

## **Welcome to Forest Friends . . .**

**T**his Instructor's Guide, along with the CD-ROM *Forest Friends* is designed to help you explore with your students the importance of forests in our world. We hope you find these tools useful as you and your students set out to discover the wonders of Alabama's most valuable ... properly managed ... and ... infinitely renewable resources. Hopefully you, and your students will enjoy the learning and implementation challenges of this CD-ROM.

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# TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>3</b>
<b>PURPOSE</b>	
<b>USE IN THE CLASSROOM</b>	
<b>WHAT IS PROJECT LEARNING TREE?</b>	
<b>REQUIRED COMPUTER EQUIPMENT</b>	

## CONTENT AREAS

<b>ENVIRONMENT .....</b>	<b>4</b>
Explores the various benefits of trees in terms of wildlife habitat, clean air, clean water and cooling effects. Students also learn about some of the wildlife found in Alabama.	
<b>ENVIRONMENT CROSSWORD PUZZLE (OLDER STUDENTS) .....</b>	<b>5</b>
<b>ENVIRONMENT CROSSWORD PUZZLE (YOUNGER STUDENTS).....</b>	<b>6</b>
<b>STUDENT ASSESSMENT - ENVIRONMENT .....</b>	<b>7</b>
<b>PRODUCTS .....</b>	<b>8</b>
Identifies numerous items made from trees that we rely on daily.	
<b>TREE PRODUCTS WORD SEARCH (OLDER STUDENTS).....</b>	<b>9</b>
<b>TREE PRODUCTS WORD SEARCH (YOUNGER STUDENTS) .....</b>	<b>10</b>
<b>STUDENT ASSESSMENT - PRODUCTS .....</b>	<b>11</b>
<b>TREE IDENTIFICATION .....</b>	<b>12</b>
Discusses the management activities necessary to maintain a healthy forest. It also introduces some of the trees common to Alabama.	
<b>TREE ID WORD SCRAMBLE (OLDER STUDENTS) .....</b>	<b>13</b>
<b>TREE ID WORD SCRAMBLE (YOUNGER STUDENTS) .....</b>	<b>14</b>
<b>STUDENT ASSESSMENT - TREE IDENTIFICATION .....</b>	<b>15</b>

## REFERENCE MATERIALS

<b>GLOSSARY .....</b>	<b>16</b>
<b>FORESTRY CONTACTS .....</b>	<b>17</b>
<b>ANSWERS TO ASSESSEMENTS .....</b>	<b>18</b>
<b>HOW A TREE WORKS .....</b>	<b>19</b>
<b>WHAT DO ALABAMA'S FORESTS LOOK LIKE .....</b>	<b>20</b>
<b>FORESTRY WORD SEARCH .....</b>	<b>21</b>
<b>THE SECRET OF FALL COLORS .....</b>	<b>22</b>
<b>TREE SQUARES.....</b>	<b>23</b>
<b>TREE COOKIE ACTIVITY DIRECTIONS .....</b>	<b>24</b>
<b>TREE COOKIE ACTIVITY .....</b>	<b>25</b>
<b>PROJECT LEARNING TREE ACTIVITY# 21 .....</b>	<b>26</b>
<b>PROJECT LEARNING TREE ACTIVITY# 27 .....</b>	<b>31</b>
<b>ALABAMA'S FAMOUS AND HISTORIC TREES .....</b>	<b>33</b>
<b>EVALUATION OF CD-ROM AND INSTRUCTORS GUIDE .....</b>	<b>34</b>

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# INTRODUCTION

## PURPOSE

The **Forest Friends CD-ROM**, along with its companion CD-ROM, a middle school version, **Alabama Forests Forever**, are designed with one goal in mind--to educate. Using the CD-ROM to actively engage student learning will increase understanding of the importance of employing scientific principles to sustainable forest management. This interactive format will hold the students attention throughout while they watch a captivating presentation of forest facts and the forest products we use.

## USE IN THE CLASSROOM

The **Forest Friends Instructional Guide** is designed to assist the educator in using the CD-ROM. Presented in an easy-to-use format, the guide provides information to facilitate learning about Alabama's forests. To assist in the learning experience, each of our three content areas includes grade level, subjects, concepts, skills and correlations to the Alabama Course Content Standards. A brief introduction to each topic is provided along with an activity to reinforce the content and a listing of associated activities from the *Project Learning Tree* (PLT) *PreK-8 Guide*.

Using the **Forest Friends CD-ROM**, this Instructional Guide, PLT activities, the contact list provided and a little imagination, the educator can lead students into subjects beyond forestry and this CD-ROM. Students may explore the need for forest products in society, better understand the role of forests in providing habitat and learn about trees commonly found in the State of Alabama.

The **Forest Friends CD-ROM** is primarily designed for use in K - 4<sup>th</sup> grade classrooms, but can be used with a wide variety of audiences. It is primarily intended for single-user or small group settings.

## WHAT IS PROJECT LEARNING TREE?

Project Learning Tree is an internationally recognized environmental education curricula. PLT provides hands-on activities using the forest as a window to awareness and knowledge of the world. Ultimately, PLT prepares students to make wise decisions about conservation practices and resource use by developing critical thinking skills.

So you can see how PLT and the **Forest Friends CD-ROM** work together, we have included two sample PLT activities as well as a listing of some PLT activities that relate to each of the content areas. For more information see the "Reference Section" in this guide for a sample PLT Activity or call the Alabama Forestry Association at the number listed on page 17 of this Instructional Guide.

## REQUIRED COMPUTER EQUIPMENT

The minimum and recommended system requirements are listed on the back of the CD-ROM case for both IBM-compatible and Macintosh computers. Your computer must meet these requirements in order to operate the CD program. The installation instructions are printed on the inside of the pamphlet in the case.

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# ENVIRONMENT

## Levels

Grades K-4

## Subjects

Science, Math

## Concepts

The forests provide habitat for thousands of different creatures.

Each inhabitant does its part in continuing the forest cycle.

## Skills

Observing, Relationships, Patterns, Organizing Information and Analyzing, Identifying Relationships

## Content Standard Correlation

Trees offer many benefits to the environment. They cool the temperature of the air by almost ten degrees and give animals a place to live. Their roots hold together the forest floor and help to keep our drinking water clean. Trees also produce the oxygen we need to breathe.

It is the job of foresters to manage and protect our forests. They understand the special role that trees play in preserving our way of life.

## Components

In this section, the students learn about the things trees do for our environment. They have the opportunity to play "Concentreeation" which tests their memory skills. After they complete each game they will see a video about an animal that is commonly found in the forest. There are nine video clips which are chosen at random. Animals included are: frogs, squirrels, owls, bears, eagles, deer, bobcats, snakes and turkeys.

## Sample Activity

Imagine, if you can, living in a place with no trees. What if all the trees in Alabama disappeared? To help us think about trees and their place in the environment, let's look at some of the things we normally find in the forest and see how plants and animals might benefit from each other.

Some forest creatures may need a single limb on a tree or a decaying log to sustain their lives, or they may need several hundred acres (an acre is about the size of a football field) of forests to meet their needs.

Thus, even animals living in the same forest may place very different de-

mands on that forest. The good news is that forests can meet the needs of many different animals at the same time.

To better understand this interaction, let's examine how some animals and plants interact. Collect signs of plant and animal life that you can find around trees, things like twigs, partially eaten plants, leaves, nuts, fruit, litter, etc. Discuss with your students how these things demonstrate an interaction between plants and animals. Ask them if there are any signs of man's interaction in this environment.

*For older students:* Individually, or in groups, have the students examine a tree(s). Start by looking at the whole tree from a distance. Ask them to note all kinds of living creatures depending on the tree -- including other plants. Have them take a closer look at the tree and area around it for signs of plant and animal interaction.

Have the students organize the information into a table or booklet and discuss the results with the class. Ask about how the tree is affected by the plants and animals that live around it. Do any of the organisms appear to harm the tree? How do the plants and animals benefit from their relationship?

