

Forests Are More  
Than Just Trees



**US Army Corps  
of Engineers®**  
Rock Island District

# Forests Are More Than Just Trees

## Objectives:

- To identify at least three benefits of the living forest.
- To define the different layers in a forest and some animals that can be found in each layer.
- To understand deforestation and why it is a serious problem.
- To become familiar with the following trees and know how they are used by today's society:

American Elm  
Box Elder  
River Birch  
Silver Maple  
Sugar Maple  
White Oak  
White Pine  
Shagbark  
Hickory

## Activities:

Students will each receive a "Forests Are More Than Just Trees" study guide. Eco-Test questions will be taken from the guide.

Before the Eco-Test, a short presentation about forestry will be presented.

## Study Questions:

1. What are the various things a forest manager must manage a forest for? How would this make his/her job difficult?
2. Name the various forest layers and explain what each does.
3. What is "deforestation" and what problems/benefits does it create?
4. Which tree species are best used in construction? furniture? fence posts? Which species benefits our society the most?
5. Which tree species grows best in moist woods? dry woods?

## The Abilities of a Tree

(\*Many original materials were developed by Grand Island teachers June Miller and Nancy Meyer, including this lesson from "1981 Grand Island, Neb., Arbor Day Elementary School Teaching Guide.")

Trees are living, breathing creatures. The fact that trees are, in many ways, like intelligent beings may come as somewhat of a surprise to you. This can be explained clearly as follows:

1. A tree eats. Its tiny hair like roots beneath the earth's surface are always on the hunt for such elements in the soil as nitrogen, calcium, phosphorus, potassium, iron, copper, zinc, and magnesium.
2. A tree drinks. A generous supply of water is required for carrying nutrients from the soil through the "digestive system" of the tree.
3. A tree digests its food. A tree has a digestive tract. Like a plumbing system, it functions as elements from the soil flow through microscopic ducts in the sapwood from the tiniest of root hairs to the most distant of leaves where tree food is formed on contact with sunlight and CO<sub>2</sub>. The food is then carried through the tree to build up layers of cells in the cambium (the inner skin or growing tissue). Tree growth and root development result.
4. A tree breathes. Like all living matter, a tree requires air. A hard, packed soil at the base of the tree will cut off the tree's breathing. Supplies of oxygen and carbon dioxide vital to the manufacture of food are absorbed through the soil by the roots, as well as from the atmosphere by the leaves.
5. A tree reproduces. The tree is capable of rearing its own family. Many seeds have wings that, with an assist by winds, carry them to points away from the parent tree. There, soil and sunlight sufficiently permit new, fast growth.
6. A tree "talks." Listen to trees the next time the leaves rustle in the wind. Thomas Hardy confirmed this when he wrote, "At the passing of a breeze the fir trees sob and moan the ash hisses the beech rustles."
7. A tree sleeps. In the winter months, when deciduous trees lose their leaves and the growing processes of evergreens slow down, a tree is getting its rest.
8. A tree has healing powers. A scar, if properly treated, will always heal as long as the tree is alive and growing.

## **Did You Know**

These interesting facts about trees?

- \*Aspirin comes from willow trees.
- \*Oaks are struck by lightning more than any other trees, while beeches are struck least often.
- \*Ginkgo trees have the straightest branches.
- \*George Washington wore hand-carved wooden teeth.
- \*Each year, insects, diseases, windstorms and wildfires consume as much wood as people do.
- \*An acre of trees produces enough oxygen to keep 18 people alive for a year.
- \*1,182 species of trees grow naturally in the U.S.
- \*When the Pilgrims arrived in America, 937 million acres were covered with forest. Now, only 5.4 percent of forest remains.
- \*Chaining a bicycle to a tree can chip off its bark and lay the tree open to disease.

Izaak Walton League of America

## **Forests Are More Than Just Trees**

Forests cover about one-third of the United States. Of these forests, the Corps of Engineers manages 50,000 acres of timbered land. The rest are managed by other Federal and state agencies and by private ownership.

Today, many forests are managed to meet many different needs. Some have large wilderness areas that are managed to emphasize conditions that occur naturally. But most forests are managed for specific uses, such as timber, recreation, hunting, and fishing. In their jobs forest managers try to meet people's needs for forest products and recreation. At the same time, they protect the living places called HABITATS of plants and animals by planting and harvesting trees, improving wildlife areas, and preventing accidental fires.

Forests are special places where many kinds of trees, plants, and animals interact with each other in many complex ways. Plants use sunlight to make food needed by animals. Animals, in turn, help the plants by pollinating flowers, distributing seeds, controlling insects, and aerating the soil. There are countless examples of these living connections between plants and animals.

