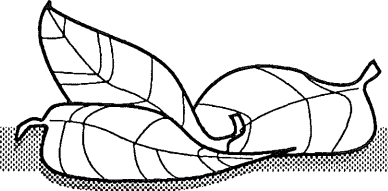
Students participate by preparing the background and drawing or painting a large map of the past forest regions of Minnesota. They research forest-related jobs in the 1860s and today, and add job information cards (and illustrations or pictures, if possible) to the bulletin board display.

**Job market of 1860** (Illustrate cards showing past forest-related jobs. These go right on the map.)

**Job market today** (Illustrate cards that show and tell about a forester, tree inspector, lumberjack, large crane operator, trucker, etc. "Today's" cards go on outside of map, but on a parallel with the regions they might apply to.)



# 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. See also the additional activities following the calendar activities list.

To complete the calendar activities during the month, collect or ask students to bring in the following: natural materials for dyes and utensils, fabrics or clothing to dye (Activities 17 and 18).

### Activity 1: Forest regions of Minnesota.

Students prepare the bulletin board by putting up background paper and drawing or painting a large map of the state of Minnesota. The map can be created on the background paper itself or on a separate sheet. Discuss the three past forest regions of Minnesota. During the week, students draw or paint the past forest regions onto the state outline.

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

Research jobs people might have had in the various forest regions in the 1860s.

### Activity 3: Forest jobs of the past.

Students write information on index cards about the jobs researched in Activity 2. Add drawings or pictures if desired. They attach the cards in the appropriate regions on the forest regions map.

### Activity 4: Look for: Tulips and daffodils.

Discuss the tree regions in Minnesota today. Research and discuss jobs that are related to trees in today's job market (forester, botanist, tree inspector, agronomist, tree farmer, florist, park service employee, lumber company worker, landscaper, artist, photographer, etc.). Make cards with illustrations to add to the bulletin board outside of the map area. (Historical cards are already on the map.)

### Activity 5: Discover the forests of your own community.

For city dwellers, what does **urban forest** mean?

Find out what portion of your county is forested, the kinds of trees that are generally cut and why, and the kinds of wood products made in your county.

List the different kinds of trees growing on the school grounds or around your home or farm. Group them by their growing preferences: i.e. lowland or highland, light or heavy soil, sunlight or shade, moist or dry soil, group or individual stands.

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

Do: *Forest Puzzler* Crossword-Activity Sheet A (pages 7-9-11 and 12)

**Answers to Forest Puzzler: Across**—3. acid rain, 8. redbacked, 11. erosion, 12. trees, 14. understory, 16. forest, 18. humus, 19. golden mouse, 21. fern, 22. porcupine, 24. recycle, 26. growth, 28. slug, 29. multiple use, 31. bark, 32. log, 34. needle, 35. canopy, 37. tropical, 38. cypress swamps, 40. broad, 41. polluted, 42. stork.

**Down**—1. fir, 2. hiking, 4. deforestation, 5. nest, 6. water, 7. northern spotted owl, 9. mushroom, 10. wood, 13. pines, 15. resource, 16. fur, 17. ruffed grouse, 19. ground beetle, 20. earthworms, 23. climate, 25. conifers, 27. salmon eggs, 28. snag, 30. decomposers, 31. boreal, 33. deciduous, 36. paper, 39. mixed.

### Activity 7: Trees are our friends in lots of ways.

Find out benefits of trees aside from their forest products. Trees do more than spruce up our space! 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—soil, water, air.**

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 regenerate 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 will protect it against Minnesota's penetrating winter winds and 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 significantly.

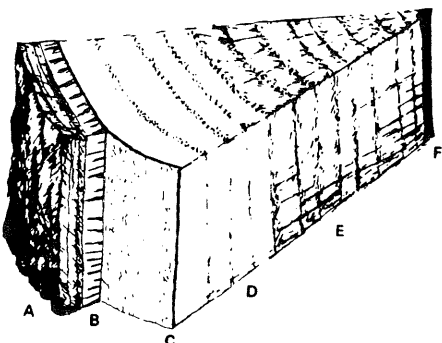
**Trees hold the soil and reduce erosion.** Water and wind erode more than enough tons of good topsoil each year from Minnesota's land to bury both sides of I-94 twelve feet under from Minneapolis to Miles City, Montana (704 miles). That's more than enough to fill 42 Metrodomes. Tree roots stabilize the soil to reduce or prevent erosion.

**Activity 8: Research: The Hinckley Fire of 1894.**  
If you need more information, write to the Fire Museum Curator, P.O. Box 40, Old Highway 61 South, Hinckley, MN 55037.

**Activity 9: What do Minnesota forests produce today?**  
Research to find out! Contact mills (see Resource list, page 5. See also Background Information section of this unit, page 7-9-1)

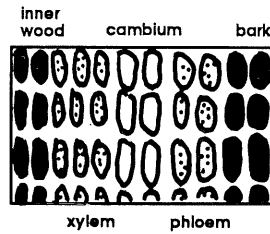
**Activity 10: Job opportunities.**  
Discuss the jobs in today's forestry market illustrated on the cards posted on the bulletin board set. If possible, have as a guest speaker someone who is employed in one of the jobs.

**Activity 11: Discover how trees grow.**  
Provide information about the cambium cells and how a tree grows (see Grade 1, page 1-2). Divide students into groups of three or four. Each group develops a way to visually show someone who does not understand the way the cambium cells divide - forming wood cells toward the center of the tree and bark cells toward the outside. Students might produce a video, drawings that move, transparencies, and models to teach this fascinating concept.

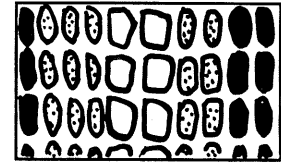


Cross section of tree reveals six distinct layers:  
A. bark  
B. phloem  
C. cambium  
D. xylem  
E. inner wood  
F. pith  
Every layer performs a vital function in growth.

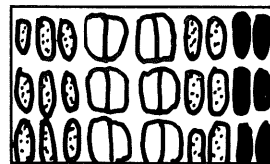
Beginning in spring, the cells in the cambium layer divide to form new cells. The new cells toward the outside of the tree form the phloem that carries sugar-rich sap from the leaves throughout the tree. Phloem eventually becomes bark. New cells toward the inside of the tree form xylem, which carries water and minerals up the tree from the root system. Xylem eventually becomes wood. Growth that makes a tree larger in width takes place at the cambium layer. Growth that makes the limbs and roots longer and trees taller takes place at the branch tips (buds) and root tips.



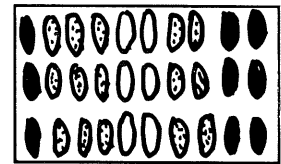
1. Cambium cells can be found between the inner wood and xylem, and the phloem and bark (moving from inside the tree out). The cambium is visible with a magnifying glass.



2. Growth widens tree trunks, limbs, and roots.



3. Then cambium cells divide, forming xylem cells toward the center of the tree and phloem toward the outside.



4. The new cambium cells begin the growth process again.

**Activity 12: Look for: Leaves forming on sugar maple and red oak trees.**

Groups continue to work on their presentations from Activity 11.

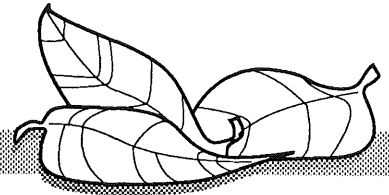
**Activity 13: Continue cambium projects.**

Groups continue to work on their presentations from Activity 11. If some are ready to present their projects, they can do so.

**Activity 14: Continue to show presentations developed in Activity 11.**

*Fun Fact:* It is estimated that millions of trees in the world are planted by squirrels who bury nuts and then forget where they hid them.

**Activity 15: Look for: Lilac bushes and apple trees blossoming.**



**Fun Fact:** Trees require enormous quantities of water. A large apple tree in full leaf may absorb as much as 95 gallons of water from the soil every day. Most of the water goes to the leaves. On a sunny summer day, some trees move water up through their trunks at the rate of three feet per minute. A tree's wood is about half water.

**Activity 16:** Look for: Bees pollinating.

**Guest speaker:** A person from the Minnesota Historical Society to speak to the class about the Interpretive History Center in Grand Rapids.

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

**Art: Nature's Palette-Dyes.** Making dyes, inks, and art materials from natural materials is easy and fun. At the same time, you can learn a lot about conservation and safety. A nature hike is an opportunity to collect some of the things. Others can be found in the kitchen, grocery store, and greenhouse.

In nature, don't take any materials whose removal would harm the environment in which it was found, and be sure not to collect plants that are protected by the law. Check with an adult to be certain no poisonous plants are collected. And play it safe by making tasting of wild plants and berries off limits!

**Colors and Sources.** *Yellow:* brown onion skins, marigold and goldenrod blossoms, sunflower petals; *orange:* roots, bark, leaves from sassafras; *bluish purple:* grapes or grape juice, blueberries, blackberries, raspberries; *green:* plantain leaves and roots "boiled," spinach leaves; *brown:* tea bags, bark, instant coffee, black walnut husks.

**Preparation.** Chop all materials into small pieces. Prepare each color separately—one part plant material to one part water. Add one tablespoon white vinegar to each pint of dye to help keep colors from fading. Bring to a boil, then simmer for about an hour. Add more water if needed. Cool and let sit overnight for brighter colors. Strain the dye through a strainer or cheesecloth.