## Project Learning Tree Activities

### #30 - Three Cheers for Trees

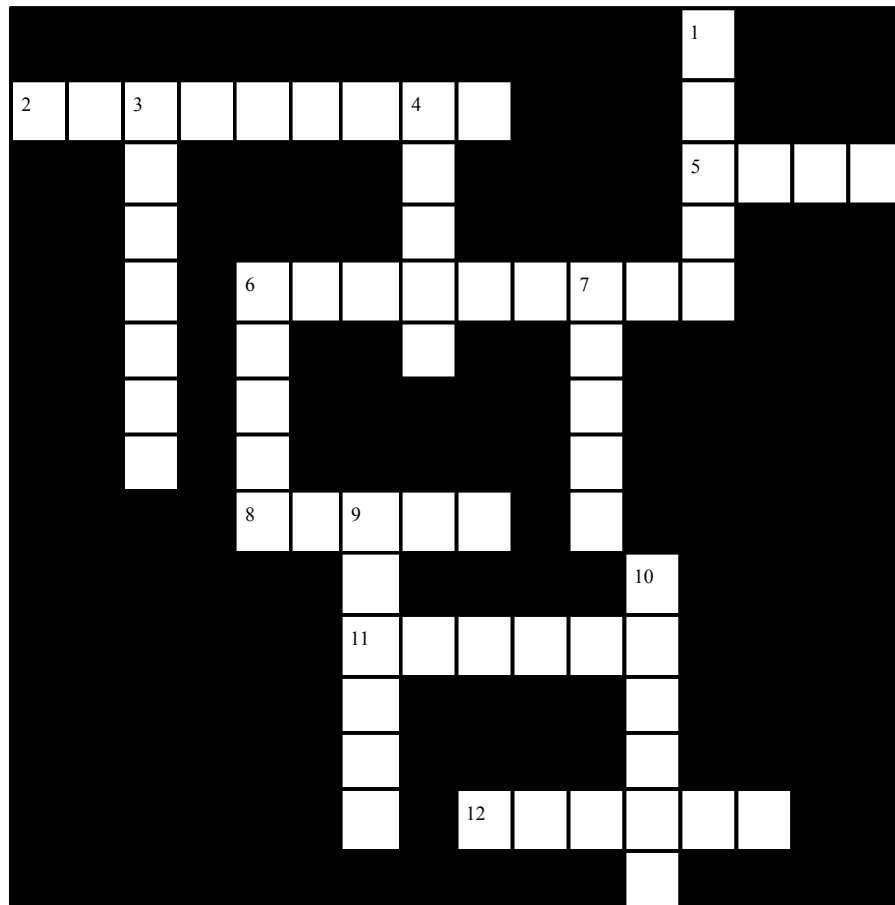
Students examine how important trees are by looking at the world without trees. This activity relies on artwork as a way to express the importance of trees.

### #47 - Are Vacant Lots Vacant?

In this activity, students look at a small scale ecosystem to discover how interrelated communities are to the environment around them. This field trip to a "vacant" area near the school will help students understand the relationship of man to their surroundings.



# ENVIRONMENT CROSSWORD PUZZLE



## Across

2. Bears do this in the winter.
5. These flying animals hunt for rats, mice and insects at night. They depend on the forest for nesting and cover during the day.
6. It is the job of \_\_\_\_\_ to take care of our forests.
8. The \_\_\_\_\_ from trees cools the forest by 10 degrees.
11. Trees produce \_\_\_\_\_ that we need to breathe.
12. Homes for animals, clean air and water and a place to have fun are benefits of a well managed \_\_\_\_\_.

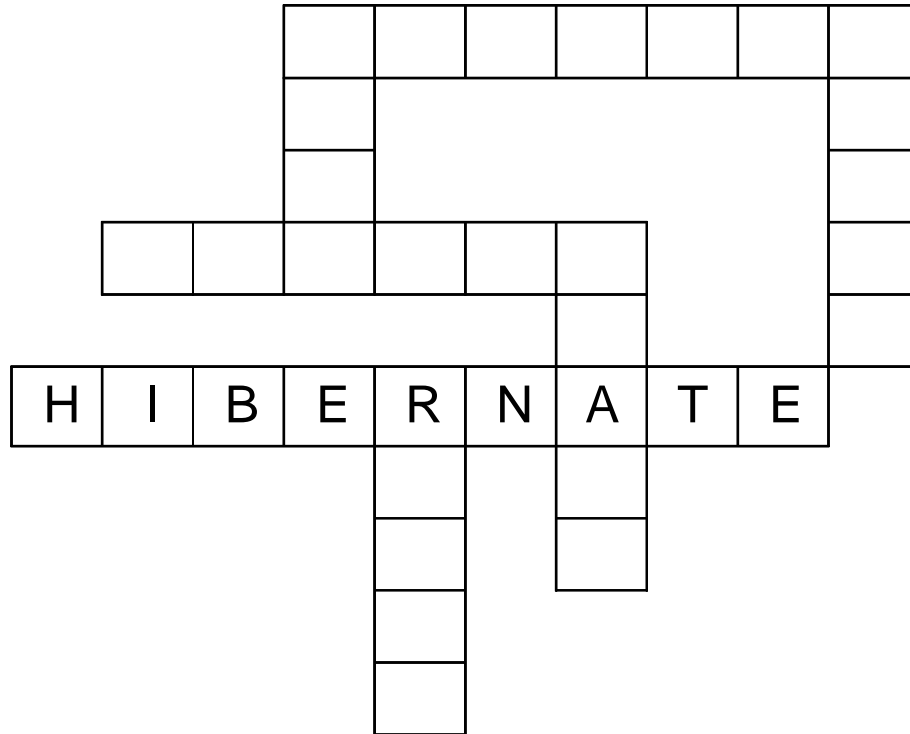
## Down

1. Tree \_\_\_\_\_ hold the forest floor together and provide water and nutrients to the tree.
3. These animals prefer to live deep in the forest and like to climb on rocks to seek out their prey.
4. We use all of the parts of these living things to make the products we need every day.
6. These amphibians live in forests where they eat insects.
7. These animals live in the trees and while they enjoy a rat or snake for dinner every now and then, they prefer fish, swooping down and catching them in near-by rivers and lakes.
9. Turkeys and other animals eat these hard seeds from trees and scatter them around the forest.
10. \_\_\_\_\_ climb trees, live in the hollow parts of trees and lay eggs in rotten logs. They feed on lizards, frogs, mice, squirrels and other forest animals.

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## ENVIRONMENT CROSSWORD PUZZLE



Use the words below to fill in the squares and create a crossword puzzle.

Acorn

Hibernate

Eagles

Shade

Forests

Snake

Frog

Roots

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## STUDENT ASSESSMENT - ENVIRONMENT

Name: \_\_\_\_\_

1. Trees produce \_\_\_\_\_ that we need to \_\_\_\_\_.  
a) water, drink      b) oxygen, breathe      c) leaves, eat
2. Shade from trees can \_\_\_\_\_ the air.  
a) cool      b) warm      c) move
3. A tree's roots help it by taking in \_\_\_\_\_.  
a) sunlight      b) soil      c) water
4. Animals need the trees in the forest for \_\_\_\_\_.  
a) food      b) a place to live      c) both a and b

*Match the animal to the correct statement below.*

- |                |  |
|----------------|--|
| ____ 5. Eagle  | a) These animals like to hibernate, or sleep, most of the winter   |
| ____ 6. Bear   | b) Living deep in the forest these animals like to climb rocks and watch for their prey, then jump down on them. |
| ____ 7. Snake  | c) These amphibians like to eat insects.   |
| ____ 8. Bobcat | d) With white heads and good eye site, these animals like to fly down from the tops of trees and catch fish.     |
| ____ 9. Frogs  | e) These are excellent climbers that often live in the hollow sections of trees and lay eggs in logs and stumps. |

***Challenge:***

10. Tell two ways a forest is like a zoo.
- 
-

# PRODUCTS

## Levels

Grades K-4

## Subjects

Science, Social Studies

## Concepts

Trees provide a large number of products that people use every day.

Trees are a renewable resource.

## Skills

Classifying and categorizing, Comparing and Contrasting, Evaluating, Identifying Attributes

## Content Standard Correlation

Many things we need every day are made from trees. Of course we use trees to make houses, furniture, pencils and paper, but there are many other products that you might not know are made from trees. Things like film, rayon for clothing, toothpaste, even cellophane tape all come from trees. No parts of harvested trees are wasted. We use every part of the tree; the solid wood, bark, sap, pulp. Even the sugars in a tree are used to make more than 5,000 different products. In fact, many paper and wood products are recycled and reused to further insure that trees are not wasted.

## Components

In this activity, the students play a game called *Wild About Wood*. In the game, nine products are randomly displayed on the screen and the students are asked to name the products that are made of wood. All of the products included in the game are made of wood or wood derivatives. When the student chooses a product, the announcer tells them they are correct and then describes what part of the tree that product comes from. The students have thirty seconds to complete this activity.

## Sample Activity

Start this activity by showing the students some every day products, both made from wood, and not made from wood. Have them distinguish between those made from wood and those not made from wood. Use things like a paper cup and a glass, a pencil and a pen, a cardboard milk carton and a plastic milk jug, a paper bag and a plastic bag, etc. You may do this before or after they view this section of the CD.

Ask the students to list the products they remember in the game *Wild About Wood*. Though only nine are viewed each time, there are 17 products included on the disk. Review the products you showed them earlier and discuss which

were made from trees. Ask which of the products in the CD surprised them the most.

*For older students:* As students name products, create a list on the chalkboard with the heading "Product." Once you have the list complete, put a second column on the board entitled "Tree Part." On another part of the board, list the words: cellulose, resin, wood fibers, pulp, and sugar. Ask the students what part of the tree (using the above words) is used to make each of the products listed, and fill that information in on your chart.

The table below lists the products in the CD and where they come from.

Product	Tree Part
Tea Bag	Pulp/Paper
Milk Carton	Pulp/Paper
Hospital Gown	Wood Fibers
Cellophane Tape	Wood Sugars
Mouthwash	Resin
Desk/Laminated Top	Wood/Paper
Carpet	Wood Fibers
Toilet Paper	Wood Pulp
Ice Cream	Cellulose
Pancake Mix/Syrup	Wood/Sap
Violin	Wood/Resin
Tire	Wood Pulp
Film	Wood Pulp
Crayon	Resin
Toothpaste	Cellulose
Orange Drink	Resin
Diapers	Cellulose

## Project Learning Tree Activities

### #12 - Tree Treasures

This activity reinforces the importance of trees in providing the products we need every day. Activity # 13, *We All Need Trees*, is an excellent companion to this.