Consider, for instance, the way squirrels bury acorns that later grow into oaks. The seeds later grow into trees, which in turn, feed and shelter other squirrels.

Now think about how the oak grows from a tiny seedling to a majestic tree with a trunk wider than your outstretched arms.

Indeed, let's think about how a whole forest starts from bare ground, grows, and changes. Like all living things, a forest grows in stages; its physical structure changes over time. It goes from bare ground to shrubs and small trees, and then from young forest to mature forest. At each stage of growth, the forest supports different sizes and kinds of trees. As the forest slowly changes, different kinds of animals move in as others move on to more suitable areas.

Every stage of a forest's growth is important to wildlife. Just as the living tree helps support the forest, the dead tree also does its part. For instance, a forest filled with young trees is not good for the woodpecker. The woodpecker prefers to peck away at dead or diseased trees, searching for insects hiding underneath the soft bark or in the dead wood. Woodpeckers also raise their young in the holes of dead, broken-topped trees called snags. Snags are important for a forest's DIVERSITY. Diversity means the variety of plants and animals that live in a forest. Without snags, for instance, a forest will have few woodpeckers. Likewise, without marshes, a forest will have few ducks.

A forest can grow and change naturally or it can be changed by people. During the early development of America, European settlers cleared much of the forested land for pastures and cropland they needed to produce food. But the settlers also benefited from the forest's gifts: fish and game for table and clothing, wood for their homes and furniture and, of course, for firewood. Animals responded in different ways to these habitat changes. Rabbits, quail, deer, and other animals that could adapt to farm settings began to flourish. But other animals didn't fare so well. Some, such as wolves and cougars, were pushed out by the steady growth of the early settlements and towns. Still other animals became extinct. One reason being that they slowly lost the kinds of forested areas they needed to live; that is, they lost their habitat.

Toward the beginning of this century, people began to realize that the growing scarcity of trees, as well as the decline and disappearance of certain animals, was becoming a problem. This led to new ideas—forest management and wildlife management. Rather than just cut trees down, people began to plant and even farm them. Today, nearly a hundred years after the first forest management efforts began, forest and wildlife management are well established fields. These two fields have clearly shown the need to protect forest and wildlife resources, not just for the sake of trees and wildlife. By properly managing this natural heritage, we also can keep our air and water clean and provide natural places for us to enjoy now and in the years, to come. One thing we see in the changes of the forests is that many kinds of wildlife have very special living requirements. Thus, if a forest is to support a variety of wildlife, it must have all the different kinds of places and foods those animals need. But because many forests do not have these varied spaces and foods, people must work to protect, manage, and even create wildlife habitats. This basic principle of helping create the habitats those certain animals need, can be used to encourage countless plants, mammals, birds, and reptiles.

Forest trees and other plants take in carbon dioxide and provide oxygen. Plants are also PRODUCERS that is, they're the source of food for the animals, or CONSUMERS. The forest also includes DECOMPOSERS, such as fungi and bacteria, which break down dead material,

turning it into soil and nutrients. **LAYER UPON LAYER:** If you look closely at the forest system, you'll see that it is made up of many layers. These layers provide places for the forested animals to nest, feed and carry out their other activities. Starting with the roof and working down, the main layers of the forest are the **CANOPY**, the **UNDERSTORY**, and the **FOREST FLOOR**. The branches and leaves of the tallest trees make up the canopy layer. Growing under the canopy and adapted to living in the shade are shorter trees and shrubs that make up the understory. Ferns, grasses, wildflowers, seedlings, logs, leaves, lichens, and mosses are all part of the forest floor. Think of two animals or insects that live in each of the layers.

In that old rotting log, tiny seeds may grow, dropped there by animals or carried by wind and water. Some tiny seeds become big trees with roots that grow deep into the ground. Roots, too, have a special role to play. Besides supporting trees and shrubs, they absorb water and nutrients from the soil. As a tree grows, its trunk gets thicker and thicker. Each year's growth adds a new ring of wood; often time that is how foresters tell the age of trees.