**Activity 18:** Look for: Bridal wreath blooming.

Dip into your dyes:

**Fabric Dyeing.** Choose natural fabrics such as cotton, flannel, or linen. Garments such as washed cotton T-shirts can also be dyed. Wet

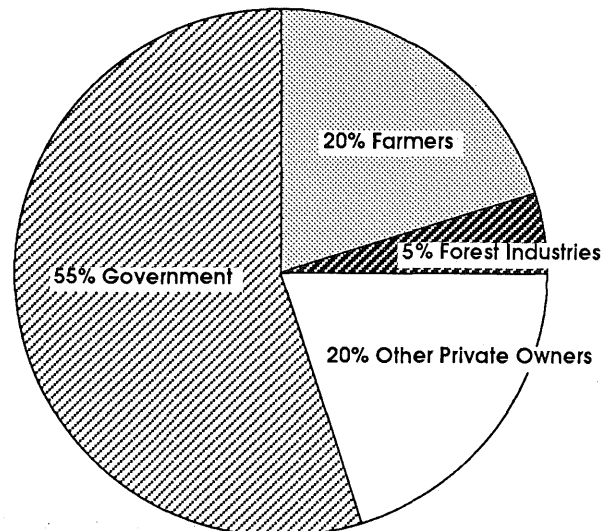
the fabric in water; squeeze out the excess. Put the fabric in the dye; stir to distribute color evenly. Leave in the dye until it's a shade darker than the color you want—it will dry lighter. Soaking time varies for fabric and dye color. Remove and squeeze, then rinse gently in clear, cool water. (Too much rinsing dulls the color!) Hang to dry in a shady spot. Make wall hangings, dresser scarves, headbands, wristbands, pillow covers, etc. with your fabric.

**Art.** Use your dyes for paints and inks in creating art projects. Store in airtight containers.

**Wildlife Treat.** Leftover dyes or material particles strained out of the dyes are a natural treat for wildlife!

**Activity 19:** Discuss: Who owns and manages Minnesota forests?

Minnesota now has 16.7 million acres of forest land. Approximately 13.7 million acres are considered fit for raising commercial tree crops. About 55 percent of the forests are managed by public agencies of the federal, state, and county governments; farmers own 20 percent; other small owners own 20 percent; and 5 percent is owned and managed by our forest industries.



**Activity 20:** Look for: Monarch butterflies.

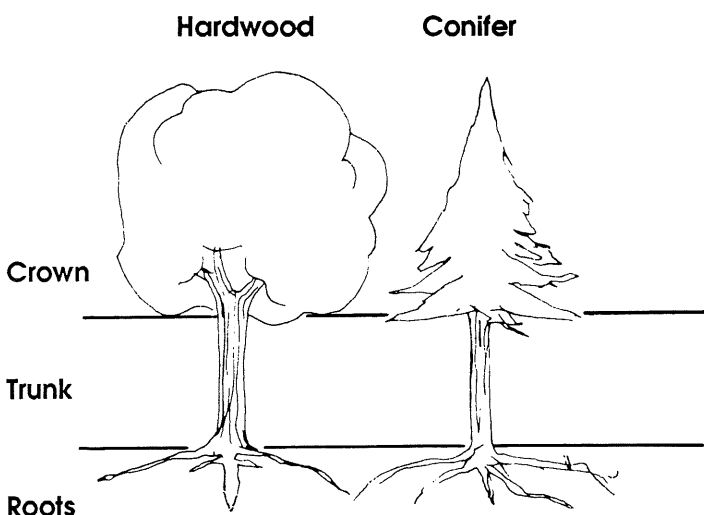
Consider creating a community or home butterfly garden. (See Appendix pages 8 and 9.)

# More Activity Fun

First, discuss the hardwood and conifer material in the "Background Information" section of this unit with your students.

1. **Model Trees.** Build a model hardwood or conifer tree showing the crown, trunk, roots, and any other parts you want.

The model might be made of plywood, lumber, styrofoam, cardboard, or craft paper. Glue sandpaper on the back of each piece for a flannelboard talk or demonstration.

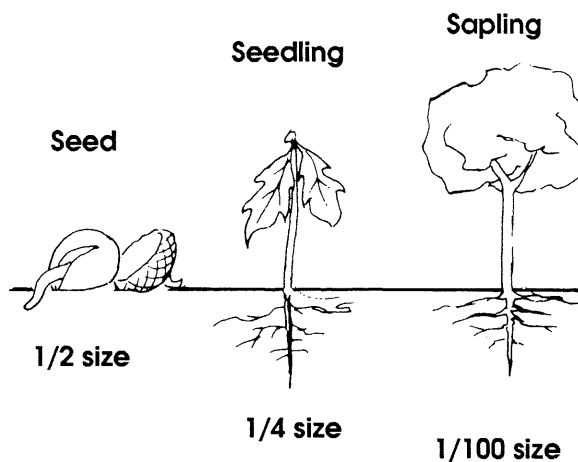


Label each part and describe the functions of each part of the tree, relating them to the environment, such as soil, water, air, temperature, and wind.

2. **Tree Growth.** Show how a tree grows from seed to maturity. Use models or actual parts of trees that you have collected.

Show the relationship of various parts of the growing tree to its environment including cooperation and competition with other plants (flora) or animals (fauna).

Observe the differences in growth and form between a hardwood and a conifer or between different hardwoods or conifers. Show how these occur in nature, and with the aid of books on trees, describe these differences in your project.



3. **From Seed to Sapling.** One of the best ways to observe the growth of various parts of a tree or plant is to plant a seed and observe the differences each day as this seed starts to grow (germinates) and develops into a seedling. You could observe similar growth with a bean seed, which germinates faster than a tree seed. Remember that most plants have roots, a stem, and leaves, and these may all be observed in this simple project.

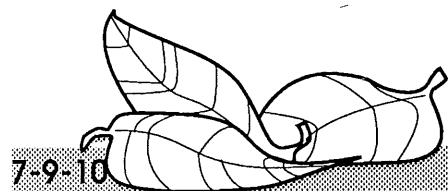
## Field Trips

1. Visit your county historical museums and see records, tools, and accounts dealing with the early history of logging, land-clearing, and forestry.

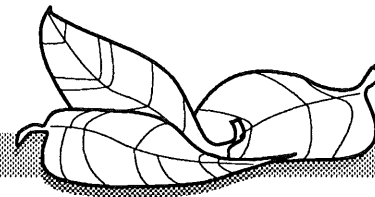
2. Visit a lumberyard, sawmill, pulp mill, or other wood-using industry. Call beforehand to arrange a tour.

3. Check your local grocery store, furniture dealer, etc., for products made from trees. Compile a list and report back to class.

*From "Forestry for Minnesota Schools," available from Minnesota Education Association, 41 Sherburne Avenue, St. Paul, Minnesota 55103. Reprinted with permission.*



# Forest Puzzler



This puzzle reviews the information presented throughout this book plus some things that may need to be researched. To make it easier for your students, list the puzzle words on the board. The answers are in Activity 6 on page 7-9-7.

## Across

3. A form of air pollution called \_\_\_\_\_ is a serious threat to forests.
8. The \_\_\_\_\_ salamander lives in northern mixed forests. It gets its name from the stripe on its back.
11. Because the roots of trees hold soil in place, forests help prevent \_\_\_\_\_.
12. Both the oldest and largest organisms in the world are \_\_\_\_\_.
14. The middle layer of the forest is called the \_\_\_\_\_.
16. A \_\_\_\_\_ is a community of trees and other plants, and of animals.
18. Decaying plant and animal matter in the soil is called \_\_\_\_\_.
19. A long tail helps the \_\_\_\_\_ balance as it scampers along branches and vines in the forest.
21. \_\_\_\_\_s, mosses, and lichens are plants that often grow on the forest floor.
22. The \_\_\_\_\_ is a prickly mammal that feeds on bark and other tree parts.
24. When you \_\_\_\_\_ your old newspapers, you're helping to conserve forest resources.
26. An old-\_\_\_\_\_ forest has many old, large trees. This type of forest also contains many snags and fallen logs.
28. A slimy, yellow invertebrate called the banana \_\_\_\_\_ lives in Pacific Coastal forests.
29. When people manage forests for more than one use at a time, they are practicing \_\_\_\_\_-\_\_\_\_\_ management.
31. A tree's \_\_\_\_\_ helps protect it from insects and disease.
32. A fallen tree, or \_\_\_\_\_, provides nutrients for insects, fungi, and other forest organisms.
34. Pines and spruces are types of \_\_\_\_\_-leaved trees.
35. The leaves and branches of a forest's tallest trees form its \_\_\_\_\_ layer.
37. \_\_\_\_\_ rain forests grow near the equator, where it is warm and where there is plenty of rain year round.
38. Many southern \_\_\_\_\_ have been drained to provide land for crops and homes.
40. Maples and elms are types of \_\_\_\_\_-leaved trees.
41. Forests can help clean \_\_\_\_\_ air and water.
42. The wood \_\_\_\_\_, which nests in cypress swamps, is an endangered bird.

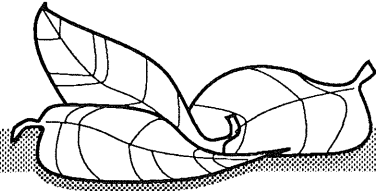
## Down

1. A type of conifer called the subalpine \_\_\_\_\_ grows near icy mountain peaks.
2. Camping, birdwatching, and \_\_\_\_\_ are all recreational activities that you can enjoy in a forest.
4. \_\_\_\_\_, or the process of clearing away trees, is occurring in many of the world's tropical forests.
5. Western tanagers \_\_\_\_\_ in conifers or oaks.
6. The \_\_\_\_\_ moccasin lives in cypress swamps and feeds on fish, frogs, and other swamp creatures.
7. The \_\_\_\_\_, a bird of prey, lives in old-growth forests.
9. Many large, brightly colored \_\_\_\_\_s grow on the damp boreal forest floor.
10. \_\_\_\_\_ is a forest product we use to build homes and make paper.
13. Loblolly and shortleaf \_\_\_\_\_ which grow in the southern United States furnish about one third of the timber produced in this country.
15. Forests are a renewable \_\_\_\_\_, which means they won't "run out" if they are properly managed.
16. Its thick \_\_\_\_\_ coat helps the pine marten withstand the cold winter temperatures of the northern mixed forest.
17. The male \_\_\_\_\_ jumps up on forest logs and drums to attract females.
19. With its strong jaws, the \_\_\_\_\_ can crush insects and other prey easily.
20. Many \_\_\_\_\_ live in the forest soil. If it rains, you may see them wiggle their way to the surface.
23. A region's \_\_\_\_\_, elevation, and soil affect what type of forest grows there.
25. Trees that bear their seeds in cones are called \_\_\_\_\_.
27. \_\_\_\_\_ are found in many streams in the Pacific Northwest. If too much silt and debris get into the water, these tiny fish embryos may be damaged.
28. A standing, dead tree, called a \_\_\_\_\_, can be a home to many animals.
30. Animals and plants that break down dead matter into smaller parts are called \_\_\_\_\_.
31. \_\_\_\_\_ forests grow in cold, northern regions.
33. Each year at a certain time, \_\_\_\_\_ trees lose all their leaves.
36. This page is made of \_\_\_\_\_, a forest product.
39. Growing between the deciduous and boreal forests, the northern \_\_\_\_\_ forest contains both conifers and deciduous trees.