### #89 - Trees for Many Reasons

This activity uses literature to ask questions about why we need trees, why we should conserve trees and that our natural environment is changing. It helps students understand the need to conserve resources.





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## TREE PRODUCTS WORD SEARCH

F	L	U	Q	K	S	D	H	D	P	E	N	C	I	L	S
D	I	B	U	Z	C	B	L	O	A	U	M	O	G	Y	K
H	R	L	A	M	R	T	D	O	P	G	V	H	S	F	V
K	G	U	M	E	A	E	D	D	E	L	C	I	R	Y	M
S	S	W	L	Y	Y	L	I	L	R	A	X	J	E	Y	H
V	Y	E	E	S	O	V	K	C	P	R	M	L	P	R	B
O	I	O	L	I	N	T	E	S	E	G	Z	T	A	P	E
T	O	O	T	H	P	A	S	T	E	C	Y	I	I	O	O
A	D	E	L	E	K	I	B	W	O	D	R	R	D	L	H
V	E	L	N	I	D	N	H	E	A	A	J	E	O	Y	O
Q	S	D	V	B	N	Y	F	T	C	K	S	R	A	X	U
T	K	O	T	L	P	A	Q	T	E	F	E	E	F	M	S
O	R	A	N	G	E	D	R	I	N	K	S	G	J	V	E
J	V	K	B	I	T	R	R	K	A	A	L	T	S	Y	E

See if you can find the following words in the word search puzzle above:

Crayon  
Desk  
Diapers  
Film  
House  
Ice Cream  
Orange Drink  
Paper  
Pencils  
Tape  
Toothpaste  
Violin

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## TREE PRODUCTS WORD SEARCH

H O U S E X Z C B K  
S R L O V A O H E V  
A W H K A G B A T G  
P A P E R L C I N B  
E J E S X W Y R D A  
E L N A M U Z D S G  
R Q C I F T D E S K  
U A I G D M L I B G  
J R L Z C R A Y O N

See if you can find the following words in the word search puzzle above:

Bag  
Chair  
Crayon  
Desk  
House  
Paper  
Pencil

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## STUDENT ASSESSMENT - PRODUCTS

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Name: \_\_\_\_\_

1. Every \_\_\_\_\_ of the \_\_\_\_\_ is used to make products we need every day.
2. Many paper and wood products are \_\_\_\_\_ and reused so trees are not \_\_\_\_\_.
3. Name two things you have or use in your classroom that come from trees:
  - 1.
  - 2.
4. Name two things you have or use in your home that come from trees:
  - 1.
  - 2.
5. Name two things you would find at the grocery store that come from trees:
  - 1.
  - 2.

*Match the product to the part of the tree used to make it*

- |                        |                |
|------------------------|----------------|
| _____ 6. Film          | a. Tree Fibers |
| _____ 7. Violin        | b. Tree Pulp   |
| _____ 8. Diapers       | c. Cellulose   |
| _____ 9. Hospital Gown | d. Wood        |

### ***Challenge***

10. What three products that come from trees would you miss the most if we could no longer use trees?
  - 1.
  - 2.
  - 3.

Why would you miss these?

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# TREE IDENTIFICATION

## Levels

Grades PreK- 4

## Subjects

Science, Reading

## Concepts

If properly managed, renewable resources can supply man's needs indefinitely.

Forest management is vital to insuring existence of forests and man.

## Skills

Observing, Identifying Patterns and Relationships, Organizing Information

## Content Standard Correlation

We have learned some of the benefits that forests provide to man and animals. Now, let's talk about why we call trees a *Renewable Resource*. A renewable resource is one that we can use over and over again. In forestry, it means we can plant seedlings, watch them grow and then harvest the trees to make the products we use every day. We can even recycle some of those products like newspaper so they can be used again to make new paper.

It is important that we take care of our trees. This is called *forest management*. Foresters grow trees in one part of the forest while trees are harvested and replanted in another part of the forest.

One of the tools foresters use to keep a forest healthy is fire. Controlled fires help clear out the under-story that competes with trees for water, nutrients and sunlight. This underbrush, if left to grow could fuel big, uncontrolled forest fires. Controlled fires also open up space for animals to live.

Wise management of our forests will insure that we will always have plenty of trees and the tree products we use every day.

## Components

The students play a game that resembles "Mr. Potato Head" by creating faces on the tree, leaf, or fruit being described in the accompanying

narrative. Twelve trees commonly found in Alabama are included on the disk. The description of each tree as well as a sketch of the tree can be printed and used for reading and

writing activities.

## Sample Activity

Have students print the narrative sections about each tree and put them in a notebook. Then, take the students to a nearby park or forest where many of these trees can be found and collect leaves--the teacher may want to do this for the students. Have the students put the leaves in the notebook.

PLT Activities #21 and 27, included in the reference section of this guide, are good activities to re-enforce this concept. In **Adopt a Tree** (#21) students look at trees individually to better understand their relationship to the environment around them. **Every Tree for Itself** (#27) helps students understand the things trees need to grow and live. The activity also introduces the topic of competition among trees.

## Project Learning Tree Activities

### #27 - Every Tree for Itself

Students look at how trees grow and the things they need in order to survive. They learn about growth rings, competition and how the environment affects tree growth.

### #63 - Tree Factory








By acting out the parts of a tree, students will learn how a tree works similar to a factory, each part of the tree performing specific functions necessary to produce the final product--a healthy tree. This activity teaches students which parts of the trees transport water and nutrients, support the tree and make food necessary for a tree's survival.



be printed and used for reading and



## TREE ID WORD SCRAMBLE

- |  |            |
|--|------------|
| 1.  _ _ _ _  _ _ _ _   | SSSSSAAAFR |
| 2.  _ _ _ _   | HYLOL      |
| 3.    _ _ _ _ _   | RALPPO     |
| 4.    _ _ _ _ _  | PEMAL      |
| 5.    _ _ _ _  | KAO        |
| 6.    _ _ _ _   | NIPE       |
| 7.    _ _ _ _ _  | NEPCA      |
| 8.  _ _ _ _  _ _ _ _ | WEETS MUG  |

Unscramble the words above to identify eight Alabama trees. Then use the letters in the circles to answer the question below.

What provides fun, food and things we need to live every day?

\_ \_ \_ \_ \_

**Hint-- These are some of the trees found in Alabama:**

Oak	Elm	Poplar	Maple	Sassafrass
Sweetgum	Pecan	Hickory	Holly	Pine

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## STUDENT ASSESSMENT - TREE IDENTIFICATION

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Name: \_\_\_\_\_

1. A natural resource, like a forest, that can be used over and over again is called a \_\_\_\_\_ resource.
2. \_\_\_\_\_ take care of our forests by using forest management.
3. Controlled fires help clear out the \_\_\_\_\_ that compete with the trees for food and water
4. Foresters use \_\_\_\_\_ to keep a forest healthy.
5. If we \_\_\_\_\_ our forests wisely, we will never run out of trees and the benefits they provide.

*Match the tree with the phrase that describes it.*

- |                         |  |
|-------------------------|--|
| _____ 6. Bald cypress   | a) These trees lose their star-shaped leaves in the winter and their fruit, which looks like little balls, falls off of the tree in the winter |
| _____ 7. Red maple      | b) Spanish moss often grows from these trees with small narrow leaves. Their wood was once prized for use in the hulls of ships.               |
| _____ 8. Sweetgum       | c) This tree, found in swamps, has “knees.”  |
| _____ 9. Live oak       | d) This is the most common evergreen tree in Alabama   |
| _____ 10. Loblolly pine | e) Wood from this tree is used to make furniture and bowling pins. It’s leaves turn bright red in the fall.                                    |

**Hint--**You will find the answers to questions 1-5 in the list below.

renewable	foresters	wildlife
fire	tree	understory
forests	manage	habitat

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## GLOSSARY

**Canopy** - the top layer of leaves and branches of the tallest trees in the forest.

**Coniferous** - an evergreen tree that has cones. The leaves of this tree are usually like needles.

**Conservation** - good use, protection, and improvement of our natural resources to make sure that we will always have these resources to use

**Deciduous** - a plant that sheds its leaves each year, usually in the fall.

**Forester** - a person with a college degree in the science of forestry who works to protect our forests.

**Forest Management** - the use of science to manage our forests so they will meet the needs of the people, animals and plants who depend on them.

**Harvest** - removal of trees in an ordered method that minimizes the damage to the environment.

**Nonrenewable Resources** - things like oil, gas, coal and gold which cannot be replaced once they are taken from the earth.

**Recreation** - the use of forestland for human fun and relaxation.

**Reforestation** - forests will be replaced after a harvest, either by replanting or other natural means.

**Renewable Resources** - raw materials or a form of energy that can be replaced either naturally or through man's efforts in your lifetime (e.g., trees).

