

4-H

Natural Resource

Club



Forestry

FORESTRY

The overall goal of the forestry project is to enable youth to gain a lifelong appreciation of forests as sources of multiple benefits for society. The Level 1 manual is intended for youth in 3rd through 5th grades and is designed to introduce youth to basic knowledge about trees and forests as well as specific skills and topics in forestry. Youth development outcomes of this manual include:

- Describe and explain tree anatomy (leaf structures, crown types)
- Outline the variety of trees in nature (range of height and forms, types of seeds)
- Identify different tree species
- Explain 10 uses of trees for products we use in everyday life
- Communicate with others about trees

The Level 2 & 3 Forestry manuals build on these core concepts and introduce more advanced topics that include understanding the characteristics of different forest regions, how to measure standing trees, the benefits of forests in urban and rural environments, uses of wood products, and understand competing values (aesthetic and economic) of trees.

Indiana 4-H Forestry manuals

(Order from Purdue's *The Education Store*: www.the-education-store.com)

- Follow the Path, Forestry 1 (#BU-08038)
- Reach for the Canopy, Forestry 2 (#BU-08039)
- Explore the Deep Woods (#BU-08040)
- National 4-H Facilitator/Helper's Guide (#BU-08041)
- Indiana Forestry Project Leader's Guide (online only, #4-H-1008-W)

Invited Speakers Suggestions

- IDNR District Foresters: www.in.gov/dnr/forestry/4750.htm
- Private consulting foresters, www.inwoodlands.org
- Society of American Foresters, Indiana: <http://indianasaf.net/>

- Indiana Master Naturalist Program, <http://www.in.gov/dnr/masternaturalist/>
- FFA advisor who competes in the 4-H/FFA Forestry Career Development CDE

Resources

- Indiana 4-H Forestry webpage: www.four-h.purdue.edu/natural_resources/, click on *forestry*
- IDNR Project Learning Tree, www.in.gov/dnr/nrec/
- 50 Trees of Indiana* (The Education Store, #: 4-H-15-80)
- IDNR Kids Page, www.dnr.in.gov/kids
- IDNR Forestry webpage: www.in.gov/dnr/forestry/, has links to: District Foresters, state forests, DNR Kids Page, career information (and more)
- Purdue FNR video, Careers in Forestry, www.fnr.purdue.edu/images/PurdueFNR.wmv
- Forests at Work - PBS' Indiana Expeditions, www.wfyi.org/IndianaExpeditions/ForestsAtWork.asp

4-H/FFA Forestry Career Development Event

Youth who like to compete with others might enjoy participating in the 4-H/FFA Forestry Career Development Event (CDE). The Forestry CDE Objectives are:

- Learn about forest ecosystems, forestry management, and the utilization of forest products
- Identify trees by leaves, seeds, and woods
- Develop leadership skills and practice good study habits
- Appreciate and manage Indiana's forest resources wisely

Teams compete in their Area CDE. Winning teams may advance to the Indiana Forestry CDE, generally held the second Saturday in December. Contact your county Extension Educator for the date of your Area contest. Information to help you prepare a team for this contest is available at http://www.four-h.purdue.edu/Natural_resources/career.html. General information about the 4-H/FFA CDEs is available at: www.four-h.purdue.edu/cde/.

Activities

The following activities were selected from the Indiana 4-H Forestry, Level 1 manual to introduce the study of trees and forestry to your 4-H Natural Resources club. This manual was written using the *Experiential Learning* model. We recommend that you allow youth to do the activity (experience) as suggested in the manual, giving help as needed (see Budding Knowledge). Be sure to discuss the *Talk it Over* section (share, apply, and generalize).