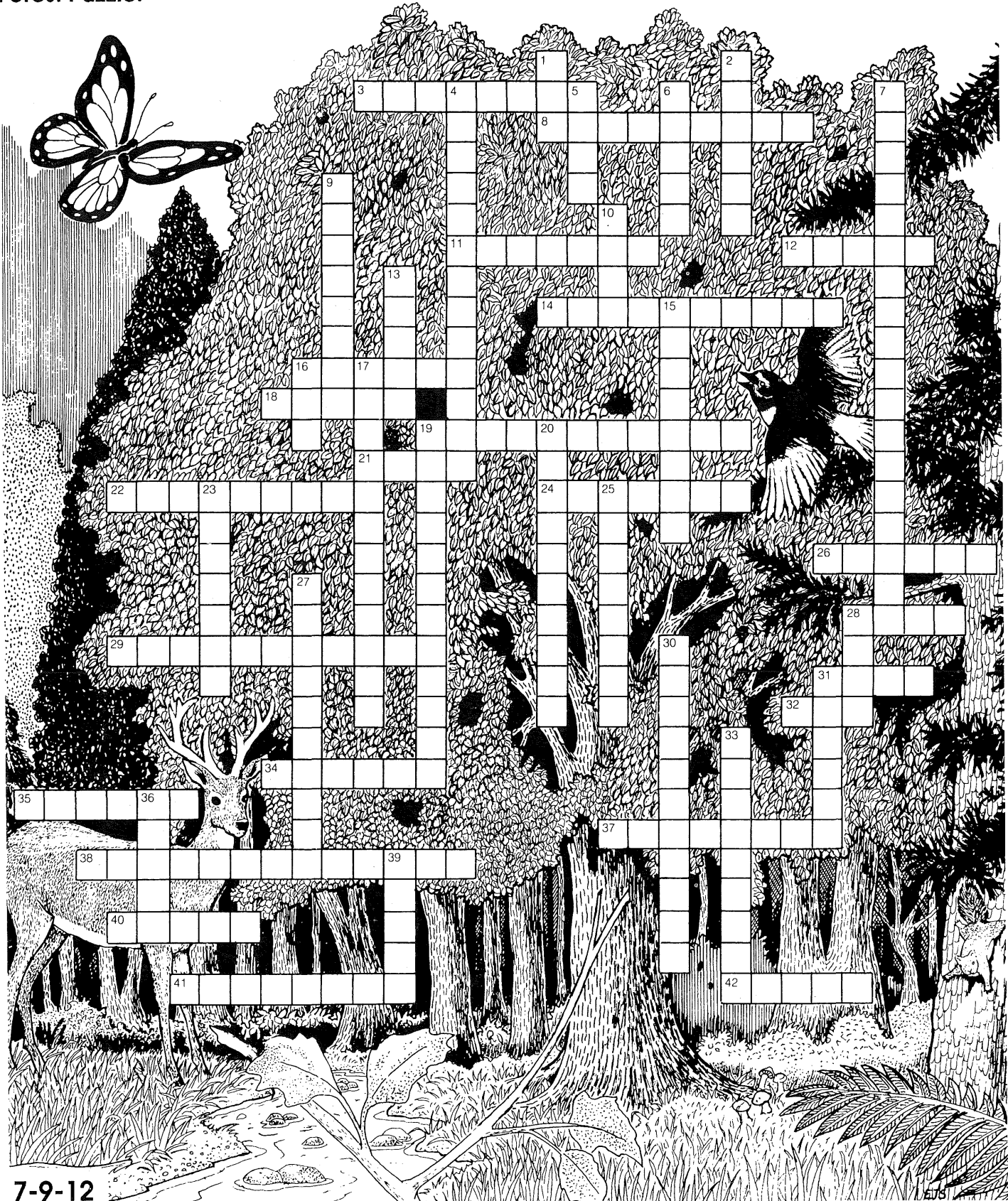
*Adapted from the National Wildlife Federation's "Forests are More Than Trees."*



# Activity Sheet A



## Forest Puzzler





# Appendix

## Let's Plant A Tree



### Background Information

#### Why do we need to plant trees?

All it takes is to look at a tree, or to sit under one on a hot summer day, to appreciate this unique plant. A tree is a beautiful living thing. Our peace of mind, our emotions, and our spirits are affected by what our eyes see. The pleasing look of trees makes them one of the most important, beautiful things in our environment.

But we receive many benefits from trees other than those we see. Trees make important contributions to the ecology and economy of our wilderness, rural, and urban areas.

Forests protect the water supply by preventing run-off and erosion. They also purify the air, provide habitat for wildlife, and occupy places where we can go to "get away from it all" by camping, hiking, and skiing.

Commercial forests in our state provide the nation with hundreds of tree products, including paper, film, turpentine, plastics, and many chemicals. Minnesota's forest industries make an important contribution to the state's economy.

In places where proper ground cover is lacking, rural areas in the United States lose over one billion dollars worth of precious topsoil every year. The planting of field windbreaks and farmstead shelterbelts in rural Minnesota helps prevent this kind of costly erosion in our state. Windbreaks and shelterbelts also reduce the effects of summer and winter winds on humans and animals; cut down on heating costs in homes; protect feedlots, gardens, orchards, and crops; and beautify homes and farmsteads.

Trees make commercial and residential areas in Minnesota's cities and towns more beautiful and valuable. But they do much more than



make our urban areas pleasant places to live. Trees are one of nature's most efficient dust traps. Their leafy surfaces keep a steady flow of dust and dirt from saturating the air we breathe. They relieve sound pollution by breaking up and reducing sound waves; tests have shown that proper landscaping can reduce traffic noise, too. Trees keep cooling costs down in summer, and so conserve precious energy resources. They absorb carbon dioxide from the atmosphere and give off oxygen.

In a single day, each of us inhales 35 pounds of oxygen - and we get it all from green plants on land and vegetation in the sea. Planting trees is not only a matter of comfort, beauty, and economy. They help us survive!

#### How we plant a tree.

Scope out a site in your yard. Check with your parents first. (If you are unable to plant in your yard, contact your city offices to see about planting on the boulevard or at a local park. Other possibilities might be your church, school, or parents' office. In any case, be sure to get approval from the person in charge.) **Call the Gopher State utility hotline and get help from an expert to locate buried electric, gas, or other utility lines.**

Call: TWIN CITIES, 454-0002  
Greater MN, 1-800-252-1166

While waiting for the utility locator to do his/her job, try to select a tree that will grow well on the site you've selected. Consider the soil type. Is it sandy and well drained? Or heavy clay, and so perhaps wet and possibly compacted? Be sure to choose a tree that will grow in the soils of your site. For help, check with your local nursery or garden center, city forester or tree inspector, DNR Private Forest Management forester, county extension agent or Soil and Water Conservation District technician.

## Where can you get trees?

There are many possibilities! Your local nursery or garden center will have both large and small trees. Make sure the trees are Minnesota grown so you know they are acclimated to Minnesota's harsh winter weather.

Low cost seedlings are available from the Minnesota Forestry Association. Seedlings are 8-12" tall and are grown in a soil plug to assure survival during transport. Seedlings are 45 cents a piece; minimum order is 25 per species. You can choose among red pine, white spruce, or blue spruce. For ordering information write or call

Minnesota Forestry Association  
220 First Avenue NW, Room 210  
Grand Rapids, MN 55744  
(218)326-1239

Tree planting programs are available that may help you, too. The Soil and Water Conservation Districts across Minnesota have local programs to help plant trees for soil and wind erosion control or reforestation. Seedlings are available at a low cost through this program. For more information, look for "Soil and Water Conservation District" under your county offices in the blue section of the white pages telephone book. The Minnesota DNR sells seedlings in large quantities. For more information, contact your local DNR Forestry office.

## Planting your trees

When choosing and planting a tree, remember there are a number of different growing regions in Minnesota (see Minnesota's Forest Regions map, page 13.) Some species of trees do better in one region than another. Before choosing a tree, find out what kinds of trees do well in your part of the state, and also at your chosen planting site.

The root systems of both seedlings and saplings must be protected before the trees are planted. If the seedlings are bare root, they must be kept in water, and not exposed to wind and warm temperatures for more than 3 to 5 minutes before they are planted, or the roots will be damaged.

containers or large clumps of dirt that are surrounded by burlap. Some saplings are purchased bare root, however. All young trees, especially the bare root trees, must be protected from extreme hot and cold. Their roots must not be allowed to dry out.

It's important to plant your trees properly. The Arbor Day kids show proper planting techniques on page 3 of this section.

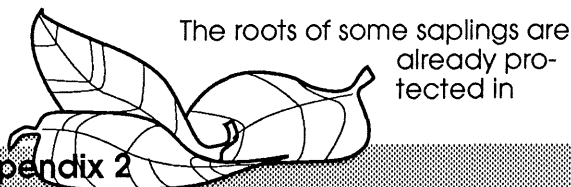
Trees are living things that need your care and protection. They need to be mulched and watered regularly after planting, too.

## Resource

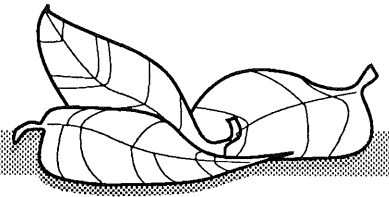
"Tree Owner's Manual" by the Minnesota Department of Agriculture, Shade Tree Program. This excellent manual is new in 1990. "Tree Owner's Manual" is a 24-page guide to proper tree selection, planting, and care. The manual is packed with the latest information that any prospective tree owner will want to have as a reference. To get your copy send \$1.20 (plus 6% sales tax) to:

Distribution Center  
Room 3, Coffey Hall  
1420 Eckles Avenue  
St. Paul, Minnesota 55108

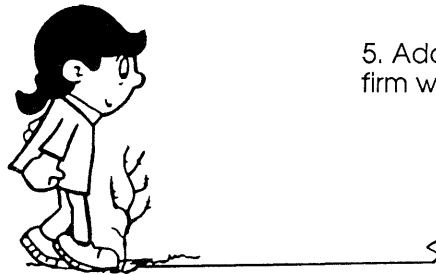
Ask for the "Tree Owner's Manual," catalog number AG-M1-3898.



