Welcome to Forest Friends . . .

This 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 our most valuable ... properly managed ... and ... infinitely renewable resources. Hopefully you, and your students will enjoy the learning and implementation challenges of this CD-ROM.

TABLE OF CONTENTS

TRODUCTION	3
Purpose	
USE IN THE CLASSROOM	
WHAT IS PROJECT LEARNING TREE?	
Required Computer Equipment	

CONTENT AREAS

Environment	4
Explores the various benefits of trees in terms of wildlife habitat, clean air, clean water and cooling	
effects. Students also learn about native wildlife.	
Environment Crossword Puzzle (Older Students)	5
Environment Crossword Puzzle (Younger Students)	6
Student Assessment - Environment	7
PRODUCTS	8
Identifies numerous items made from trees that we rely on daily.	
TREE PRODUCTS WORD SEARCH (OLDER STUDENTS)	9
TREE PRODUCTS WORD SEARCH (YOUNGER STUDENTS)	10
Student Assessment - Products	11
TREE IDENTIFICATION	12
Discusses the management activities necessary to maintain a healthy forest.	
TREE ID WORD SCRAMBLE (OLDER STUDENTS)	13
TREE ID WORD SCRAMBLE (YOUNGER STUDENTS)	14
Student Assessment - Tree Identification	15

REFERENCE MATERIALS

GLOSSARY	. 16
Forestry Contacts	. 17
Answers to Assessements	. 18
How a Tree Works	. 19
Forestry Word Search	. 20
The Secret of Fall Colors	. 21
TREE SQUARES	. 22
TREE COOKIE ACTIVITY DIRECTIONS	. 23
Tree Cookie Activity	. 24
Project Learning Tree Activity # 21	. 25
Project Learning Tree Activity # 27	. 30
Evaluation of CD-ROM and Teacher's Guide	. 32

PURPOSE

The *Forest Friends CD-ROM*, along with a middle school version, *Forests Forever*, and a high school version, *Forest Fever*, 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 Teacher's 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 forests. To assist in the learning experience, each of our three content areas includes grade level, subjects, concepts, skills and correlations to state educational sandards. 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 Teacher's 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.

The *Forest Friends CD-ROM* is primarily designed for use in K - 4th 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 Interactive Training Media, Inc. at the number listed on page **17** of this Teacher's 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.



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

Sunshine State Standards

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 breath.

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 "Concentrection" 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 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 hun-dred 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 demands 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, lets 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 student 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 well help students understand the relationship of man to their surroundings.



2 3 I I 4 I I I 2 3 I I I 4 I I I 2 3 I I I 4 I I I 2 3 I I I I I I I 1 I

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.



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

Acorn	Hibernate
Eagles	Shade
Forests	Snakes
Frog	Roots

Student Assessment - Environment

Name:_____

1. Trees produce	that	we need to
a) water, drink	b) oxygen, breath	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 c	orrect statement below	w.
5. Eagle	a) These animals like	e to hibernate, or sleep, most of the winter
6. Bear	b) Living deep in the their prey, then ju	e forest these animals like to climb rocks and watch for imp down on them.
7. Snake	c) These amphibians	s like to eat insects.
8. Bobcat	d) With white heads a tops of trees and a	and good eye site, these animals like to fly down from the catch fish.
9. Frogs	e) These are exceller and lay eggs in log	nt climbers that often live in the hollow sections of trees gs 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

Sunshine State Standards



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.

the CD and where they	come nom.
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.