Pages	Activity Objective	Materials Needed	Time (min.)
Leafing Out			
6-7	Youth will learn (if they don't already know) the difference between conifers and deciduous trees. We recommend that you collect example leaves with club members. Youth also label the parts of a deciduous leaf (may need help).	Copy of page 6 for each youth. Page 7 can be copied or discussed with the group.	20
Meet "Your Highness"			
8-9	Youth identify major tree parts and use these terms and others in a crossword puzzle.	Copy of page 8 for each club member. Page 9 can be copied or discussed with the group.	30
Down in the Dirt			
20-21	Youth compare roots they collected from three different habitats.	Plastic bag, shovel, bucket with water, and copy of page 20. Page 21 can be copied or discussed.	30
Thirsty Trees			
22-23	Youth observe the movement of water through a plant. Adding a few cups of food dye may help youth make observations. We recommend the activity is set up in a club meeting and youth take their plants home and record their observations (page 22) between meetings.	Plant, scissors, cardboard square, petroleum jelly, 2 plastic containers, and copy of page 22. Page 23 can be copied or discussed with the group at the next meeting.	30
My Couch is a Tree?			
30-31	Youth will expand their knowledge of the many products that we get from our forests by completing a word search.	Copies of page 30 for each youth. Page 31 can be copied or discussed with the group.	30
Fun in the Forest			
32-33	Youth will learn about Indiana's State and National (if you wish) forests. Use the map on the next page to indicate the location of our State Forests and Hoosier National Forests. Discuss any visits youth have made to a forest. Reference: www.in.gov/dnr/forestry/	State map showing state and national forests. Page 32 & 33 can be discussed with the group or copied.	15

Leafing Out



When you look at trees in a forest, they may all look alike. But a closer look will show you they are not all the same. In this activity, you'll use your decision making skills to divide trees into their two main groups, **conifer** and **deciduous**, and to identify the parts of leaves.

Take a Hike!

1 Look at the pictures on the right. Write **conifer** or **deciduous** under the appropriate tree. Identify whether the leaf under each tree is a **broad-leaf** or **needle-leaf**. Then name six parts of a maple leaf. Just write the part names on the appropriate lines. Check "Budding Knowledge" and the "Tree Talk" glossary for clues.

Forestry Skill:
Separating trees into basic groups

Life Skill:
Decision making

Success Indicator:
Labels leaf types, parts and arrangements.

Education Standard:
Characteristics of organisms

Tree Talk



Alternate Leaf Arrangement

Apex

Base

Blade

Broadleaf

Conifer

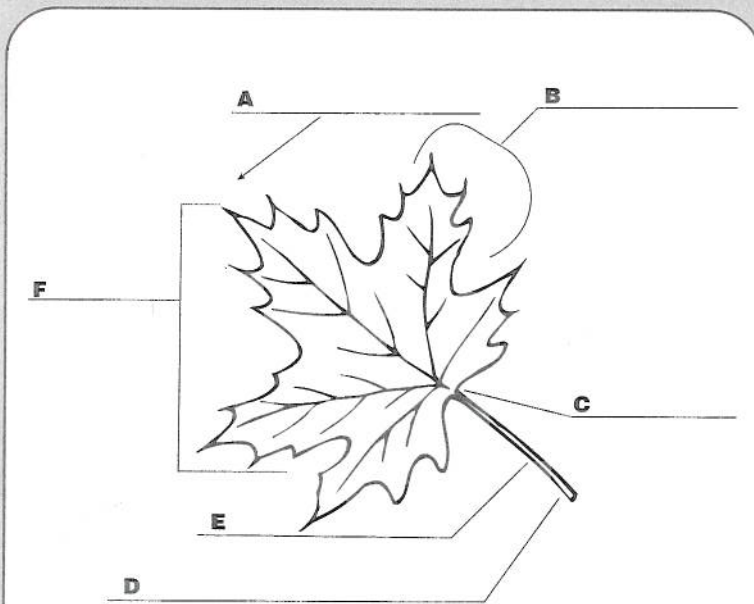
Deciduous

Margin

Needle

Opposite Leaf Arrangement

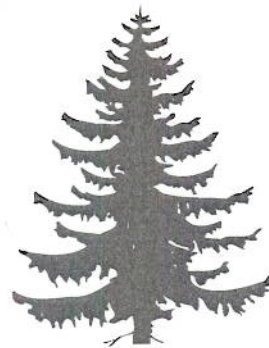
Petiole



Parts of a Leaf Word Bank

Petiole	Base of Blade
Blade	Base of Leaf
Margin	Apex

2 Now go out and see if you can find one of each type of leaf and glue it to the page next to its photograph.



A few conifers lose all their leaves each year, and not all broad-leaf trees lose their leaves.

Tall Tree Tales

(Talk it over with your helper)

Share

What difference did you discover among leaf types, parts of a leaf and leaf arrangements?

Process

Why is it useful to know the correct names for the different parts of a leaf?

Generalize

What did you learn about yourself by sharing your new knowledge with others?

Apply

If you decided to plant a tree for Arbor Day, what questions would you ask a nursery professional when selecting your tree?

Let's make like a tree and leave!