# How To Plant A Tree



1. Choose a proper location for your tree. Don't forget its ADULT size.



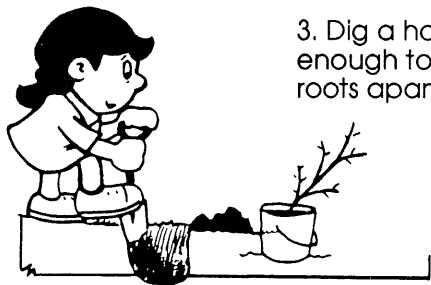
5. Add more soil and firm with foot.



2. Keep your roots moist at all times. Dry roots die.



6. Mulch with wood chips.



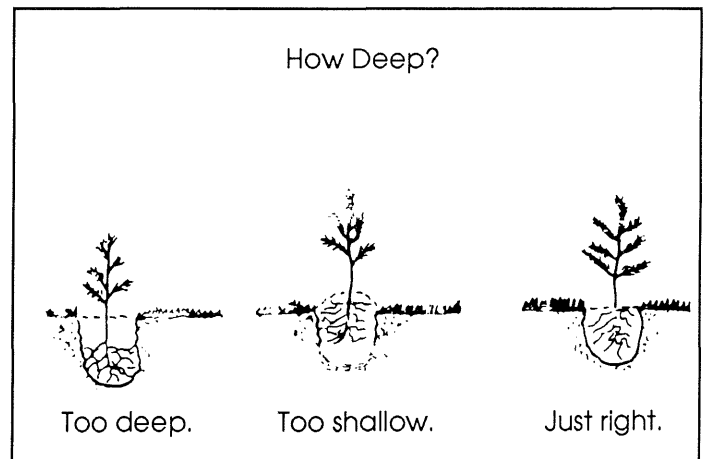
3. Dig a hole large enough to spread the roots apart.



7. Water regularly.  
\*Wait for shade!



4. Place the tree in the hole at the proper depth. (See "How Deep" illustration.) Gently add loose soil.



\*What care besides watering will your tree need in the months and years to come? (Protection from damage-people, animals, machines like lawnmowers, wind, disease, smothering by grass and groundcover, etc.) How will the tree get this protection?

# Trees Throughout the Seasons

Most of the activities in this guide book are geared toward spring. They're things you can do in connection with your Arbor Day or Arbor Month celebrations.

Trees offer fascinating learning opportunities all year long, however. Don't miss out on the other seasons! The following pages take you "through the year" with trees. Another year, you may want to make trees a whole-year learning adventure. A suggested on-going activity is to have students "adopt" trees that they can identify and observe through all the seasons. Each student creates a scrapbook about his or her tree and how it changes through the seasons.

If individual student scrapbooks don't fit easily into your school program, scan and choose other activities as each season arrives. Some activities are interchangeable from season to season. Your students will develop new interests in trees along with better scientific observation skills. You'll probably discover a lot of new things about those intriguing giant plants yourself!

## Trees Throughout The School Year

1. Starting in the fall, encourage each student to make a scrapbook called "My Adopted Tree." The scrapbook should have a strong cover so it will last all year. Each time a new drawing or project is completed, it goes into the scrapbook. Display the books for all to enjoy during Arbor Month. Students bring them home at the end of the year.

2. Once each season, each student draws a detailed picture of his or her tree, including all changes and at least six objects found in its environment (flowers, birds, animals, rocks, snow, seeds, grass, etc.).

3. Ask: What animals or insects can be seen near or on your tree during each season? Look in crevices of the bark, on the leaves, along the bottom of the trunk, and on branches and twigs. Make a picture list of the things you see each season.

## Challenging Students:

1. Close your eyes. What sounds do you hear around your tree? What do you smell around your tree? What do you feel on and around your tree? Open your eyes. What do you see around your tree?

2. Choose a dead or nearly dead tree to compare with yours. How are they the same? How are they different?

3. Take seasonal photographs of three or four different kinds of trees. Put them in school-year order and compare them at the end of the school year. Make a bulletin board display of your photographs.

4. How has your tree changed? Be sure to ask this question each season.

## Autumn Questions And Activities:

1. Ask each child to "adopt" a tree to observe and learn about all year long.

2. Take a leaf from your tree back to the classroom. Examine it with a magnifying glass. What do you see? Iron it between two pieces of wax paper and place it in your scrapbook.

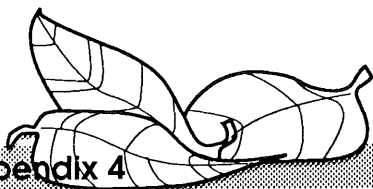
3. Are there holes in some of the leaves on your tree? Why? What has been eating them?

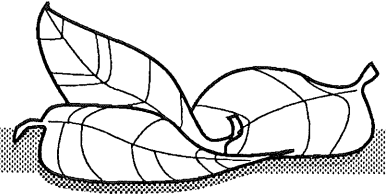
4. What is inside leaves to make them green? (Chlorophyll).

5. Why do leaves change color in fall? (The chlorophyll disappears from the leaf as the days become shorter. The yellow, orange, red, and brown pigments that are also in the leaf now show through.)

6. Why do leaves fall off the trees in autumn? (When the leaves are not producing food, they dry up and lose their hold on the branches. The wind blows them off.)

7. How much time has passed between the first color changes in the leaves of your tree and the time the tree is left bare?





### Summer Questions And Activities:

1. If they haven't already done so, ask each child to "adopt" a tree to observe and learn about all year.

2. How is your tree like the others? How is it different?

3. Is your tree dead or alive?

4. Are there any nests in your tree? Why is it a good place for a nest? (The branches hold the nest in place. The nest is hidden and out of reach of many enemies.)

5. Are there many plants growing under your tree?

6. Are there more leaves on one side of the tree than on the other? Why? (The tree may get more sun on one side.)

7. Do you see buds near the leaves of your tree? When are buds for the next season's leaves made? (At the same time as leaves and new shoots, during elongation in spring.) When will these buds grow into leaves?

8. Take two leaves from your tree back to class. Examine them with a magnifying glass. Try to match your leaves to the leaf pictures in a tree identification book. What kind of tree is your tree?

9. Iron a leaf from your tree between two pieces of wax paper and place it in your "My Adopted Tree" scrapbook.

10. Make a leaf print with the other leaf from your tree. Place the leaf on newspaper. Brush the leaf with ink or paint. Move the leaf to a clean newspaper. Place a porous paper over the leaf and rub gently to transfer the ink or paint from plant to paper. Let the paint dry, and place the print in the scrapbook.

11. Gather a small piece of bark, a twig, a seed from your tree, and a small plastic bag of soil from under your tree (use a large spoon or trowel). Mount all these on a piece of heavy paper and place them in your scrapbook.

12. Take two temperature readings, one under your tree and the other away from its shade. How much do they differ? (Note: When

taking a temperature in the sun, shade the bulb of the thermometer.)

13. Does there seem to be a breeze under your tree when there isn't any away from its shade? Why? (The cool air under the tree is heavy and pushes the warm air away as it sinks to the ground.)

### Evaluation - (If A Year-Long Project)

Your evaluation of each student's skills and conceptual developments should be guided by the contents of "My Adopted Tree" scrapbooks, responses to questions, and participation in discussions. The questions listed below are designed to help you make good subjective evaluations. You'll need to adapt the questions to meet your students' age level.

- a. How well did the student follow directions?
- b. How much direction did the student require?
- c. Did the student formulate new questions?
- d. Did the student design new experiments to answer these questions?
- e. Did the student recognize cause and effect relationships?
- f. Could the student state the problem to be solved?
- g. Did the student arrive at conclusions by himself or herself?
- h. How many characteristics of his or her tree did the student identify?
- i. Could the student describe enjoyable and useful ways of using trees?
- j. Did the student compare and contrast the characteristics of his or her tree with those of other trees?
- k. Could the student predict the outcome of his or her investigations?
- l. Could the student predict changes in his or her tree?
- m. How well did the student use his or her five senses?

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# Planting With A Purpose: A Butterfly Garden

Arbor Month isn't just a time to honor trees. It's for celebrating and planting all kinds of things...shrubs, ground cover, sod, garden plants, flowers, and more.

Are you in the mood for a unique and different reason for planting...one that will be beautiful itself and will attract a host of interesting new wildlife to your yard? Try a butterfly garden!

## Planning...and Planting...for Guests!

Wild animals—including insects—have four basic needs for survival: food, water, shelter, and shade. Keep these needs in mind as you plant and all sorts of wild creatures will come to your garden—even though it's primarily a butterfly garden.

Midwesterners enjoy an incredible variety of beautiful butterflies—at least 200 species. Among the most common are the monarch, painted lady, comma, redspotted purple, tiger swallowtail, red admiral, cabbage butterflies, and several species of blues. Two types of food are necessary for butterflies—*food for caterpillars* and *nectar sources for adult butterflies*.

At least 175 different plants are food sources for various butterfly caterpillars in the Midwest. The list includes trees (such as birch, aspen, willow), grasses and legumes, milkweed and flowering plants such as those shown on your butterfly garden map. Some of the best butterfly sources are dogbanes, milkweed, thistles, goldenrod, peppermint, and red clover. Butterflies like plants with flat-topped flowering heads. Single-flowered blossoms are better than double-flowered blossoms because nectar is more accessible.

Because their needs are similar to those of butterflies, bees and moths may be attracted to your butterfly garden. Early-spring blossoming plants that are available when they first emerge from their hives are important to bees.