**Seedling** - a young tree grown from seed.

**Succession** - the replacement of one plant community by another, through natural processes over time.

**Sustainability** - use and growth of natural resources to meet present and future needs.

**Understory** - layer formed by the leaves and branches of the smaller trees under the forest canopy.

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## FORESTRY CONTACTS

### **Alabama Cooperative Extension Service**

112 M. White Smith Hall  
Auburn University, AL 36849  
(334) 844-1002  
[www.aces.edu](http://www.aces.edu)

### **Alabama Department of Conservation & Natural Resources**

64 Union Street  
Montgomery, AL 36310  
(334) 242-3465  
[www.dcnr.state.al.us/agfd](http://www.dcnr.state.al.us/agfd)

### **Alabama Environmental Council**

2717 7th Avenue S., Suite 207  
Birmingham, AL 35233  
(205) 322-3126  
[www.alenvironmentalcouncil.org](http://www.alenvironmentalcouncil.org)

### **Alabama Forest Owners' Association**

P.O. Box 361434  
Birmingham, AL 35236  
(205) 987-8811  
[www.alabamaforestowners.com](http://www.alabamaforestowners.com)

### **Alabama Forestry Association**

555 Alabama Street  
Montgomery, AL 36104  
(334) 265-8733  
[www.mindspring.com/~alforest](http://www.mindspring.com/~alforest)

### **Alabama Forestry Commission**

513 Madison Avenue  
Montgomery, AL 36130-2550  
(334) 240-9300  
[www.forestry.state.al.us](http://www.forestry.state.al.us)

### **Alabama Forests Forever Foundation**

555 Alabama Street  
Montgomery, AL 36104  
(334) 265-8733  
[alforestsforever.org](http://alforestsforever.org)

### **Alabama TREASURE Forest Association**

P.O. Box 145  
Chunchula, AL 36521  
(334) 679-6087  
[www.atfa.net](http://www.atfa.net)

### **Alabama Wildlife Federation**

46 Commerce Street  
Montgomery, AL 36104  
(800) 822-9453  
[www.alawild.org](http://www.alawild.org)

### **Auburn University School of Forestry & Wildlife Sciences**

108 M. White Smith Hall  
Auburn University, AL 36849  
(334) 844-1007  
[www.forestry.auburn.edu](http://www.forestry.auburn.edu)

### **The Nature Conservancy of Alabama**

2821-C 2nd Avenue South  
Birmingham, AL 35233  
(205) 251-1155  
[www.tnc.org](http://www.tnc.org)

### **USDA Forest Service**

National Forests in Alabama  
2946 Chestnut Street  
Montgomery, AL 36107-3010  
(334) 832-4470  
[www.r8web.com/alabama](http://www.r8web.com/alabama)

### **USDA Natural Resources Conservation Service**

P.O. Box 311  
Auburn, AL 36830  
(334) 887-4535  
[www.ga.nrcs.usda.gov/al](http://www.ga.nrcs.usda.gov/al)

### **US Department of the Interior Fish & Wildlife Service**

P.O. Drawer 1190  
Daphne, AL 36526  
(334) 441-5181  
[www.fws.gov](http://www.fws.gov)

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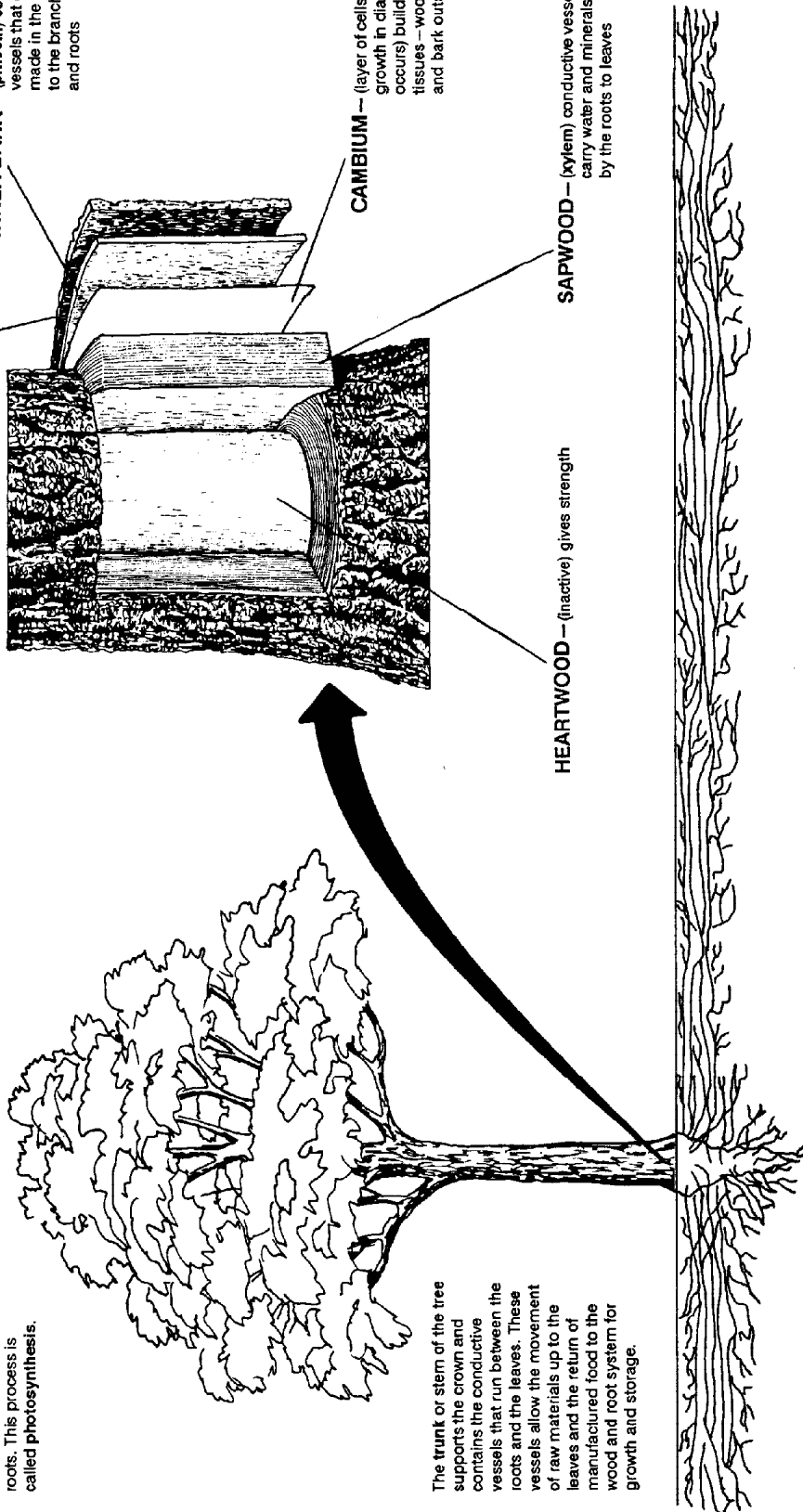
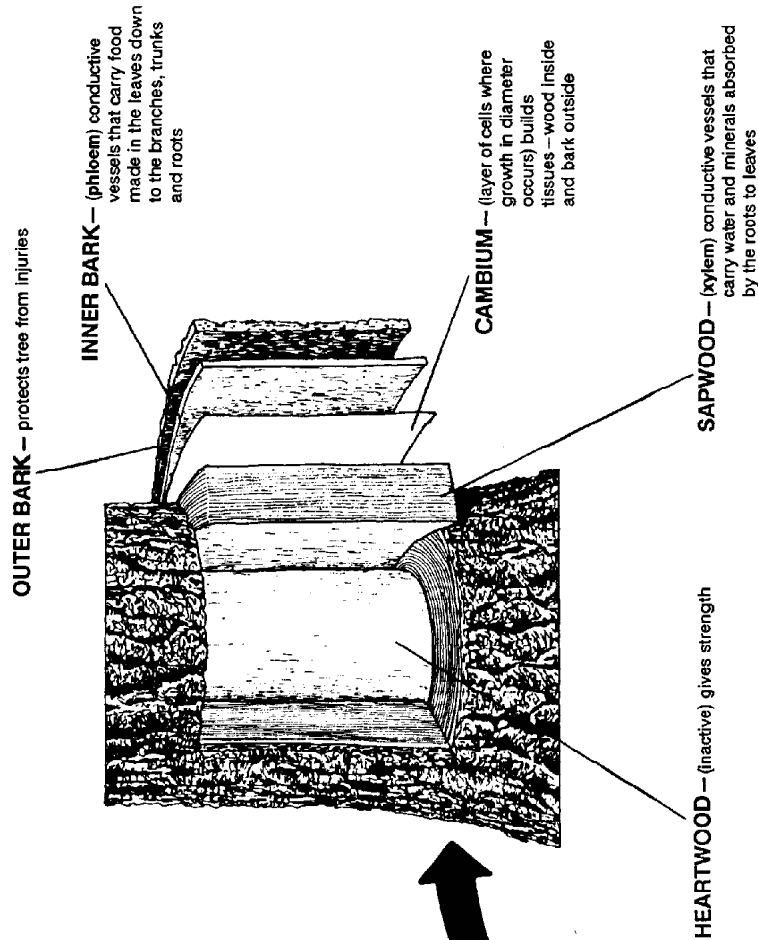


# HOW A TREE WORKS

The **crown** consists of the leaves and branches. The leaves should be called the tree's "chemical laboratory." They contain chlorophyll, the substance that gives the green color to the leaves. In the presence of sunlight, the leaves use the water and minerals from the roots, and the carbon dioxide from the air, to produce sugar and oxygen.

The oxygen is released to the atmosphere and the sugar is stored in the stem and roots. This process is called **photosynthesis**.