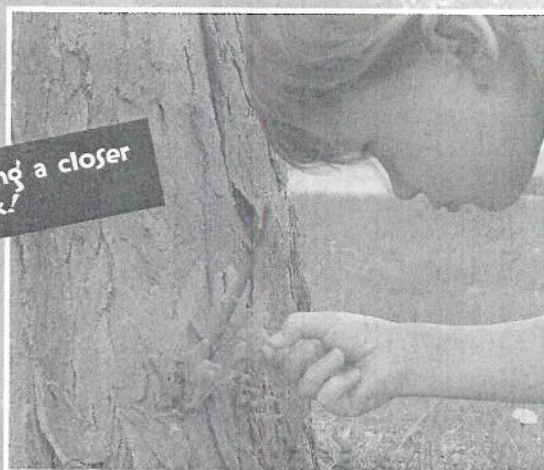
Leaf me alone!

Budding Knowledge

Conifer and Deciduous Trees

Trees are classified as either **conifer** or **deciduous**. **Conifers** normally do not shed their leaves in the fall, but **deciduous** trees usually shed all their leaves each autumn.

Leaves can be arranged on a twig either **oppositely** or **alternately**. They have five basic parts: **petiole**, **blade**, **margin**, **apex** and **base**. **Conifers** have needles with three basic types of **arrangements**: bundled, peg-like or pad-like.



Branching Out

1. Dry and mount five different kinds of leaves.
2. Draw a leaf silhouette.
3. Keep a journal to record where at least 10 different leaves and trees are located, and the date you found them. Share your journal with your helper.
4. Make a leaf chain or a dried leaf collage.

Meet "Your Highness"



Forestry Skill:
Identifying tree parts

Life Skill:
Communicating with others

Success Indicator:
Identifies 10 parts of a tree.

Education Standard:
Characteristics of organisms



Tree Talk

- Bark
- Branches
- Conical
- Crown
- Needle
- Nutrients
- Roots
- Twigs

If you met a king, chances are he would have a **crown**. The same is true for Mother Nature's kings - trees. In this activity, you'll label the different parts of a tree and tell what each part's job is. Then use your communicating skills to tell others what you learned.

Take a Hike!

Match the tree parts found in the word bank to the tree diagram. Next, find the words in the Word Bank in the Word Find. Give yourself extra credit if you can also find the eleven species of trees hidden in the Tree Parts Word Find.

Finally, explain to your helper or a family member the parts of a tree that you now know.

Tree

Tree Parts Word Find

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

Word Bank

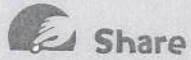
- ash
- aspen
- bark
- birch
- branches
- cedar
- crown
- cypress
- elm
- fig
- fir
- holly
- leaves
- needle
- oak
- pine
- roots
- trunk
- twigs

Apres
FACTOIDS



Tall Tree Tales

(Talk it over with your helper)



Share

What are the major parts of a tree?

What tree part is your favorite?



Process

How did you explain the tree parts and functions to others?



Generalize

How are the tree parts similar to your body parts?



Apply

What things can you find in your home, at school and on the playground that come from trees? What part of the tree did they come from?

What does a tree say when he looks in the mirror?



(yountray!) (ye, I'm a tree!)

Budding Knowledge

Bark and Crown

The leaves and branches at the top of a tree are called the **crown**. The tree's **bark** is like a person's skin, protecting it from insects, disease, storms and hot or cold weather.



A tree's bark protects it from insects, disease, storms and hot or cold weather.

What did the dog say as he brushed up against the tree?



Bark, bark!

Branching Out

1. Find a tree near your home and show someone the parts.
2. Explain to your helper which part of the tree looked sick.

Down in the Dirt



Forestry Skill:

Exploring what is in the soil below a tree

Life Skill:

Learning to learn — gathering information

Success Indicator:

Describes why trees need space to grow.

Education Standard:

Organisms and environments



Tree Talk

- Absorb*
- Drip Line*
- Feeder Root*
- Photosynthesis*
- Root Density*
- Tap Root*

Have you ever thought about what you would see if you had X-ray vision? What do you think you would see if you looked into the ground under a tree? In this activity, you'll use your information-gathering skills to learn what a tree's roots do and why.

Take a Hike!