TREE PRODUCTS WORD SEARCH

F	L	U	Q	Κ	S	D	Н	D	Р	Е	Ν	С	Ι	L	S
D	Ι	В	U	Ζ	С	В	L	0	А	U	М	0	G	Y	K
Η	R	L	А	М	R	Т	D	0	Р	G	V	Н	S	F	V
K	G	U	М	E	А	E	D	D	E	L	С	Ι	R	Y	М
S	S	W	L	Y	Y	L	Ι	L	R	А	Х	J	E	Y	Н
V	Y	Е	Е	S	0	V	K	С	Р	R	М	L	Р	R	В
0	Ι	0	L	Ι	Ν	Т	E	S	E	G	Ζ	Т	А	Р	Е
Т	0	0	Т	Η	Р	А	S	Т	Е	С	Y	Ι	Ι	0	0
A	D	Е	L	Е	Κ	Ι	В	W	0	D	R	R	D	L	Н
V	Е	L	Ν	Ι	D	Ν	Η	Е	А	А	J	Е	0	Y	0
Q	S	D	V	В	Ν	Y	F	Т	С	Κ	S	R	А	Х	U
Т	Κ	0	Т	L	Р	А	Q	Т	E	F	Е	Е	F	М	S
0	R	А	Ν	G	E	D	R	Ι	Ν	Κ	S	G	J	V	Е
J	V	Κ	В	Ι	Т	R	R	K	А	А	L	Т	S	Y	Е

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

TREE PRODUCTS WORD SEARCH



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

Bag Chair Crayon Desk House Paper Pencil

Student Assessment - Products

		Name:
1. Every	of the	is used to make products we need every day.
 Many paper and v not 	vood products are	and reused so trees are
 Name two things y 2. 	ou have or use in your c	lassroom that come from trees:
 Name two things y 1. 2. 	ou have or use in your h	nome that come from trees:
 Name two things y 2. 	ou would find at the gro	cery story that come from trees:
Match the product to	the part of the tree us	ed to make it
6. Film	a. Tree	Fibers
7. Violin	b. Tree	Pulp
8. Diapers	c. Cellu	llose
9. Hospital Go	own d. Woo	d
<i>Challenge</i> 10. What three produces the longer use trees? 1. 2. 3. Why would you miss	cts that come from trees these?	would you miss the most if we could no

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

Sunshine State Standards

We have learned some of the benefits that forests provide to man and animals. Now, lets 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 understory 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



n a r r a t i v e. Twelve trees commonly found in the state are included on the disk. The description of each tree as well as a sketch of the tree can be reading and writ

ing 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 preforming 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 trees' survival.

printed and used for reading and writ-

TREE ID WORD SCRAMBLE



Unscramble the words above to identify twelve state 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 the state:
Live oak	Yellow-poplar	Sugar maple
-		

Sweetgum Black walnut Red maple Yellow-poplar Pecan Bald cypress Longleaf pine Sugar maple Magnolia Elm Sycamore Hickory White oak American holly Sassafrass

TREE ID WORD SCRAMBLE



Unscramble the words above to identify eight 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 the states:

Oak	Elm	Poplar	Maple	Sassafrass
Sweetgum	Pecan	Hickory	Holly	Pine

Student Assessment - Tree Identification

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 loose 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 a very common evergreen tree.
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

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 - insuring that 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 the 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.

FORESTRY CONTACTS

A directory of Florida Division of Forestry offices (Forestry Stations) throughout the state can be found on the Wildfire Prevention CD as an Internet link under "Resources". Click on the Florida Division of Forestry website link < \underline{WWW} . fl-dof.com > once on the

Division of Forestry homepage, click on "About Us", then click on "Map of Districts"

Blackwater Forestry Center 11650 Munson Highway Milton, FL 32570 Telephone: 850-957-6140

Tallahassee District 865 Geddie Road Tallahassee, FL 32304 Telephone: 850-488-1871

Suwannee District Route 7, Box 369 Lake City, FL 32055 Telephone: 904-758-5700

Waccasassa Forestry Center 1600 NE 23rd Avenue Gainesville, FL 32609 Telephone: 352-955-2005

Withlacoochee Forestry Center 15019 Broad Street Brooksville, FL 34601 Telephone: 352-754-6777

Lakeland District 5745 S. Florida Avenue Lakeland, FL 33813 Telephone: 863-648-3163

Okeechobee District 5200 Hwy 441 North Okeechobee, FL 34972-8697 Telephone: 863-462-5160 Chipola River District 715 West 15th Street Panama City, FL 32401 Telephone: 850-872-4175

Perry District 618 Plantation Road Perry, FL 32347 Telephone: 850-838-2299

Jacksonville District Route 2, Box 65 Bryceville, FL 32009 Telephone: 904-266-5003