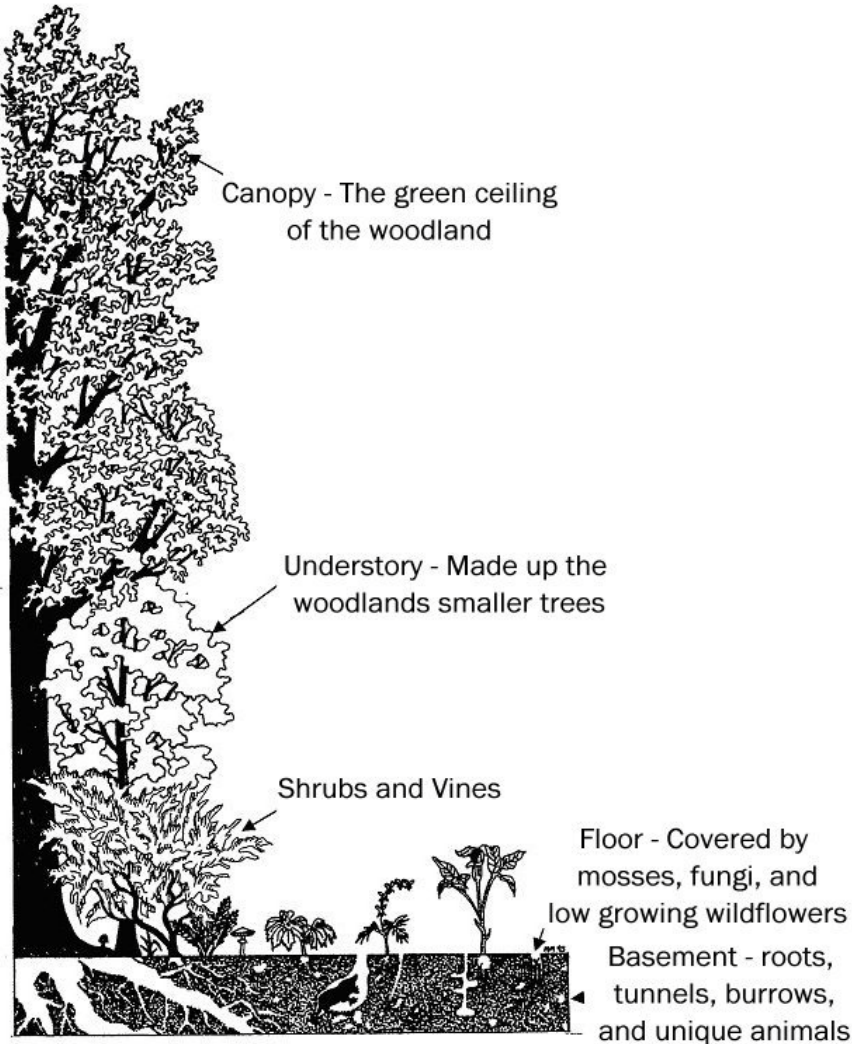
There are many different types of forests, each with its own combination of plants and animals. **CONIFEROUS** forest's trees bear seeds in cones and have needle-like leaves. Evergreens and pines are the most common trees found in the Coniferous forest. You will find many birds in the Coniferous forest because the trees provide good cover. **DECIDUOUS** forests are made up of trees that lose their leaves in the fall. Most of the trees such as the colorful maples and oaks are the ones we notice because of their brilliant hues. Illinois, Iowa, and Wisconsin are made up of a **MIXED**, forest containing both **CONIFEROUS** and **DECIDUOUS** trees.

Forests are facing a lot of problems today. For example, acid rain and other forms of pollution are damaging and, in some cases, even destroying many forests around the world. Uncontrolled fires, which destroy thousands of acres of forests each year, are another problem. But one of the most serious threats to forests worldwide is **DEFORESTATION**. Deforestation is clearing away of forested lands for pastures, farmlands, and, other development. Much of the deforestation that's occurring today is happening in the tropics, in areas such as the rain forests of Central and South America and Asia. And it's occurring at an incredible rate. In the past century, about half of the world's total acreage of tropical rain forest has been cleared away.

The reasons for deforestation in the tropics vary. For example, a lot of forests are being cleared for subsistence; farmers farm the land for a couple of years and then are forced to move on after the land has lost its productivity. Huge tracts of forests are also cleared by cattle ranchers who convert the land to pasture.

Scientists aren't sure what the long-term effects of tropical deforestation will be, but many think that it could seriously affect the Earth's climate. Others point out that by destroying these forests, we're losing a huge potential source of medicines, foods, and other products that benefit people. Of course when the tropical forests go, the incredible diversity of plants and animals that live there will be destroyed. (Many scientists think that the tropics have thousands of plant and animal species that we don't even know about yet. Forests are more than just trees. They provide a valuable and varied resource. Everyone must work together to manage our forests for the benefit of all.