## Digging In

1. **First, select a good site** for your garden. Full sun for at least several hours a day is best. Consult with the county extension office, Soil Conservation Service, or local garden center if you need to learn more about

the soil or drainage in your planting site. Good knowledge of your soil and site conditions is important because it influences your choices about which plants to use. Your county extension service can perform inexpensive soil tests for you. Once you know the soil types, a garden center or seed source can help you match plants to your soil and sell you the seeds you need. If some of the seeds on the garden map aren't available, substitute with dill, asters, sunflowers, violets, parsley, or petunias. Consider both annuals (plants that live through a single growing season) and biennials/perennials (species that come up two or more years without replanting). Sometimes, you can transplant wild plants into your garden from their natural settings.

2. **Work up your soil** with a roto tiller or by hand until it is smooth and finely textured. Use the size proportions on your garden map, or adapt the map to fit your space.

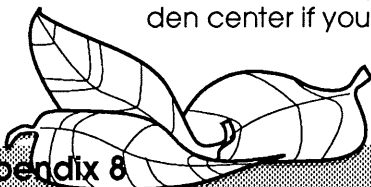
3. **Plant the seeds**, following directions for each species.

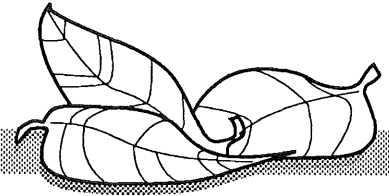
4. **Water daily at first.** After the garden is established, water as necessary to keep moist.

5. **Enjoy!** Watch carefully for wildlife visitors. Keep binoculars and magnifying glasses handy for a close-up view of your guests. You'll want a camera, too; a zoom-lens model is ideal. Your garden will be a neighborhood meeting place for all sorts of fascinating creatures!

## Resource

"*Landscaping For Wildlife*," by Carroll Henderson; Nongame Wildlife Program, Section of Wildlife, Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, MN 55155-4007. The information for your butterfly garden was adapted from this source. To order, contact: Minnesota's Bookstore  
117 University Avenue  
St. Paul, MN 55155  
(612) 297-3000 or 1-800-652-9747





### Summer Questions And Activities:

1. If they haven't already done so, ask each child to "adopt" a tree to observe and learn about all year.

2. How is your tree like the others? How is it different?

3. Is your tree dead or alive?

4. Are there any nests in your tree? Why is it a good place for a nest? (The branches hold the nest in place. The nest is hidden and out of reach of many enemies.)

5. Are there many plants growing under your tree?

6. Are there more leaves on one side of the tree than on the other? Why? (The tree may get more sun on one side.)

7. Do you see buds near the leaves of your tree? When are buds for the next season's leaves made? (At the same time as leaves and new shoots, during elongation in spring.) When will these buds grow into leaves?

8. Take two leaves from your tree back to class. Examine them with a magnifying glass. Try to match your leaves to the leaf pictures in a tree identification book. What kind of tree is your tree?

9. Iron a leaf from your tree between two pieces of wax paper and place it in your "My Adopted Tree" scrapbook.

10. Make a leaf print with the other leaf from your tree. Place the leaf on newspaper. Brush the leaf with ink or paint. Move the leaf to a clean newspaper. Place a porous paper over the leaf and rub gently to transfer the ink or paint from plant to paper. Let the paint dry, and place the print in the scrapbook.

11. Gather a small piece of bark, a twig, a seed from your tree, and a small plastic bag of soil from under your tree (use a large spoon or trowel). Mount all these on a piece of heavy paper and place them in your scrapbook.

12. Take two temperature readings, one under your tree and the other away from its shade. How much do they differ? (Note: When

taking a temperature in the sun, shade the bulb of the thermometer.)

13. Does there seem to be a breeze under your tree when there isn't any away from its shade? Why? (The cool air under the tree is heavy and pushes the warm air away as it sinks to the ground.)

### Evaluation - (If A Year-Long Project)

Your evaluation of each student's skills and conceptual developments should be guided by the contents of "My Adopted Tree" scrapbooks, responses to questions, and participation in discussions. The questions listed below are designed to help you make good subjective evaluations. You'll need to adapt the questions to meet your students' age level.

- a. How well did the student follow directions?
- b. How much direction did the student require?
- c. Did the student formulate new questions?
- d. Did the student design new experiments to answer these questions?
- e. Did the student recognize cause and effect relationships?
- f. Could the student state the problem to be solved?
- g. Did the student arrive at conclusions by himself or herself?
- h. How many characteristics of his or her tree did the student identify?
- i. Could the student describe enjoyable and useful ways of using trees?
- j. Did the student compare and contrast the characteristics of his or her tree with those of other trees?
- k. Could the student predict the outcome of his or her investigations?
- l. Could the student predict changes in his or her tree?
- m. How well did the student use his or her five senses?

*Reprinted with permission from the Minnesota Department of Education and the Minnesota Department of Natural Resources.*

# Planting With A Purpose: A Butterfly Garden

Arbor Month isn't just a time to honor trees. It's for celebrating and planting all kinds of things...shrubs, ground cover, sod, garden plants, flowers, and more.

Are you in the mood for a unique and different reason for planting...one that will be beautiful itself and will attract a host of interesting new wildlife to your yard? Try a butterfly garden!

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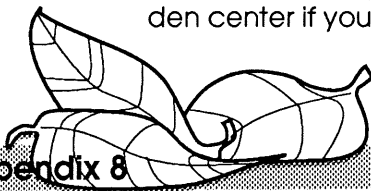
3. **Plant the seeds**, following directions for each species.

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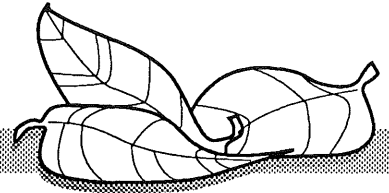
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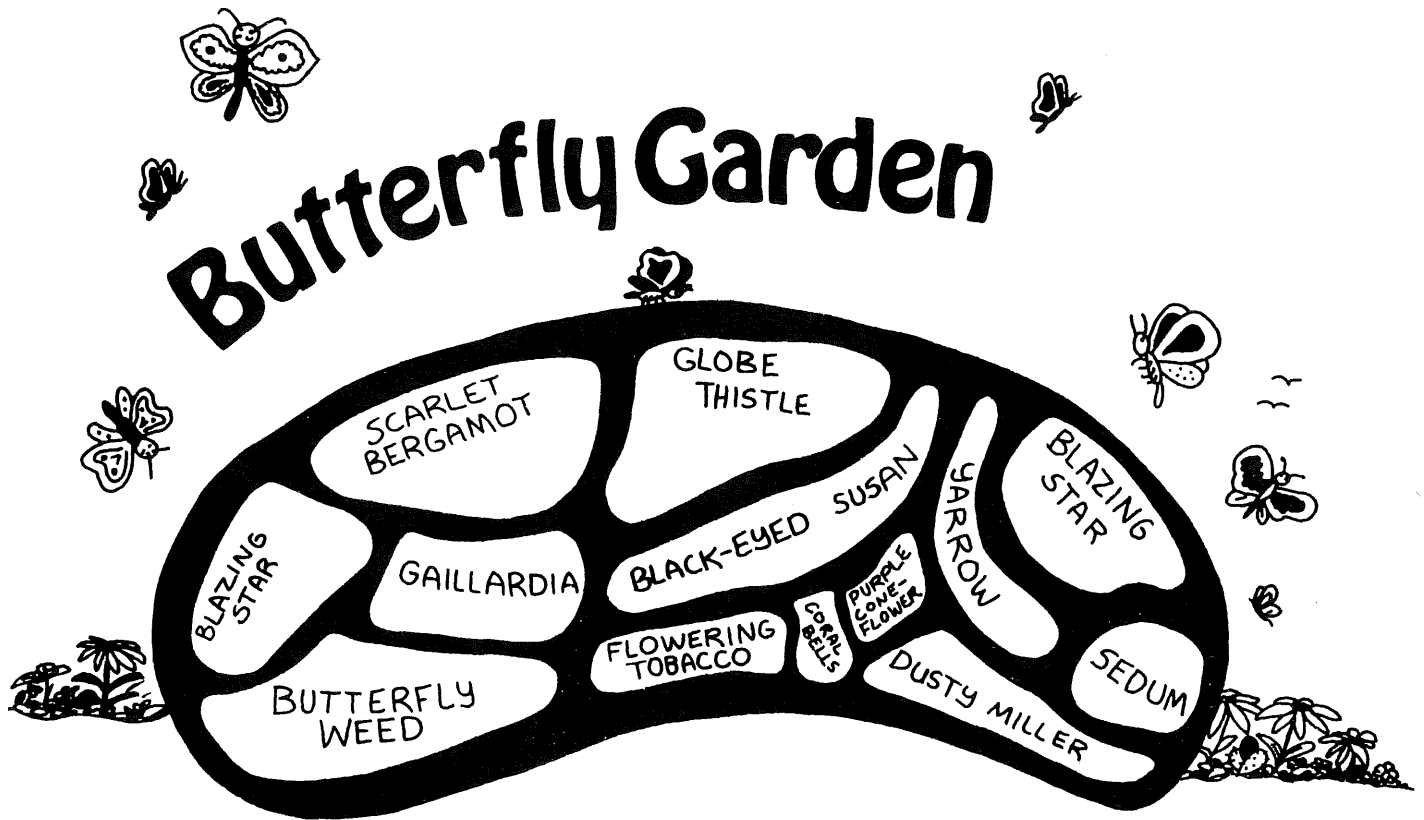


# Butterfly Garden



Butterfly garden designed by Carrol Henderson, Minnesota Department of Natural Resources, Division of Wildlife.

Found in: "Landscaping for Wildlife." To order this book, refer to previous page.



# From Paper to Plastic

It's hard to imagine what life would be like without trees. We use them to make everything from cardboard to chewing gum. In this activity your students can discover just how big a role trees play in their everyday lives.

First pass out a copy of Appendix page 12 to each student. Tell them that there are more than 40 things in the picture that are made, in some way, from trees. Have them use pencils to circle all the "tree objects" they can find. Afterward, discuss their answers using the following information. Then invite students to color the picture.

## Putting Tree To Work

### Building with Wood:

People build a lot of different things with wood. When logs are brought to the sawmill, their bark is removed and they are carefully measured and cut into lumber. Most lumber is used to construct houses and other buildings. Some is used to make athletic equipment, crates, furniture, tool handles, wooden toys, works of art, and many other things.