1 Mark three zippered bags with the numbers 1, 2 and 3. You will need to find three different sites to take root samples: Site 1—in a wooded area. Site 2—in a park with several trees. Site 3—in a yard where there is only one tree. At each of the sites, brush away all the leaves and debris to uncover the bare soil. Use a tape measure to mark a square that is 6 inches wide and 6 inches long. Then use the shovel to dig a hole 6 inches deep. Place all of the soil from the hole in a bucket. Be sure to replace the dirt you removed and clean the area.

2 Fill the bucket with water and let it sit for 5 minutes to soften the soil. With your hands, carefully wash and remove all of the soil from the roots you gathered. Place your cleaned roots in the three plastic bags.

3 Lay the bags with roots inside next to each other. Use the chart below to compare the roots found at the different sites.

Root Test	Color	Size	Shape	Unique Features
Site 1 Wooded				
Site 2 Park				
Site 3 Yard				



Around 85 percent of a tree's roots are found in the top 18 inches of soil.

Tall Tree Tales

(Talk it over with your helper)

Share

Why are roots important to a tree's survival?
Did you find more roots in some places than in others?

Process

Why is it important to protect the roots of trees?

Generalize

Why would trees in the city be more likely to suffer root damage than trees in a forest? Why?

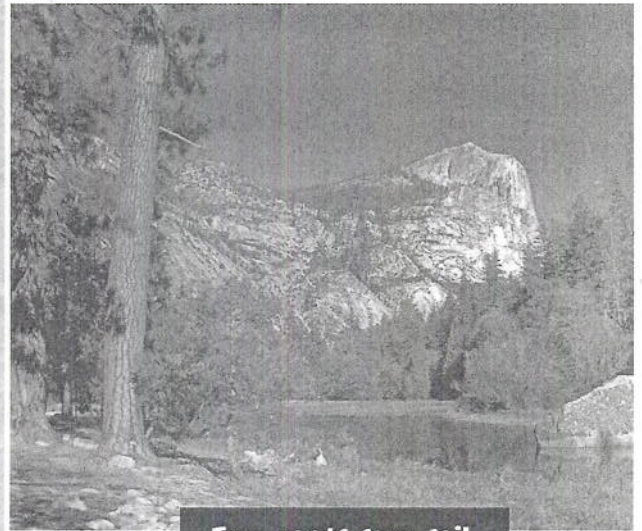
Apply

What can you do to protect and improve the conditions for the roots of trees growing in your yard at home?

Budding Knowledge

A Tree's Roots

A tree's roots serve many functions. Besides holding a tree in the soil, the roots also **absorb** water and nutrients needed by the tree to make food, grow and survive. Roots also serve as a storage area for excess sugars produced by **photosynthesis**. The roots also aid in **shoot** growth and development. Tree roots take in **oxygen** and release **carbon dioxide** much like people. How many roots grow in the soil depends on the soil conditions and whether or not the ground is sheltered by trees.



Tree roots save soil.

Branching Out

1. Contact a local official and find out what they do to maintain the street trees in your community.
2. Ride your bicycle or walk around your neighborhood. Look for conditions that are damaging to tree roots. Write down your observations and share them with your helper.

Thirsty Trees

Forestry Skill:
Understanding the process of transpiration

Life Skill:
Acquiring and evaluating information

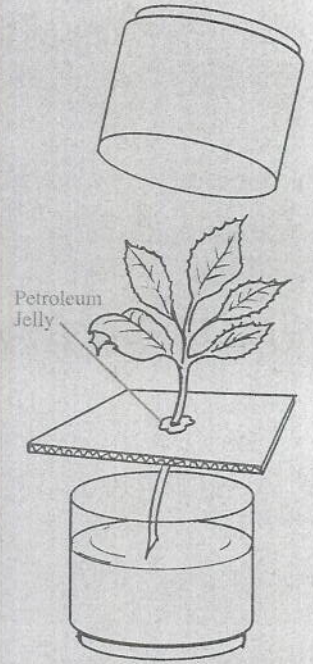
Success Indicator:
Observes and records the amount of water released by a tree.

Education Standard:
Characteristics of organisms

Every living thing needs water to survive. Trees do, too! In this activity, you'll become a scientist and use your skills to investigate the mystery of water and **transpiration**.

Take a Hike!