The **trunk** or stem of the tree supports the crown and contains the conductive vessels that run between the roots and the leaves. These vessels allow the movement of raw materials up to the leaves and the return of manufactured food to the wood and root system for growth and storage.



The **root system** is the most important part of a tree, yet is the most frequently ignored. A tree's root system usually extends horizontally beyond the branch tips.

The majority of the root system is located in the upper 12" to 18" of soil because of the high levels of oxygen which the roots require. Roots absorb minerals and water, store food, support and anchor the tree.



ALABAMA FORESTRY COMMISSION  
513 Madison Avenue  
Montgomery, AL 36130

AFC-ED-02 Reprinted July 1993

## WHAT DO ALABAMA'S FORESTS LOOK LIKE?

Forestry is a reflection of Alabama's economic and environmental health. It is tightly woven into every aspect of life. People in Alabama are both proud of this resource and concerned about its continued stability and vitality. In every community you are reminded of Alabama forestry.

Forests make up 21.9 million of the state's thirty million acres. Recent surveys indicate this is the third largest commercial forest in the nation. Today there are more Alabama acres in forest than ever recorded in the history of the USDA-Forest Service inventories.

Sixty-seven percent of the total land base is considered forestland. The nearly 22 million acres of trees in Alabama consist of four major timber "types" - pine, pine and hardwood mix, upland hardwood, and bottomland hardwood. These stands cover eight major physiographic regions which provides the conditions for species diversity. South Alabama is abundant in pure stands of pine. As you travel north, the type changes to mixed pine/hardwood conditions and then to more complex hardwood forests near the Tennessee boundary.

### Major Forest Types





## Forestry Word Search



Find and circle each of the following words relating to forestry. Words can be vertical, horizontal, forward, backward or diagonal.

Acorns  
Air  
Bark  
Birds  
Deer  
Fire  
Habitat  
Hardwoods

Insects  
Leaf  
Nest  
Oak  
Pine  
Pollution  
Rabbit  
Recreation

Root  
Smokey Bear  
Soil  
Squirrel  
Stewardship  
Sun  
Timber  
Trails

TREASURE  
Trees  
Turkey  
Water  
Wildflowers  
Wildlife  
Woodsy Owl

S	R	E	W	O	L	F	D	L	I	W	Z	R	Q	B
Q	O	Z	A	K	P	M	E	E	O	R	E	F	I	N
U	F	P	T	R	E	E	S	M	R	B	X	R	S	Y
I	G	W	E	E	Z	S	K	A	M	J	D	T	T	I
R	L	L	R	C	V	M	Z	I	E	S	N	Q	E	F
R	Y	O	M	R	C	O	T	V	O	A	K	B	W	I
E	T	I	B	E	D	K	C	X	F	E	G	P	A	R
L	E	A	F	A	C	E	T	R	E	A	S	U	R	E
C	R	L	U	T	H	Y	N	F	W	R	J	H	D	P
M	G	P	X	I	J	B	T	D	E	K	A	A	S	X
T	B	Y	I	O	N	E	Q	E	M	B	Z	R	H	L
I	V	F	U	N	B	A	D	I	I	P	Y	D	I	I
B	A	R	K	H	E	R	S	T	X	F	E	W	P	O
B	P	A	N	L	Q	T	A	Y	S	G	K	O	K	S
A	H	C	Q	O	C	T	Z	U	L	C	R	O	M	Q
R	O	O	T	E	J	G	N	J	Y	S	U	D	Z	F
Q	L	R	S	L	I	A	R	T	H	C	T	S	F	N
G	R	N	Z	M	P	O	L	L	U	T	I	O	N	E
J	I	S	H	L	W	O	Y	S	D	O	O	W	G	S
X	A	W	M	P	W	I	L	D	L	I	F	E	Y	T

## THE SECRET OF FALL COLORS

Few sights satisfy the soul like the brilliant colors splashed across our nation's hardwood forests each fall. Refusing to slip quietly into winter, nature marches out with great fanfare, as sugar maples show their bright oranges and yellows, aspens cover the West with a golden blanket, and the red and purple leaves of oaks and gums fill the South.

But what determines which color is assigned to a particular tree? And how does nature know it is time to let loose this change?

Actually the secret is in the sap. The chemicals of each tree's sap provides instructions on what fall color its leaves should turn. Different amounts of iron, phosphorus, sodium and other chemicals determine whether the tree turns amber, gold, red, orange, purple or just fades from green to brown.

What triggers the change? Poplar myth credits Jack Frost with this event, but in reality, the temperature has little to do with it. The answer really is found in the changing length of the days. As days grow shorter and nights longer in the fall, the flow of sap to leaves is slowed down. As the sap dries up, the chemical which makes leaves green, chlorophyll, disappears. This leads to the display of the fall colors.

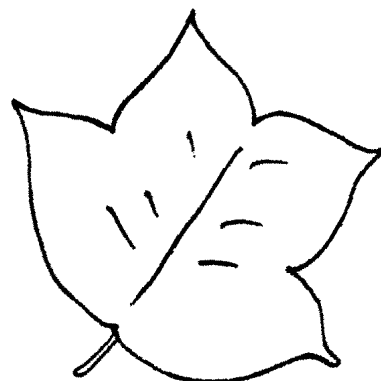
The colorful leaves are not just pretty. As they fall to the earth, they return nutrients that plants need to grow to the soil. Mammals, insects and other creatures on the forest floor eat these leaves. When they die,

they add nutrients back to the forest. This helps complete the life cycle of the forest.

Some suggestions for trees which can give your yard some pretty fall color are below.

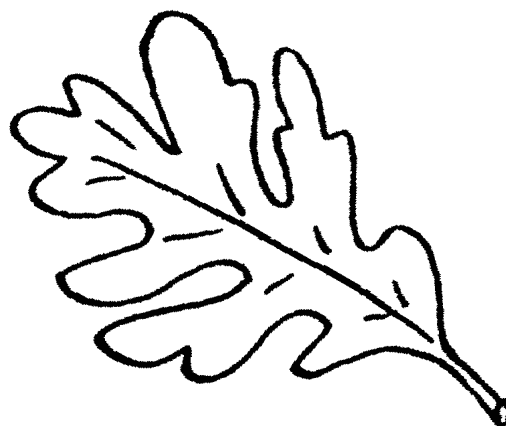
### **Yellow**

Beech  
Birch  
Elm  
Ginkgo  
Hackberry  
Hickory  
Locust  
Pecan  
Persimmon  
Sycamore  
Willow