*Wood products in the picture:* banister, baseball bat, blocks, bookshelf, broom handle, bulletin board frame, cabinets, chairs, clock, counter, door, fence (see through open door), fruit bowl, molding (on walls), paintbrush handle, picture frames, sofa, stairs, stereo cabinet and speakers, spools for thread, stools, tables, tennis racket, umbrella handle, window frame, wood inside walls.

### Making Paper:

Paper is made from *cellulose*, the major component of cell walls in most plants. Most paper in the United States is made with cellulose that comes from trees. To turn a tree into paper, the bark is first stripped off and the trunk is chopped into small pieces, or *chips*. Afterward, the chips are usually cooked with chemicals until they form an oatmeal-like *pulp*.

Next the pulp is washed and the impurities (such as dirt) are filtered out, leaving a pulp of cellulose fibers and water. This "clean" pulp is then sent through a series of machines where the

fibers are flattened and broken apart so that they will form a smooth sheet when the

paper is dried.

Eventually the pulp is run onto screens and the water is drained off. And finally, the newly made paper is compressed and dried. (Depending upon the chemical process used to make the pulp and the amount of refining the pulp goes through, different kinds of paper can be made, such as coffee filter paper, heavy writing paper, and so on.)

*Paper products in the picture:* books, candy wrapper, cereal box, gift (wrapping and box), magazines, milk container, newspaper, notes on bulletin board, paper towels, record album covers.

### Cellulose Is Everywhere:

Besides being used to make paper, cellulose is one of the ingredients of many other products. For example, it can be mixed with certain chemicals, turned into a thick liquid, and then squeezed through small holes or slits to form fibers. The fibers can be used to make carpeting or conveyor belts, or they might be spun into fabric (rayon and some others) for making clothes or furniture. Different kinds of plastic films, such as cellophane and photographic film, are also made from cellulose.

Cellulose is also added to certain substances that are used to make car steering wheels, toothbrush handles, ping-pong balls, and some other plastic products. And depending on how it's processed, cellulose can be used in making explosives, thickeners in shampoo and salad dressing, and wallpaper paste.

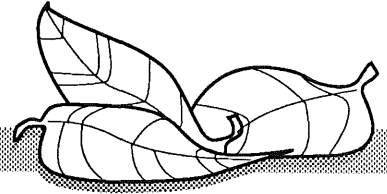
*Cellulose products in the picture:* buttons, comb, curtains, eyeglasses frame, hairbrush handle, luggage, pillows, rug, upholstery on sofa.

### About Bark:

Tree bark has lots of different uses. For example, the spongy bark of the cork oak tree, which grows in the Mediterranean countries of Europe and Africa, is stripped off and made into bottle cap liners, bottle stoppers, floats, and even heat shields for space vehicles.

Special chemicals in the bark of some trees also have a lot of different uses. For example, some trees produce *tannin*, which is used to cure leather.





*Bark products in the picture:* baseball (has a cork center), bulletin board.

**Using the Ooze:**

Some trees ooze special saps called *gums* and *resins*. Gums and resins can be used to make many things, including cosmetics, mouth-wash, paint thinner, perfumes, soap, and coatings for vitamins and other pills. Other trees produce a special juice called latex that can be used to make conveyor belts, hoses, rubber tires, and other rubber products.

*Gum, resin, and rubber products in the picture:* paint, rubber gloves.

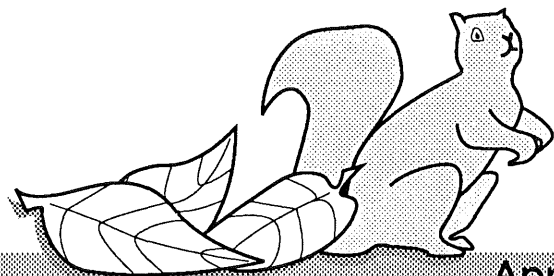
**Eating Tree Food:**

People eat the fruit, nuts, roots, and bark of many different trees. Most fruit and nuts can be eaten right off of the tree. But other tree "parts" must be cooked, dried, or processed in some way before people can eat them.

*Tree foods in the picture:* apples, chocolate bar (cocoa tree beans are used to make chocolate), orange.

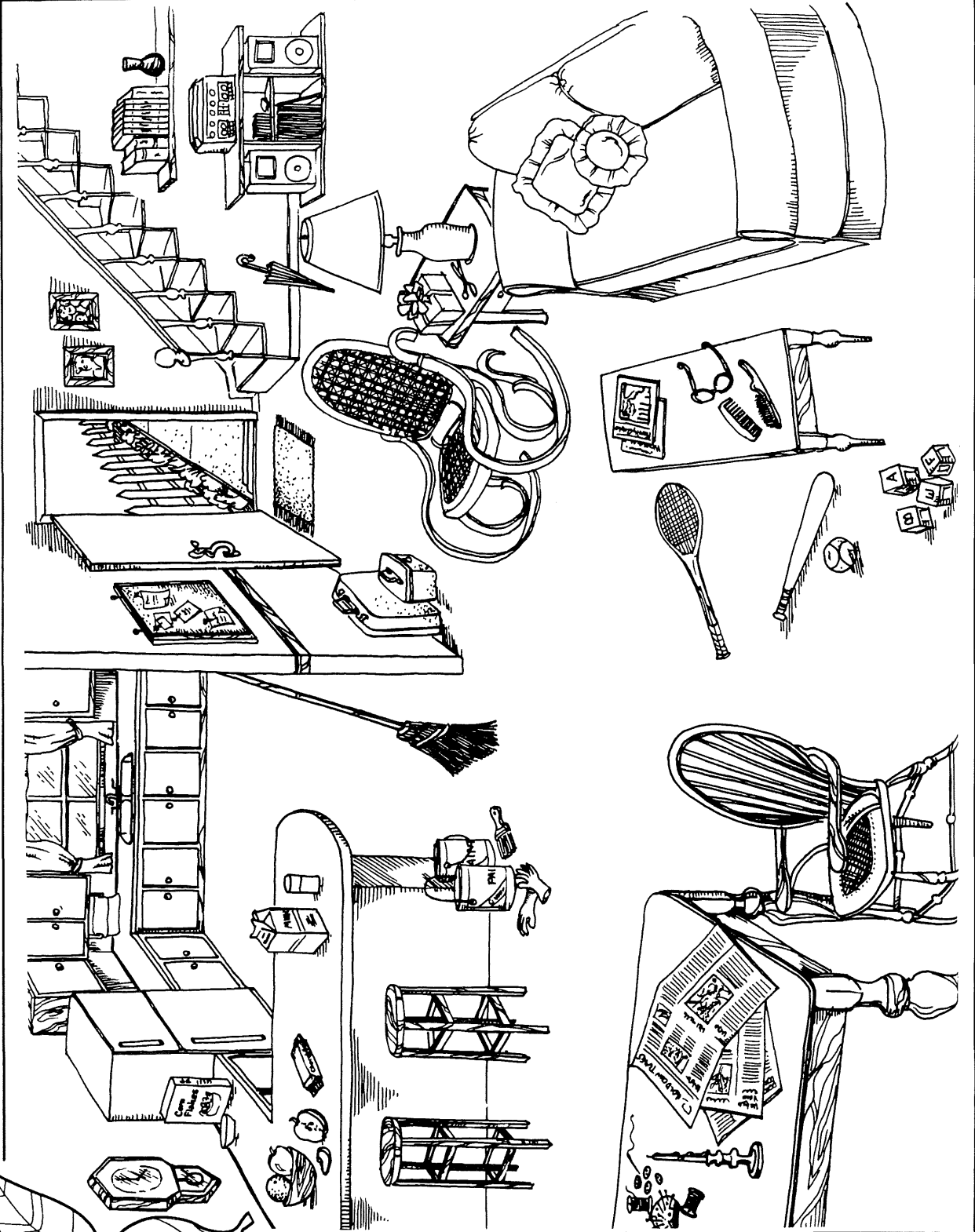
Besides the products we've listed, trees can also be used in making adhesives, asphalt, baby food, cleaners, inks, medicines, and pesticides. And many trees are sources of natural fibers that can be made into clothes, furniture, and stuffing material for cushions and life jackets.