Make a cutting 5 inches tall from a plant in your yard. Using your scissors, pierce a small hole in the center of a piece of cardboard just large enough for the stem of the plant to fit. Fill one plastic container with water, place the cardboard over the top. Apply petroleum jelly around the stem of the cutting to form a seal. Insert the plant cutting through the hole. Make sure the stem is in the water and that the cutting has several leaves. Cover the plant cutting with a second plastic container. Carefully place the container in the sun or under a lamp. Record the start time and the time you begin to see water droplets on the inside of the outside container. Write what you observe.



Transpiration Test

Start time _____ End time _____

My Observations: _____

Tree Talk



Absorb
Intensity
Transpiration



A single tree growing out in the open can release between 50 to 100 gallons of water in a single day.

Share

What did you find?

What do you think your observations mean?

Process

Why do you think trees release water through their leaves?

Generalize

How does the process of transpiration affect the atmosphere?

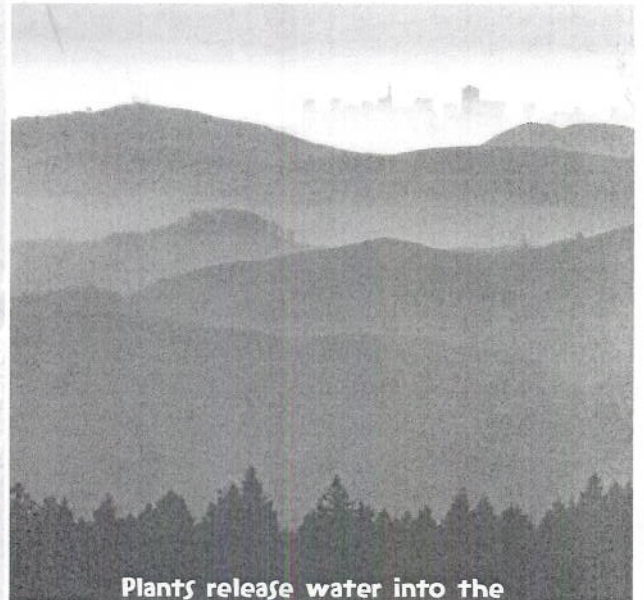
How does it affect climate?

Apply

What can you do to make sure trees have enough water to survive and grow?

Water and Trees

Just like people, trees need lots of water every day. Trees **absorb** water mostly through their roots, but they also release water vapor through their leaves in a process called **transpiration**. Transpiration is a basic, very important process that impacts local climate. The rate a tree **transpires** is increased along with increases in temperature, sunlight intensity, water supply and tree growth rate. Only about one percent of all the water absorbed by a plant is used, and the rest is released back into the atmosphere through transpiration.



Plants release water into the atmosphere through transpiration.

Branching Out

Repeat the same experiment, but this time, place the container in a dark place like a closet. Explain to your helper how the change in the light level affects the rate the water is **transpired** from the leaves.

My Couch Is a Tree?



ou may not like the sound of depending on a tree for your next meal, but in this activity you'll use your learning skills to find the many different products, even the things we eat, that come from the forest.

Take a Hike!

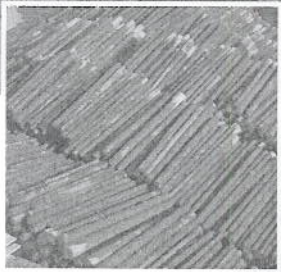
Complete the word find to see just a few of the products that come from trees and other plants in the forest.

Forestry Skill:
Realizing the many products that we get from our forests

Life Skill:
Learning to learn

Success Indicator:
Completes the word find.

Education Standard:
Characteristics of organisms



Forest Products Word Find

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

Forest Product Word Bank

Balloon	Door	Paper
Baseball bat	Floors	Pencil
Boat	Furniture	Piano
Cabinets	Guitar	Railing
Cocoa	Gum	Table
Coconut	Lincoln logs	Vanilla
Coffee bean	Maple syrup	Walnut
Cola	Mouthwash	
Cork	Mushrooms	

Tree Talk

Forest products



The cashew is not actually a nut.

Share

Show an adult or friend your completed word find. What surprised you about all the products that come from forests?

Process

What **products** that come from forests do you see in your home?

Generalize

How do you think someone ever invented chocolate from the cocoa bean?

Apply

Petroleum products are used for a variety of products. Describe a new product that could be made from wood.

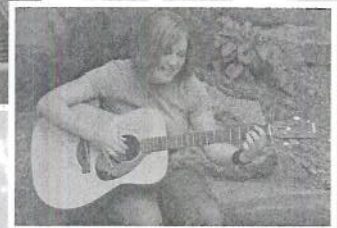
Wood Products

Trees are the main source of a wonderful substance called wood. Wood has so many uses because it is available in so many places. It is easy to shape and mold into different objects, and it looks beautiful.