### **Orange**

Red Oak  
Sassafras

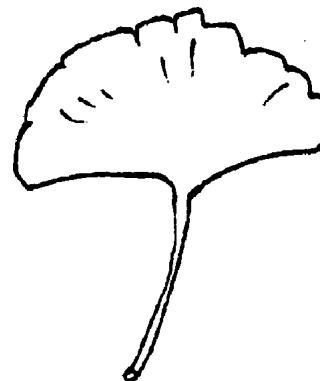


### **Gold**

Ash  
Buckeye  
Willow Oak  
Yellow-Poplar

### **Red**

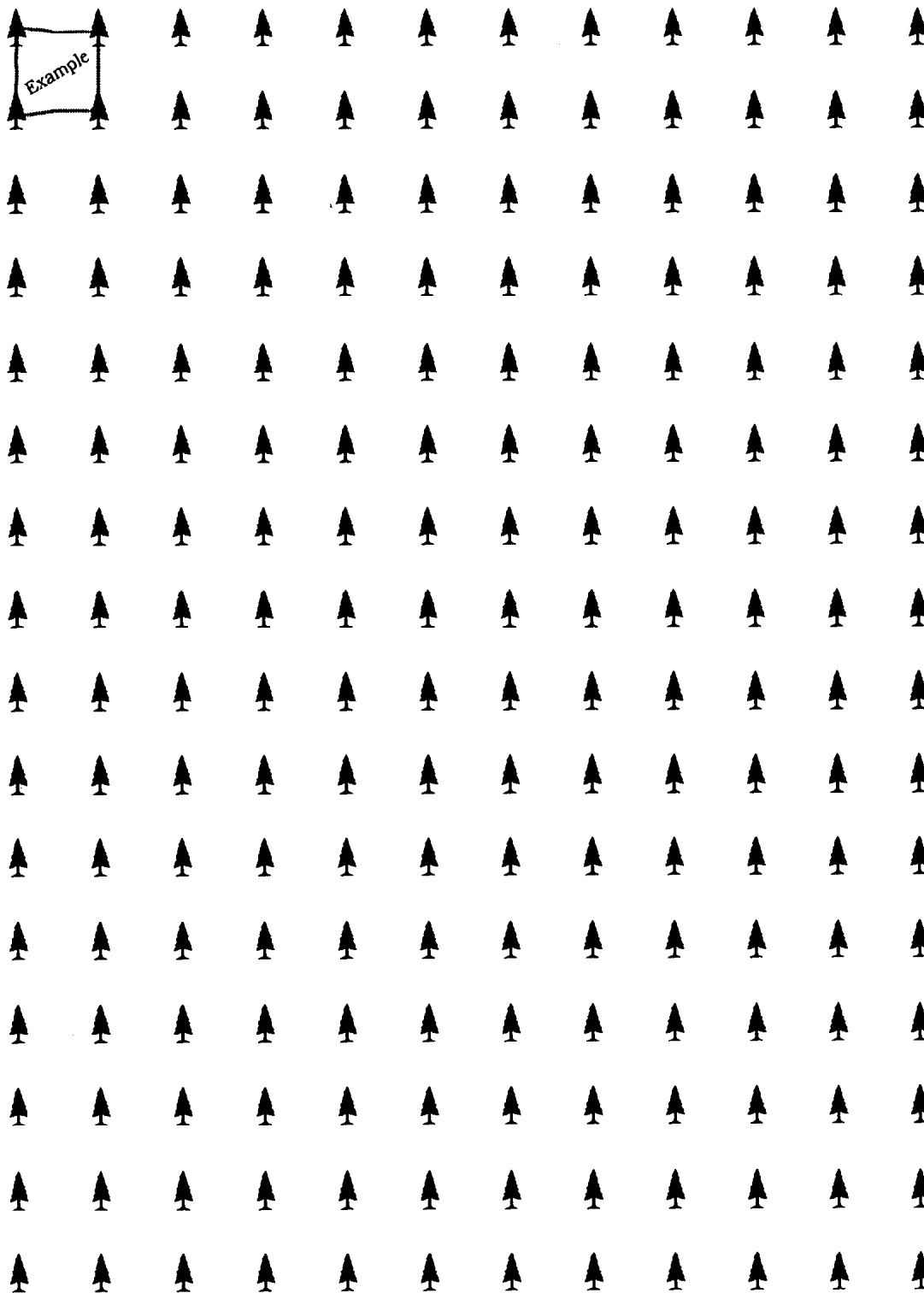
Black Cherry



*This information is from an Alabama Forestry Commission publication entitled "The Secret of Fall Colors."*

# TREE SQUARES

Each player takes a turn connecting two trees, either horizontally or vertically. The player drawing the last line forming a square puts his or her initials inside the square. When all trees are connected, the players with the most squares wins.



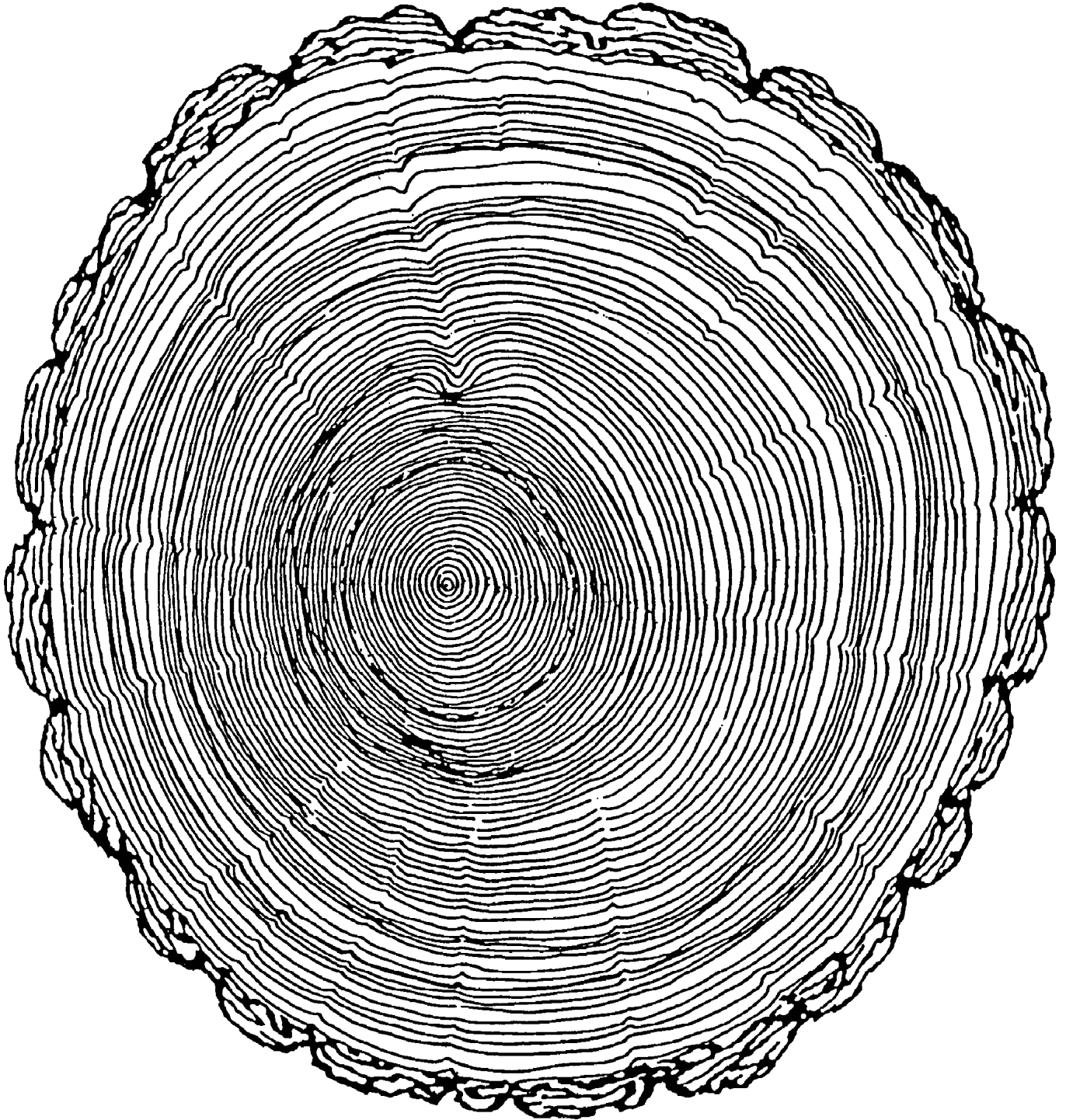
## **TREE COOKIE ACTIVITY DIRECTIONS**

Use the “tree cookie” on the next page to talk about the age of trees and relating their life span to that of your students. Some suggestions include:

1. Have them determine the age of the tree.
  2. Tell them it was harvested in 1998. Ask what year was it born.
  3. Discuss the effect of fire, drought, nutrient shortages etc. on tree growth and the development of tree rings.
  4. If the tree was harvested in the year 2000, have them mark significant events in time for things like their birth, when they started school, the Gulf War, etc.
-



## TREE COOKIE ACTIVITY

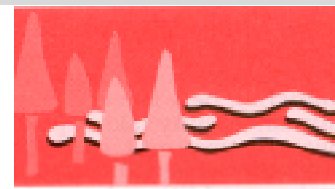


# PROJECT LEARNING TREE ACTIVITY # 21

## Adopt a Tree

### Overview

This activity will encourage students' awareness of individual trees over time, as well as incorporate various other subjects. By adopting individual trees, students will gain greater awareness and appreciation of their local environment.



### Getting Ready

Have students make "Adopt a Tree" notebooks for recording information. Students can fold a sheet of construction paper in half, insert blank pages and staple the book along the folded edge. They can draw or paste a photo of their adopted tree on the cover. Make copies of student page 68 for each student.

### Doing the Activity

1. Ask students to name something that is their very own or is special to them in some way. For example, someone might mention a pet. Someone else might mention a present received from a relative or close friend, and so on.
2. Explain that each person will choose his or her very own special tree to adopt. With **younger students**, you can have the whole group adopt a particular tree. Where there's a shortage of trees, you might have teams adopt trees. Students will observe their trees throughout the school year, or for however long you decide to conduct the activity. How they select their tree is up to

them. Some students may choose the tallest or fullest tree. Others may choose the smallest, "cutest" tree. Some may pick a seemingly average-looking tree, only to discover that there's more than meets the eye. No matter which tree they pick, students should be able to say why they chose it. You might have students tie a colored piece of yarn around their tree to identify it.

3. Provide each student with a small notebook, and explain that students should use their notebooks to record observations and answer questions about their trees. You can also have them decorate their own notebooks.

4. Take students outside and let each choose a tree. If you're working with **older students**, or if there aren't trees near your school, you might have students choose trees near their yard or in their neighborhood. Students could briefly visit their tree before or after school.

5. Have students write the answers to the questions on the student page

in their "Adopt a Tree" notebooks. For **younger students**, you will need to read and explain the question to them.

6. You might give **younger students** "Adopt a Tree" certificates (page 69) to fill out after

### Levels

Activity: Grades 3-8

Variation 1: Grades PreK-1

Variation 2: Grades K-4

### Subjects

Science, Math, Language Arts, Visual Arts, Social Studies

### Concepts

- Organisms are interdependent; they all depend on nonliving components of the Earth. (4.1)
- While every organism goes through a life cycle of growth, maturity, decline, and death, its role in the ecosystem also changes. (13.3)

### Skills

Observing, Concept Forming, Reasoning, Organizing Information

### Objectives

Students will 1) describe a chosen tree using personal observation and investigation, and organize information about the tree, 2) identify relationships between their tree and other organisms, and 3) put together a book or portfolio about their tree.

### Materials

Activity: notebooks, pencils, drawing paper, crayons or markers, camera, copies of page 68, (optional), student page 69

### Time Considerations

Preparation: 15 minutes

Activity: 50 minutes (longer projects can be done throughout the year)



they've chosen their trees.