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



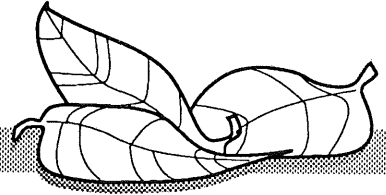
# Activity Sheet CopycatPage

From Paper to Plastic

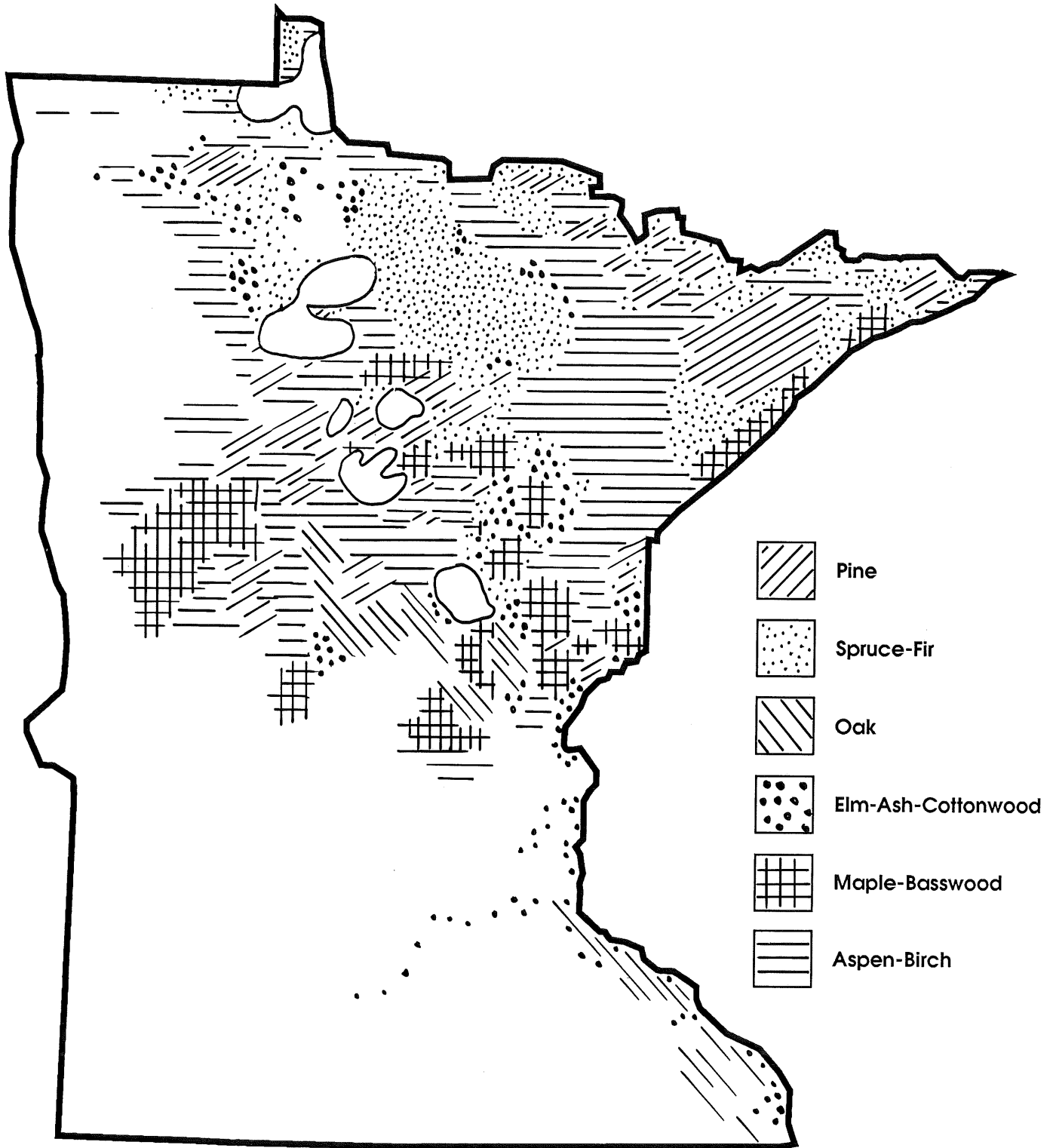


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# Activity Sheet

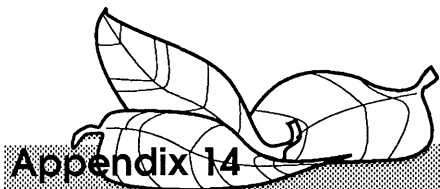
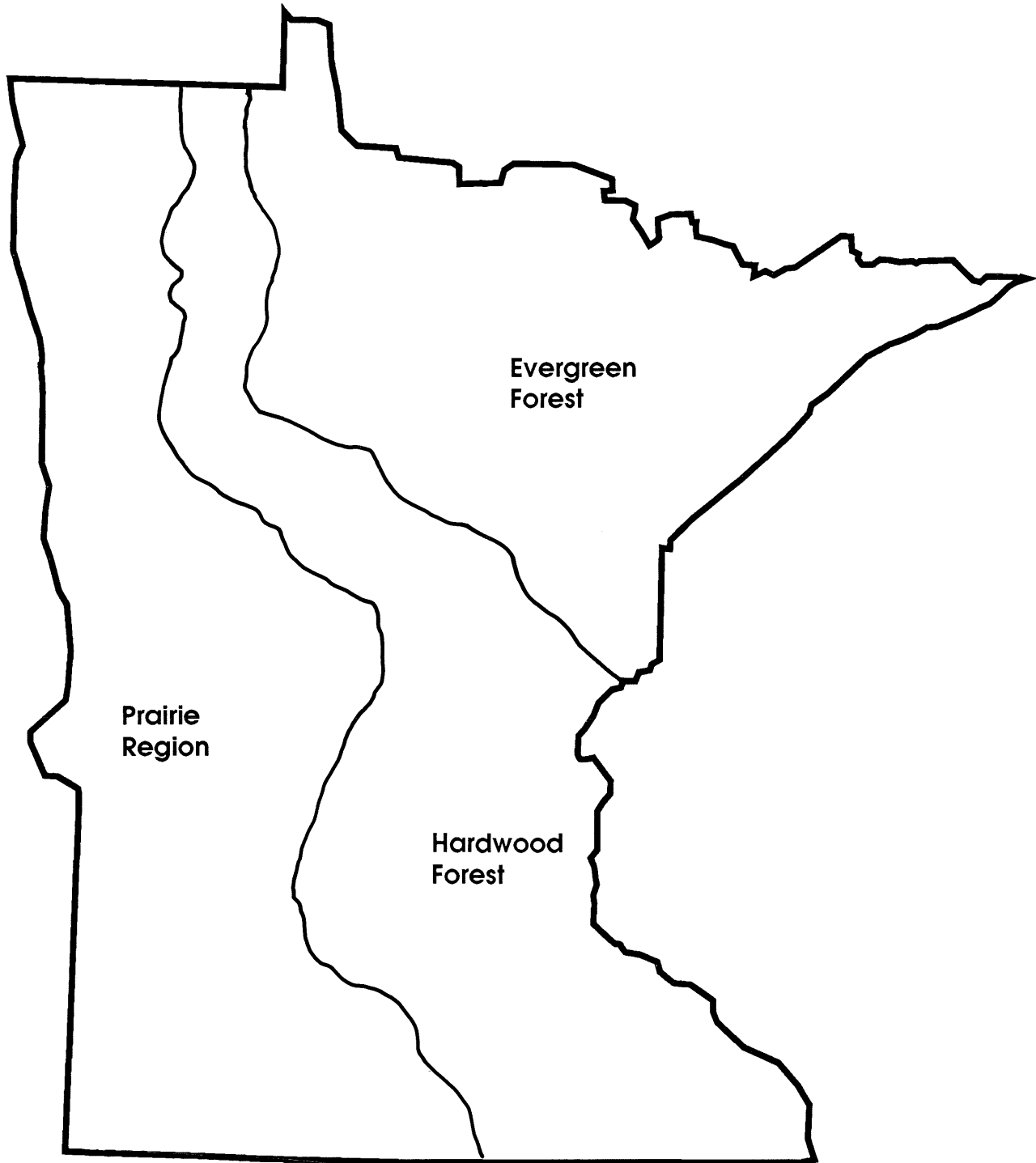


Minnesota Forest Regions Map (present)

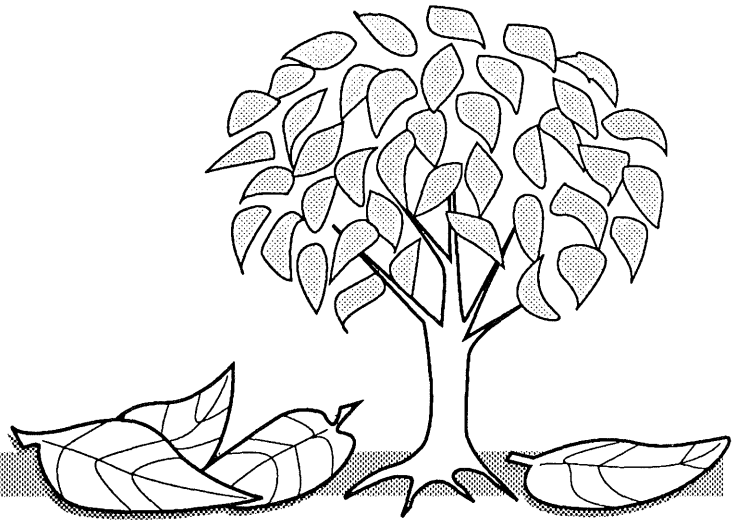


# Activity Sheet

Minnesota Forest Regions Map (past)



# Resources



## General Resources - All Levels

- **Minnesota Arbor Month Committee**

Room 226  
90 West Plato Boulevard  
St. Paul, MN 55107  
(612)296-8410

Arbor Day educational materials.

- **Minnesota Department of Natural Resources - Division of Forestry**

500 Lafayette Road  
St. Paul, MN 55155-4044  
(612)296-5966

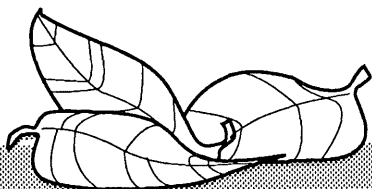
Smokey Bear poster series and miscellaneous materials, available free in limited supply, March through April. Materials are also available through local forestry offices.

- **Minnesota Department of Agriculture**

Shade Tree Program

*"Tree Owner's Manual,"* a 24-page guide for homeowners for proper tree selection, planting, and care. To order, send \$1.20 (plus 6% sales tax) to:

*"Tree Owner's Manual"*  
MN Extension Distribution Center  
Room 3 Coffey Hall  
1420 Eckles Avenue  
St. Paul, MN 55108



- **Project Learning Tree**

Project Learning Tree is an environmental education program developed by the American Forest Institute to emphasize the forest as part of the human environment. The two manuals that are part of the program provide supplementary teaching activities in various subject areas - social studies, language arts, mathematics - for grades kindergarten through twelve.

The Minnesota Departments of Education and Natural Resources are cooperating with the American Forest Institute in making Project Learning Tree workshops and teaching materials available to Minnesota educators. For more information, call or write:

Project Learning Tree Coordinator  
Department of Natural Resources  
500 Lafayette Road  
St. Paul, MN 55155-4044  
(612)297-2214

- **Cassie Schombert**

Project Learning Tree, Poster  
1250 Connecticut Avenue N.W.  
Suite 320  
Washington, DC 20036

*"We All Need Trees"* poster, \$1.00.

- **Minnesota Bookstore**

117 University Avenue  
St. Paul, MN 55155  
(612)297-3000

*"Trees of Minnesota,"* a book that discusses more than 50 different trees found in Minnesota, \$5.00.

*"Minnesota's Forest Treasures"* poster, \$3.00.

*"Forestry For You And Me"* coloring book, \$2.50.

Please add \$1.50 for shipping and handling.

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- **U.S. Forest Service**

Eastern Region  
310 West Wisconsin Avenue, Room 500  
Milwaukee, WI 53203

Miscellaneous related materials, free.