**\*Forest Hotel –**



Woodlands are like a multi-level hotel. Beneath the woodland floor is the *basement*, containing tunnels and burrows which serve as the home to a variety of unique animals. The woodland floor may be covered by mosses, fungi, and low-growing wildflowers. The next level of the "forest hotel" may consist of a thick growth of *shrubs and vines*. Smaller trees make up the *understory* layer of the hotel, and the penthouse suite is the high canopy, which forms the green ceiling of the woodland.

Each of these layers supports a variety of wildlife dependent on woodland plants. Each spring, the woodland seems to come to life one layer at a time as lower levels of the forest hotel become green and bloom before the higher levels leaf out and block out sunlight.

\*The Forest Hotel and Woodlands information obtained from "Iowa Woodlands" by Iowa Association of Naturalists.

## Individual Tree Identification Information\*

\*Tree Information Obtained From:

FOREST TREES OF ILLINOIS

by Robert Mohlenbrock and

A NATURAL HISTORY OF TREES OF

EASTERN AND CENTRAL NORTH AMERICA by

Donald C. Peattie

Students, you should attempt to locate the above-mentioned books or any other tree identification books to help you in understanding the following tree descriptions. Locate pictures of these trees, check out field guidebooks and identify the trees in your home or schoolyard. The following information is only a guide to get you started; you may wish to add your own notes on these pages.

### AMERICAN ELM (*Ulmus americana* L.)



**Other Name:** White Elm

**Growth Form:** Large tree up to 80 feet tall, trunk diameter up to 4 feet: crown broadly rounded or sometimes flat-topped, usually with drooping branchlets.

**Bark:** Light or dark gray, furrowed, at maturity breaking into thin plates.

**Leaves:** Alternate, simple; blades oval to elliptic, pointed at the tip, strongly asymmetrical at the base, up to 6 inches long and about half as wide, coarsely doubly toothed along the edges, the upper surface dark green and smooth, the lower surface pale and either softly hairy or smooth, leafstalks very short, usually yellow,

**Wood:** Heavy, strong, pale brown.

**Uses:** Flooring, farm implements, shipbuilding, frequently planted as an ornamental and as a shade tree, but greatly diminished in number by the Dutch Elm disease.

**Habitat:** Bottomland woods, along streams.



**BOX ELDER**  
(*Acer negundo* L.)



on the lower surface.

**Wood:** Light weight, soft, close-grained, and white.

**Uses:** Paper pulp, interior finishing, furniture.

**Habitat:** Moist woods.

**Other Name:** Ash-leaved Maple.

**Growth Form:** Medium tree up to 60 feet tall; trunk diameter up to 4 feet; crown wide spreading.

**Bark:** Light brown, ridged when young, becoming deeply furrowed with age.

**Leaves:** Opposite, pinnately compound, with 3-7 leaflets; leaflets elliptic to ovate, up to 4 inches long, about half as broad, pointed at the tip, tapering or rounded at the sometimes asymmetrical base, smooth or usually coarsely toothed along the edges or even shallowly lobed, light green and smooth on the upper surface, paler and smooth or hairy

**SUGAR MAPLE**  
(*Acer saccharum* Marsh)



**Other Name:** Hard Maple.

**Growth Form:** Medium to large tree up to 80 feet tall: trunk diameter up to 3 feet; crown broadly rounded, with many branches.

**Bark:** Gray to dark brown to black, becoming furrowed and scaly.

**Leaves:** Opposite, simple; blades up to 5 inches long, nearly as broad or a little broader, palmately 3 to 5-lobed, the edges of the leaves sparsely and coarsely toothed, dark green and smooth on the upper surface, green or paler on the lower surface and usually smooth, or sometimes hairy on the veins; leafstalks up to 3

inches long, smooth and sometimes hairy. The leaves turn brilliant shades of yellow and orange in the autumn.

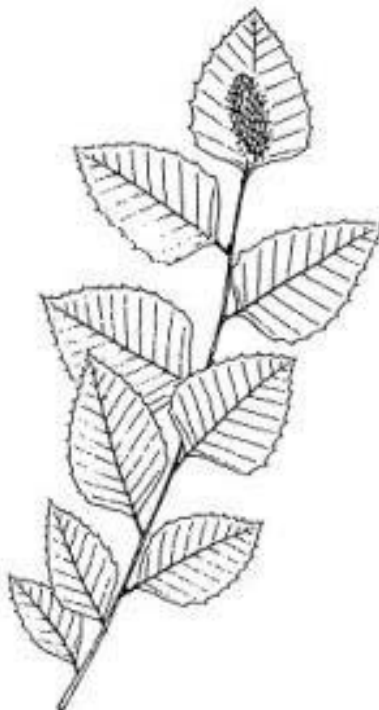
**Wood:** Heavy, strong, close-grained, light brown.