7. Have students visit their trees on a regular basis. Each time they visit, have them write a few sentences or make sketches in their notebooks describing any changes they notice (broken branches, new leaves); animal or human activity taking place on or near the tree (nest, carved initials); or any other observations. You might make up additional questions as different seasons come and go. What color do the leaves become in the fall? When does the tree bloom in the spring? Have students guess the causes of these changes and predict future changes or have them take photographs of their tree.

### **Variation 1--Growing Up Together**

1. Take the class outside to a grove of trees. Give students a few minutes to use their senses of smell, touch, hearing, and seeing to get acquainted with the area. Choose a particular tree to observe in different ways. For example, how does the tree look when you are sitting? When you are lying on your side? When you are lying on your back?
2. Ask students to volunteer to describe the tree, using their senses. Summarize each student's description by making comparative statements. You may structure students' comments by asking individuals to complete this sentence: "the tree is \_\_\_\_\_."
3. Ask students whether they think the tree is alive. Do not discount their answers, but ask how they know whether the tree is alive or not. (Trees need food and water to grow just like people.)
4. Use these discussion questions: How are all trees alike? How are they different? Are they all alive? Are other plants alive in the area? What benefits do these trees

provide for them and the environment?

### **Variation 2--Adopt an Object**

Rather than limiting this activity to trees, allow students to adopt any special object (house plant, pet, statue, billboard, a store window) from their indoor or outdoor environments. Adapt the "Adopt a Tree" student page 68 so that it encompasses non-tree and human-made items. Include questions that relate the object to people. How did it get there? How does it benefit society? What is its special meaning to you?

### **Enrichment**

1. Have students work in pairs to measure the height, circumference, and crown of their trees. (See "How Big is your Tree?" on page 239 for complete directions.) Afterward, have each pair use those measurements to design several math problems with the rest of the group.
2. Have students create a picture of a tree with flip up windows portraying life on their tree, in their tree, and among the tree's roots. (See the diagram on page 67.)
3. Raise money to buy a class tree. Take students to a nursery to pick out a tree; then hold a tree-planting ceremony. (See "Plant a Tree" on page 95 for complete directions.)
4. Create a "Whole Language Tree." Use a large, bare tree, painted or modeled in the classroom, as a focal point for various curriculum topics. Through the year, have students show how the tree is constantly changing: from green leaves and apples to changing colors and falling leaves; and from winter skeletons to bursting buds, flowers, and bees. You can also use the tree to demonstrate ideas associated with plants, holidays, and social and environmental issues.

## **END NOTES ...**

### **Assessment Opportunity**

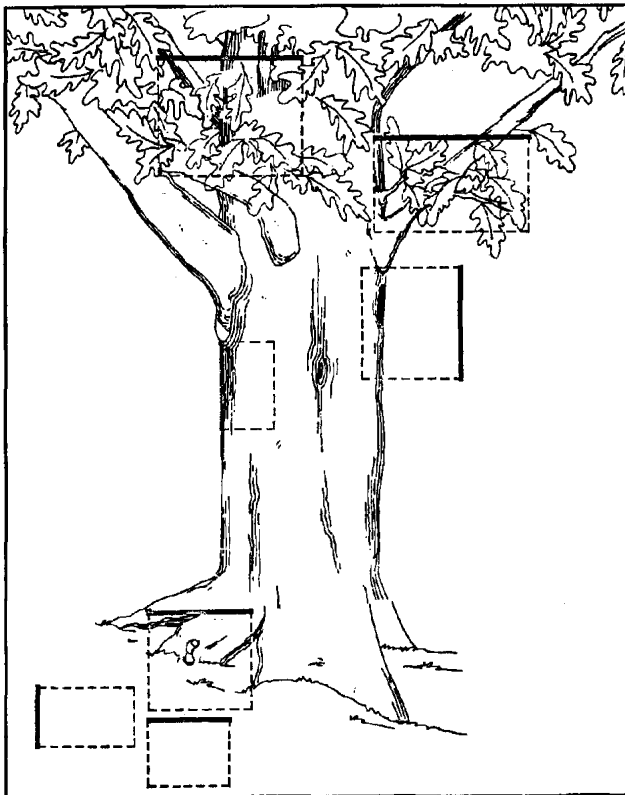
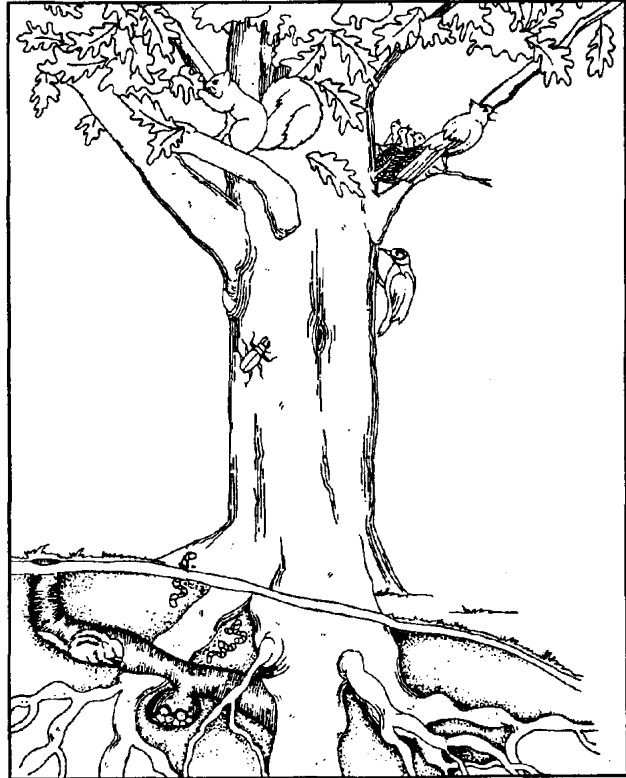
1. Over short or extended periods, younger students can create books or portfolios about their adopted trees. On the first book page, each student can glue a picture of himself or herself standing next to the adopted tree. Students' books can also include drawings, poems, story, pressed leaves, rubbings, flowers or twigs.
2. Older students can write an essay about life from their tree's perspective. For example, a student who adopts a very old tree might write a story in which the tree "talks" about the days when small farms dotted the landscape or when horses and buggies crowded city streets. The tree could also talk about how it relates to the plants, animals and people around it and what problems it has.

### **RELATED ACTIVITIES**

Trees as Habitats, Plant a Tree, We All Need Trees, Trees for Many Reasons, Tree Lifecycles, Trees in Trouble, Tree Cookies, Signs of Fall, How Big is Your Tree?

For teachers to read...

**DIAGRAM OF  
FLIP-UP WINDOWS**





## ADOPT A TREE QUESTIONS

### On Your First Visit

**1**

Where is your tree?  
Draw a map to show its location.

**2**

Is your tree alive? How can you tell? Is it healthy? In what ways are people helping or hurting it?

**3**

Draw a picture of your tree from various perspectives: from a distance, from a high place, or from lying underneath looking up.

**4**

Write a paragraph or poem describing your tree.

**5**

Draw a picture of a leaf from your tree. How does the leaf smell? How does it feel?

**6**

Do you know what kind of tree you have adopted? Does your tree have any fruits, nuts, or seeds that help identify it? Use a field guide to look up your tree.

**7**

Make a rubbing of your tree's bark. How does the bark feel? How does it smell?

**8**

Are any animals on or near your tree? Don't forget to look for insects, spiders, and other small animals.

**9**

Are there any signs that animals have used your tree in the past? Look for holes, nests, trails, and other animal signs. How do those animals depend on your tree? Do they harm it?

### On Additional Visits

- 1** Review the notes from your previous visit.
- 2** How has your tree changed? (Use the questions above as a checklist.)
- 3** How has your tree stayed the same?

## OFFICIAL PLT Adopt a Tree Certificate

\_\_\_\_\_  
Official Tree Name

\_\_\_\_\_  
Nickname

\_\_\_\_\_  
Birthplace

\_\_\_\_\_  
Circumference

\_\_\_\_\_  
Height

\_\_\_\_\_  
Age

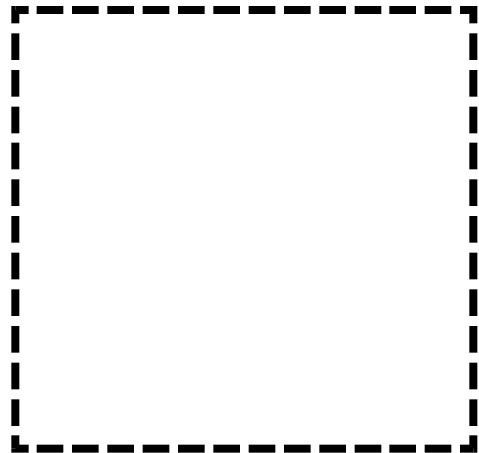
\_\_\_\_\_  
Identifying Characteristics

\_\_\_\_\_  
Adopted By

\_\_\_\_\_  
Date

One Especially Interesting Thing About My Tree Is

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Place Leaf Rubbing in the Space Above

# PROJECT LEARNING TREE ACTIVITY # 27

## Every Tree for Itself

### Overview

Try this activity to give your students an idea of the conditions that trees need to live and grow, and to help your students understand that trees must often compete for their needs.

### Background

What do trees need so they can grow? Some of their needs are the same as those of people and other animals. For example, trees need plenty of water. They also need plenty of nutrients, which they get from food. But trees and people don't get food the same way. Plants make their own food by using energy from the sun.