- **U.S.D.A. Soil Conservation Service**

Federal Building, Room 345  
100 Centennial Hall North  
Lincoln, NE 68508-3866

- **Local DNR Forestry Offices**

Miscellaneous related materials, free.

- **County Extension Offices**

Miscellaneous related materials, free.

- **National Association of State Foresters**

P.O. Box 21707  
Columbia, SC 29221

*"You Can Do It"* activity book, #88. Appropriate for primary grades. Minimum order is a standard pack of 100 at \$25.00.

- **National Wildlife Federation**

1400 - 16th Street N.W.  
Washington, DC 20036-2266

NatureScope, *"Trees are Terrific"* (75021).  
\$6.00 each plus \$3.25 shipping per order.

- **Chippewa National Forest**

Cass Lake, MN 56633  
(218)335-2226

*"Tomorrow's Forests Begin Today"* (fold out poster). Listing of available slide/tape programs. Miscellaneous related materials, free. Return postage only.

- **Forest History Center**

2609 County Road 76  
Grand Rapids, MN 55744  
(218) 327-4482

- **Minnesota Landscape Arboretum**

3675 Arboretum Drive, P.O. Box 39  
Chanhassen, MN 55317  
(612)443-2460

Education programs.

- **Minnesota Forest Industries**

208 Phoenix Building  
333 West Superior Street  
Duluth, MN 55802-1679  
(218)722-5013

Paper Making Kits, \$8.00.

- **Minnesota Extension Distribution Center**

Room 3 Coffey Hall  
1420 Eckles Avenue  
St. Paul, MN 55108

Miscellaneous Extension Materials.

- **Southern Forest Products Association**

P.O. Box 52468  
New Orleans, LA 70152

*"Our Forest"* booklet, grades 4 through 6,  
\$1.25.

- **Supply Service**

National 4-H Council  
7100 Connecticut Avenue  
Chevy Chase, MD 20815  
(301)961-2934

*"What's a Tree to Me?"* Urban tree project booklet for 9- to 14-year olds to learn more about trees. Member's manuals are \$1.50 each and leader's guide is 95 cents.

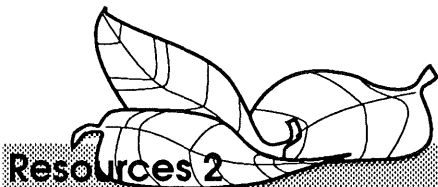
- **Champion International Corporation**

One Champion Plaza  
Stamford, CT 06921  
(203)358-7000

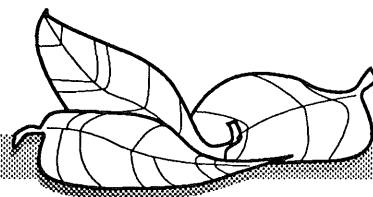
*"The Life of the Forest"* booklet. Appropriate for grades 4 through 12. Free.

- **Minnesota Forestry Fair**

State Fairgrounds, St. Paul; Natural Resources Park and DNR Building; April each year. Call (218)326-1239 or (612)296-5958 for information.







- **Minnesota state forests, parks, and campgrounds.** A list is available from:

Minnesota Department of Natural Resources  
Information Center  
500 Lafayette Road  
St. Paul, MN 55155-4040  
(612)296-6157 or 1-800-652-9747

A variety of printed materials is also available, free.

- **Regional and other local parks.** A map is available from:

Metropolitan Council  
Mears Park Center  
230 East Fifth Street  
St. Paul, MN 55101  
(612)291-6359, TDD 291-0904

Publication Number S80-88-040, May 1988.

## Film Resources

### Source for Rental Films:

- **University Film and Video**  
University of Minnesota  
313 - 5th Street Southeast  
Suite 108  
Minneapolis, MN 55414  
(612)627-4270

### Free Loan:

- **Minnesota Department of Natural Resources Film Library**  
500 Lafayette Road  
St. Paul, MN 55155-4046  
(612)296-0899

Catalog available of films, film-strips, and slide/tape programs. Return postage only.

Any Minnesota organization may borrow DNR films. Films are sent out by the DNR parcel post and must be returned pre-paid. Order films by number and title at least three weeks in advance of the date on which the film will be shown.

Film #21

#### **Trees: Minnesota's Tallest Crop**, 23 minutes

Deals with our forest land as a valuable resource; how the well-managed forest produces more wood, more jobs, more wildlife, and more recreational opportunities for people. Junior High to Adult.

Film #41

#### **Trees: How to Identify Them**, 11 minutes

Illustrates the various ways of identifying trees and motivates students to study them, beginning with the trees in their own community. Grades 1-9.

Film #46

#### **Conserving Our Forests Today**, 15 minutes

Answers the following questions: What are the benefits of forests? How does a tree grow? How are forests wasted? How do we conserve and replant forests? Grades 1-9.

Film #59

#### **Islands of Green**, 25 minutes

Depicts the story of the preservation and use of large "islands of green" in our national forests; presents the need for saving small islands of green in and around our cities. Junior High to Adult.

### Rental Films:

- **Arbor Day**  
Eastin Phelan, 1936, black and white, 18 minutes  
Spanky plays a solid oak in the tree-planting pageant and Alfalfa sings a song called "Trees." Mr. Smithers, the truant officer, brings a boy and girl to school and watches the program. A classic Little Rascals film. Grades 1-6.
- **Lorax, The**  
Bailey, 1972, 24 minutes  
Fantastic animals enact a verse drama of the ecological damage wrought by uncontrolled progress. Based on the book by Dr. Seuss. Grades K-6.
- **Plant, The**  
Lucerne Films, 1984, 13 minutes  
A clever fantasy, combining live action and animation. The PLANT is no ordinary plant. It pushes through the snow in the dead of winter. When a gentle young man brings it into his home, the plant springs to life. It rejects rejection and demands attention. Young children.

- **Replanting The Tree Of Life**

Bullfrog, 1987, 20 minutes

Taking a global perspective, this film discusses use of trees and the threat of deforestation. The concept of "The Tree of Life" as an enduring symbol for the natural environment and the importance of living in balance with nature are stressed. Grades 7-9.

- **Seasons Change**

Arthur Mokin, 1985, 10 minutes

The changing seasons are illustrated with children and song. Young children.

- **Summer Legend**

Churchill, 1987, 8 minutes

Delightfully animated retelling of the Micmac Indian legend explaining the cycle of the seasons through a skillful combination of drawing, music, and voice. Young children.

- **Woods and Things, The**

Churchill, 1980, 11 minutes

A film for discovery: the deep shadows, a spider, a deer, a million ladybugs, and other treasures of the woods. Young children.

### Free Filmstrips:

- **The Forest, 1971**

This filmstrip tells the story of the formation of a forest step by step, from volcanic rock to mature trees, and beyond. It emphasizes the ecological interrelationships between the plants and animals that precede and exist in a mature forest. A script accompanies the filmstrip. 58 frames.

Lassen Volcanic National Park  
P.O. Box 100  
Mineral, CA 96063-0100

Terms: Borrower pays no transportation charges. Return as soon as possible via parcel post. Book one month in advance. Grades 5-8.

## Books

- **Minnesota Bookstore**

117 University Avenue  
St. Paul, MN 55155  
(612)297-3000

Books available on travel and adventure, cooking, gardening, nature, fishing, wildlife, history and folklore. Prices vary.

Note: The following books are listed according to grade level so teachers can locate titles that relate to the "**Arbor Day/Month Guide**" subject matter for their grades. Teachers are encouraged to use books from any grade level, however, to expand students' exposure to the fascinating world of trees.

### Kindergarten

Bulla, Clyde Roberts. "**A TREE IS A PLANT.**"

Thomas Y. Crowell Co., 1960.

Coats, Laura Jane. "**THE OAK TREE.**" MacMillan, 1963, ages 3-6.

Collier, Ethel. "**A BIRTHDAY TREE.**" William R. Scott, Inc.

Darby, Gene. "**WHAT IS A TREE.**" Pictures - Lucy and John Hawkins. Benefic Press, 1957.

Orange, Anne. "**THE LEAF BOOK.**" Learner Pub. Co., 1975 (A book of leaf rubbings).

Rinkoff, Barbara. "**GUESS WHAT TREES DO.**" Ill. by Beatrice Darwin, Lothrop, Lee and Shepard Co.

Shapp, Martha and Charles. "**LET'S FIND OUT ABOUT TREES.**" Franklin Watts, 1970, ages 5-8.

Udry, Janice May. "**A TREE IS NICE.**" Harper Row, 1956, ages 3-6.

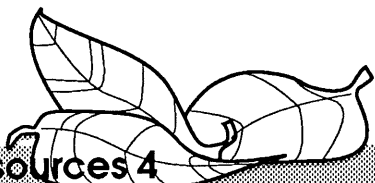
### Grade 1

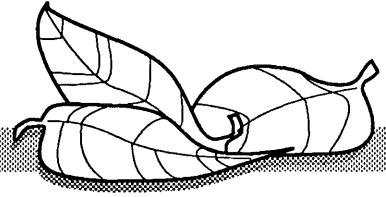
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Taylor, Mildred D. **"SONG OF THE TREES."** The Dial Press, 1975.

#### Grade 4

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#### Resources:

- Minnesota Forest Industries, Inc.  
208 Phoenix Building  
Duluth, MN 55802

#### • Paper Mills and Lumber Mills of Minnesota:

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Grand Rapids, MN

Boise Cascade  
International Falls, MN

Consolidated Papers, Inc.  
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Little Falls, MN

Potlatch Corporation  
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- **"A WALK IN THE FOREST"** by Herbert G. Lash  
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2300 Sun Life Building  
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1776 Massachusetts Ave. N.W.  
Washington, D.C. 20036  
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The following materials are somewhat technical but provide good background knowledge about windbreaks and shelterbelts.

#### **U.S.D.A. Soil Conservation Service Bulletins**

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#### **Resources:**

- **TOMORROW'S FORESTS BEGIN TODAY**, U.S.D.A. Forest Service, 1988. Silviculture: The art of managing and tending a forest.
- **Forest History Center**  
2609 County Road 76  
Grand Rapids, MN 55744  
(218) 327-4482