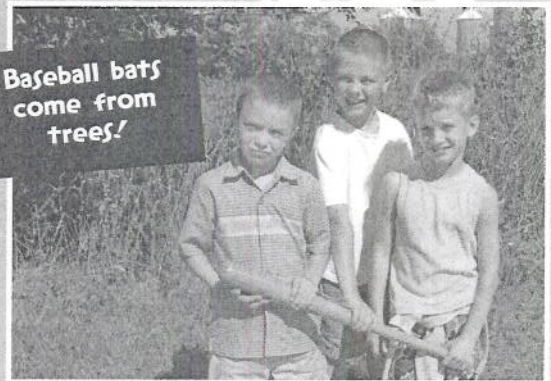
For hundreds of years in the United States, wood has been used for thousands of products used daily. Some of these products include food, lumber, paper, oils, baskets, furniture, doors, windows, and many others.



Begin to notice how many things you use each day that are made of wood or products from trees.



Baseball bats come from trees!



Branching Out

1. Make your own word search game using **forest products**.
2. Conduct a scavenger hunt to find as many different **forest products** as you and your friends can.

Fun in the Forest

Now that you've learned the basics about trees and forests, it's time to visit your state's forests! In this activity, you'll locate forests around your state and decide which one you want to visit the most!

Take a Hike!

Think about the forests you have visited and what you did there. Now see if you can find information about five different forests in your state. You might find this information on the Internet or in brochures and books at the library. Use the space below to list your state's forests in the order you would like to visit them, and tell why you would like to visit the No. 1 forest.

Forestry Skill:
Using maps to prepare for trips and locate forests

Life Skill:
Learning to learn, locating resources

Success Indicator:
Researched state forests.

Education Standard:
Organisms and environments

State Forests

State Forests in _____
(your state)

I would like to visit...

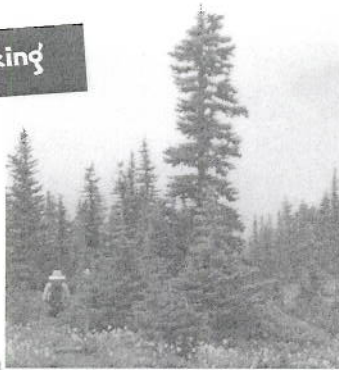
1. _____
2. _____
3. _____
4. _____
5. _____

I would like to visit _____ the most because...

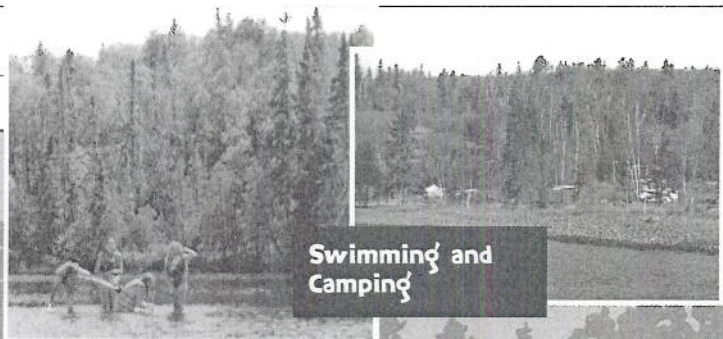


Forested Acres Preserved

Hiking



Swimming and Camping



Did you know that in 1630, about 46 percent of the land in the United States was covered in forests? By 1907, that number had dropped to about 34 percent, and it has remained at 33 to 34 percent since then.

Share

How did you find five forests in your area?

Process

What did you know about forests in your state before you researched them?

Generalize

What forests would you like to try to visit in the future?

What can you do to understand those forests more?

Apply

Why do you think more or fewer **forested acres** are needed in the United States?

Forest Recreation

Many forested areas have been **preserved** for recreational uses because of special geographic or biological features of the area. Lakes, ponds, streams and waterfalls are just some of the attractive features found in parks and recreational areas around forests. Hiking, rock-climbing and bird-watching are some hobbies you can pursue in forests.

Forests offer many fun activities.



Branching Out

1. Ask your helper to take your group to a nearby forest so you can experience a real live forest.
2. Write a one-page report describing why you do or do not believe special areas in forests should be protected from development.