Bunnell District Route 1, Box 20 F Bunnell, FL 32110 Telephone: 904-446-6787

Orlando District 8431 S. Orange Blossom Trail Orlando, FL 32809 Telephone: 407-856-6512

Myakka River District 4723 53rd Avenue E Bradenton, FL 34203 Telephone: 941-751-7629

Caloosahatchee District 10941 Palm Beach Blvd. Ft. Myers, FL 33905 Telephone: 941-694-2181

ANSWERS TO ASSESSMENTS

Environment Crossword Puzzle, (Older Student Version), page 5



Environment Crossword Puzzle, (Younger Student Version), page 6



Student Assessment - Environment, page 7

1. b	4. c	7. e
2. a	5. d	8. b
3. c	6. a	9. c

10. The forest provides a place for many animals to live, like a zoo. We can visit a zoo or a forest to learn about plants and animals.

Product Word Search, (Older Student Version), page 9

F	L	U	Q	Κ	S	D	Н	D	Р	Е	Ν	С	Ι	L	S
D	Ι	В	U	Ζ	С	В	L	0	А	U	М	0	G	Y	Κ
Н	R	L	А	М	R	Т	D	0	Р	G	V	Н	S	F	V
K	G	U	М	Е	Α	Е	D	D	Е	L	С	Ι	R	Y	М
S	S	W	L	Y	Y	L	Ι	L	R	А	Х	J	Е	Y	Н
V	Y	Е	Е	S	0	V	Κ	С	Р	R	М	L	Р	R	В
0	Ι	0	L	Ι	Ν	Т	Е	S	Е	G	Ζ	Т	А	Р	Е
Т	0	0	Т	Н	Р	А	S	Т	Е	С	Y	Ι	Ι	0	0
Α	D	Е	L	Е	K	Ι	В	W	0	D	R	R	D	L	Н
V	Е	L	Ν	Ι	D	Ν	Н	Е	А	А	J	Е	0	Y	0
Q	S	D	V	В	Ν	Y	F	Т	С	Κ	S	R	А	Х	U
Т	Κ	0	Т	L	Р	А	Q	Т	Е	F	Е	Е	F	М	S
0	R	А	Ν	G	Е	D	R	Ι	Ν	Κ	S	G	J	V	Е
J	V	K	В	Ι	Т	R	R	Κ	А	А	L	Т	S	Y	Е

Product Word Search, (Younger Student Version), page 10

Н	0	U	S	Е	х	Z	С	в	К
S	R	L	0	V	A	0	н	E	v
^	w	ц	v	,	G	B	•	т	Ģ
A D	vv	-11 -D	Г	n	U T	D	A	ı N	D
Р	А	Р	E	К	L	C	1	IN	в
Е	J	Е	S	Х	W	Y	R	D	А
Е	L	Ν	А	М	U	Ζ	D	S	G
R	Q	С	Ι	F	Т	D	Е	S	Κ
U	А	Ι	G	D	М	L	Ι	В	G
J	R	L	Ζ	С	R	А	Y	0	Ν

Student Assessment - Products, page 11

- 6. b 1. part, tree
- 2. recycled, wasted 7. d
- 3. answers will vary 8. c
- 4. answers will vary 9. a
- 5. answers will vary 10. Answers will vary.

Tree Identification Word Scramble (Older Students), page 13

- 1. Magnolia 7. Hickory
- 2. Yellow-poplar 8. Live oak
- 3. Red maple 9. Sycamore
- 4. Bald Cypress 10. Longleaf pine
- 5. American Holly 11. Sweetgum
- 6. Sassafrass 12. Pecan
 - bottom line = A FOREST

Tree Identification Word Scramble (Younger Students), page 14

- 1. Sassafrass 5. Oak
- 2. Holly 6. Pine
- 3. Poplar 7. Pecan
- 4. Maple 8. Sweetgum
 - bottom line = A FOREST

Student Assessment - Balance, page 15

- 1. renewable 6. c
- 2. foresters 7. e
- 3. understory 8. a 4. fire
 - 9. b
- 10. d 5. manage