If trees don't get enough water, nutrients or sunlight, they may grow slowly or die. Growth rings show this graphically. In general, wide rings indicate good conditions for growth (plenty of nutrients, water, and sunshine) while narrow rings often indicate less favorable conditions for growth (drought, insect damage, lack of nutrients, competition). (See additional background in "Tree Cookies" on page 289, "Sunlight and Shades of Green" on page 137, "Air Plants" on page 85, and "How Plants Grow" on page 135.)

### Getting Ready

Cut two 3" x 3" (7.6 cm x 7.6 cm) squares out of blue, yellow, and green construction paper for each student. To save time you could use colored poker chips. Poker chips work much better than paper if you're doing the activity on a breezy day.

### Doing the Activity

1. Pass out the cross-sections from several trunks or branches (tree cookies), and have your students examine the growth rings. (If you do not have an actual cross-section, draw a big one on the chalkboard.) Explain that the number of rings

indicates the trees age.

2. Give a large piece of paper (at least 8.5" x 11" or 22 cm x 28 cm) or a white paper plate to each student.

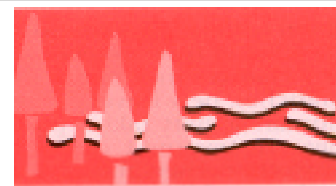
3. Tell students to imagine that they are trees. Have them draw a cross-section of themselves, representing their age in growth rings. (You might laminate these drawings for durability.)

4. Have students stand about three feet (91 cm) apart on their cross-sections.

5. Equally distribute the colored squares (or poker chips) on the floor around the students so the squares are about one to two feet (30-61 cm) apart.

6. Tell students that they'll be playing a game called "Every Tree for Itself." The object of the game is for the "trees" to gather as many squares as they can. Explain that each colored square represents a tree requirement. Blue represents water, yellow represents sunlight, and green represents a nutrient such as nitrogen, oxygen, or carbon dioxide. Make appropriate adjustments if you use poker chips.

7. Give a signal, to start the first round. Have student trees reach with their roots and branches (arms and legs) to gather their requirements. Tell students that one foot (their tap root) must remain planted on their cross-section at all times. They are not allowed to slide their cross-section along the floor or step off it; they will be disqualified for doing so.



### Levels

Grades K-8

### Subjects

Science, Math

### Concepts

- The Earth's atmosphere, water, soil, climate and geology vary from region to region. (1.3)
- Organisms are interdependent; they all depend on nonliving components of the Earth. (4.1)
- Altering the environment affects all life forms--including humans--and the interrelations that link them. (4.2)

### Skills

Determining Causes and Effects, Identifying Relationships and Patterns, Predicting, Interpreting

### Objectives

Students will 1) simulate how trees compete for their essential needs; and 2) describe how varying amounts of light, water and nutrients affect a tree's growth.

### Materials

8" x 10" (20 cm x 25 cm) pieces of paper or paper plates; pieces of blue, yellow, and green paper, markers or crayons, (optional: tree trunk or branch cross-sections showing annual growth rings, often available from tree trimming services or forest industries; three colors of poker chips)

### Time Considerations

Preparation: 15 minutes  
Activity: 50 minutes

**8.** Allow student trees to gather these requirements for one 30 second round. (They can either collect all types of requirements at once or one type of requirement each round.) Have students use a notebook to record how many of each color requirement they gathered. Use the following questions to discuss the results of the first round:

- How many requirements did each tree get?
- Do any trees lack a particular requirement?
- What might happen to a real tree that lacked one of its requirements? (It might grow slowly or eventually die. Point out to the students, though that different species of trees have different requirements.)
- Is there any such thing as too much water, sunlight, or nutrients? (Yes, every species has optimum levels beyond which the tree becomes stressed.)

**9.** Have students stand on their cross-sections in groups of three to five. Gather the colored squares and spread them around the room again. Play another round and have student trees record their results.

**10.** Compare the results of this round with those of the first. In most cases, students will notice that each tree gathered fewer requirements. Ask if they can reach any conclusions about trees that grow close to each other. (Such trees compete for requirements. Often they don't grow as well as trees that are more widely separated from one another.) Ask if any trees "died" because they could not get a particular requirement. (You can allow trees to fall down or look droopy if they haven't received their vital requirements.)

**11.** Ask students how foresters might use their knowledge of competition in caring for a stand of trees. (Foresters plant trees a certain

distance apart so that the trees will be able to get enough nutrients. The distance varies depending on the species of tree. Foresters also thin young stands of trees).

**12. Try** several more rounds, comparing the results each time. Here are suggestions for setting up additional rounds. As before, each student should examine his or her resulting each round. Older students can record those results and later graph or chart the results of each round and draw conclusions.

- Have all of the students stand closer together.
- Put students closer together, but have only half of the class participate.
- Use fewer water squares (representing a drought).
- Use fewer sunlight squares (representing lack of sunlight for young trees because of overcrowding).
- Use fewer nutrient squares representing poor quality soil).

#### **Enrichment**

For a visual way to portray water absorption by roots, try the following:

- 1.** Explain that for many species of trees, the diameter of the spread of the tree's roots is roughly equal to the tree's height. Have students measure themselves and then make a circle (using chalk or string) with a diameter equal to their height.
- 2.** Play the tree game with each student standing in the center of his or her circle. Tell the student trees they can gather water squares only within their circle of roots.
- 3.** Play the game again using root circles, but this time have trees stand in clumps. Afterward, discuss the results of root competition.

#### **END NOTES...**

##### **Assessment**

##### **Opportunity**

Assign values to the amounts of requirements the students gather. For example, a collection of three or more of each requirement could represent superior growth. Two of each requirement could represent average growth. And one or fewer of each could represent poor growth. Using these values as a basis, have students record the numbers of trees that are growing very well, fairly well and poorly for each round. Older students can use graphs.

##### **RELATED ACTIVITIES**

Tree Cookies, Tree Factory, To Be a Tree, Sunlight and Shades of Green, How Plants Grow, Air Plants, Plant a Tree,



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## ALABAMA'S FAMOUS AND HISTORIC TREES

Consider checking out one of Alabama's Famous and Historic Trees. This would make a good writing/history project for your students. Contact your county Alabama Forestry Commission office to find out more about these trees.

**Tree Name**

1. Battlefield Sycamore
2. Boyington Oak
3. Duffie Oak
4. General Gorgas Oak
5. Georgia Cottage Oaks
6. Jackson Live Oak
7. Jackson Red Oak
8. General Jackson Pine
9. Colbert Ferry
10. Hellen Keller Oak
11. Incense Cedar
12. Hanging Tree
13. Easter Red Cedar
14. Hippocrates Tree
15. Laurel Oak
16. Godfrey Ginkgo
17. The Big Oak
18. Weeping Mullberry
19. Magnolia Grove
20. Yancy Tree
21. Bethany Oak
22. Jenison Oak
23. Capital Oak
24. Kring Post Oak
25. Ellen Bryce Tree
26. The Freedom Tree-Triumphs
27. Kelly-Stone-Hill-Magnolia
28. Mabry-Wilson-Whitten Grove
29. Byrd School Learning Tree
30. Tree 249-3

**Location**

Montgomery  
Mobile  
Mobile  
Tuscaloosa  
Mobile  
Baldwin County  
Tallapoosa County  
Wetumpka  
Sheffield  
Tuscumbia  
Tuskegee  
Baldwin County  
Hale County  
Jasper  
Sumter County  
Fort Payne  
Geneva  
Florence  
Greensboro  
Attalla  
Attalla  
Northport  
Tuscaloosa  
Gainesville  
Tuscaloosa  
Montgomery  
Carrollton  
Odenville  
Selma  
Bibb County

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# EVALUATION

## *Forest Friends* CD-ROM and Instructional Guide

Please complete the following questionnaire to help us determine the effectiveness of the *Forest Friends* CD-ROM and Instructional Guide.

Name \_\_\_\_\_

School/Organization \_\_\_\_\_

Mailing Address \_\_\_\_\_

At what grade level(s) have you used the CD-ROM? \_\_\_\_\_

In which subject areas? \_\_\_\_\_

Thank you for providing your reactions to the CD-ROM and *Instructional Guide*. The following information will help us plan future teaching tools and implement programs more effectively. Please comment when appropriate on the space provided.

**1. The CD-ROM is an effective teaching tool.**

Strongly agree      1      2      3      4      5      Strongly disagree

**2. I do not have the technology necessary to incorporate into my class room.**

Strongly agree      1      2      3      4      5      Strongly disagree

**3. The *Instructional Guide* is an effective tool.**

Strongly agree      1      2      3      4      5      Strongly disagree

**4. The resource materials will be helpful when I teach about the environment.**

Strongly agree      1      2      3      4      5      Strongly disagree

**5. I plan to use the CD-ROM with future classes.**

Strongly agree      1      2      3      4      5      Strongly disagree

**6. I plan to use the *Instructional Guide* to prepare for future classes on forestry issues.**

Strongly agree      1      2      3      4      5      Strongly disagree

The Alabama Forests Forever would appreciate any further comments you wish to share.

\_\_\_\_\_ Check here if you are interested in receiving training in Project Learning Tree.

**Mail To:** Alabama Forests Forever Foundation  
555 Alabama Street  
Montgomery, AL 36104

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