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 Hardwo	ods			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	о	L	F	D	L	I	W	Z	R	Q	в	
Q	0	Z	A	K	Ρ	М	Е	Е	0	R	E	F	I	N	
U	F	P	T	R	Е	Е	S	М	R	В	х	R	S	Y	
I	G	W	Е	Е	Z	S	K	A	М	J	D	т	т	I	
R	L	L	R	с	v	М	Z	I	E	S	N	Q	Е	F	
R	Y	0	М	R	С	0	T	v	0	A	K	В	W	I	
E	Ť	I	В	Е	D	K	С	Х	F	E	G	Р	Α	R	
\mathbf{L}	E	A	F	A	с	Е	т	R	Е	A	S	U	R	E	
С	R	\mathbf{L}	U	т	H	Y	N	F	W	R	J	H	D	Р	
М	G	Р	Х	I	J	В	т	D	Е	ĸ	A	A	S	х	
Т	в	Y	I	0	N	Ε	Q	E	М	В	Ζ	R	H	\mathbf{L}	
I	v	F	U	N	В	A	D	I	I	Ρ	Y	D	I	I	
В	A	R	K	H	Ε	R	S	т	х	F	Ε	W	P	0	
в	Р	A	N	L	Q	т	A	Y	S	G	K	0	К	S	
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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, phoshorus, 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 Sassafrass

Gold Ash Buckeye Willow Oak Yellow-Poplar

Red Black Cherry











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.

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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 affect 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 there birth, when they started school, the Gulf War, etc.

TREE COOKIE ACTIVITY



PROJECT LEARNING TREE ACTIVITY # 21

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 chose 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 chose 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

Adopt a Tree



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 then 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

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?





Ad	OFFICIAL PLT dopt a Tree Certifica	ate
Official Tree Name		
Nickname		
Birthplace		
Circumference	Height	Age
Identifying Characteristics		Date
One Especially Interesting T	hing About my Tree Is	
	I I I	
	Plac	ce Leaf Rubbing in the Space Abov

PROJECT LEARNING TREE ACTIVITY #27

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 crosssection 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 crosssections.

5. Equally distribute the colored squares (or poker chips) on the floor around the students so the squares are about one to two feed (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.

Every Tree for Itself



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 crosssections 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,

EVALUATION

Forest Friends CD-ROM and Teacher's Guide

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

Name										
School/Organizati	on									
Mailing Address_										
At what grade lev	vel(s) ha	ve you	used the	CD-RC	DM?					
In which subject	areas?_									
Thank you for pro will help us plan futu priate on the space p	oviding y are teachi rovided.	our reading tools	ctions to s and im	o the CD plement	-ROM a program	and <i>Teacher's Guide</i> . The following information as more effectively. Please comment when appro-				
1. The CD-ROM	1. The CD-ROM is an effective teaching tool.									
Strongly agree	1	2	3	4	5	Strongly disagree				
2. I do not have	the tech	nology	necessa	ary to ir	icorpor	ate into my class room.				
Strongly agree	1	2	3	4	5	Strongly disagree				
3. The Teacher's	<i>Guide</i> is	an effe	ctive too	ol.						
Strongly agree	1	2	3	4	5	Strongly disagree				
4. The resource	materia	ls will t	oe helpf	ul when	I teach	about the environment.				
Strongly agree	1	2	3	4	5	Strongly disagree				
5. I plan to use t	he CD-l	ROM w	ith futu	ire class	ses.					
Strongly agree	1	2	3	4	5	Strongly disagree				
6. I plan to use th	e <i>Teach</i>	er's Gu	<i>ide</i> to pr	epare fo	or futur	e classes on forestry issues.				
Strongly agree	1	2	3	4	5	Strongly disagree				
Interactive Trainir	ng Media	ı, Inc. w	vould ap	preciate	any furt	her comments you wish to share.				

____Check here if you are interested in receiving training in Project Learning Tree.

Mail To: Interactive Training Media, Inc. 2625 Mitcham Drive Tallahassee, FL 32308