**Uses:** Furniture, interior finishing, cabinets; maple sugar is derived from the sap; frequently grown as an ornamental.

**Habitat:** Moist Woods.

## **RIVER BIRCH**

(*Betula nigra* L.)



**Other Name:** Red Birch

**Growth Form:** Up to 75 feet tall; trunk diameter up to 2 feet; crown irregularly rounded.

**Bark:** Curling, shredding, brownish-pink to reddish-brown.

**Leaves:** Alternate, simple; blades rhombic to ovate, coarsely doubly toothed, paler and densely hairy on the lower surface, up to 3 inches long, acute at the tip, truncate or tapering to the base, the leafstalks woolly.

**Wood:** Strong but light, pale brown.

**Uses:** Wood is used for furniture; sometimes planted as an ornamental.

**Habitat:** Along rivers and streams; bottomland woods.

**Distinguishing Features:** The shaggy, peeling reddish-brown bark readily distinguishes this tree from any other in Illinois, as does its rhombic, doubly toothed leaves.

**WHITE OAK**  
(*Quercus alba* L.)



**Growth Form:** Large tree up to 100 feet tall; trunk diameter up to 3 feet; crown very broad, with stiff, horizontal branches; trunk relatively short and rather thick.

**Bark:** Gray or whitish with gray patches, shallowly furrowed.

**Leaves:** Alternate, simple; blades usually with 7 or 9 lobes, the lobes rounded and not bristle-tipped, the sinuses varying from shallow to deep, the upper surface green and smooth, the lower surface paler and smooth, up to 10 inches long, up to half as wide, turning red in the autumn; leafstalks up to 1 inch long, rather stout, smooth. Leaves on the same tree may vary considerably.

**Fruit:** Acorns borne 1 or 2 together, with or without a stalk, the nut oblong, up to 3/4 inch long, green to greenish-brown, often minutely hairy.

**Wood:** Heavy, hard, strong, durable, coarse-grained, pale brown.

**Uses:** Interior finishing, cabinets, general construction, fence posts, fuel, tight cooperage (barrel making).

**Habitat:** Moist woods, wooded slopes, dry woods.

**WHITE PINE**  
(*Pinus strobus* L.)



**Growth Form:** Tall tree well over 100 feet tall in some regions of the United States; trunk diameter sometimes in excess of 3 feet; crown pyramidal.

**Bark:** Brown, divided into broad ridges by shallow fissures.

**Leaves:** Needles in clusters of 5, very flexible, up to 5 inches long, blue-green.

**Fruit:** Cones oblong, curved, drooping, up to 8 inches long, each scale comprising the cone lacking any prickles; seeds narrowly oblong, up to 1/4 inch long, with a wing up to 3/4 inch long.

**Wood:** Light in weight, soft, light brown.

**Uses:** Interior finishing, construction.

**Habitat:** Moist woods, wooded slopes.

## SHAGBARK HICKORY

(*Carya ovata*)



seed sweet.

**Wood:** Heavy, hard, light brown close-grained.

**Uses:** Tool handles, fuel; the nuts are tasty.

**Habitat:** Low, shaded woods.

**Distinguishing Features:** The Shagbark Hickory is distinguished by its shaggy bark, its usually 5 large leaflets, and its large winter buds.

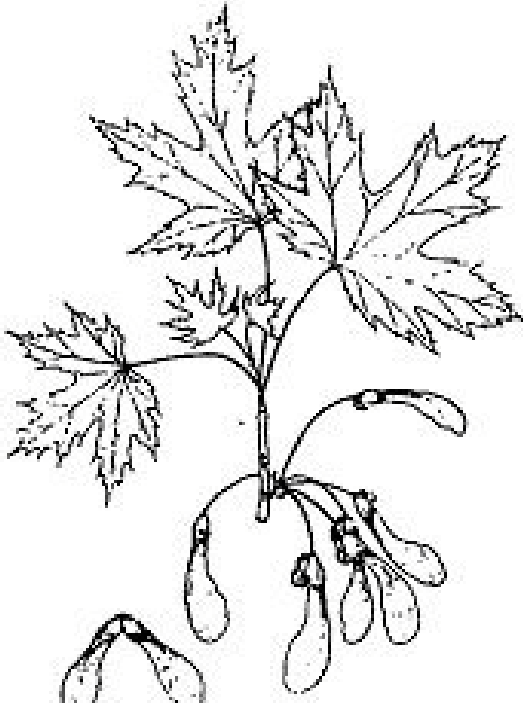
**Growth Form:** Medium to large tree up to 80 feet tall; trunk diameter up to 3 1/2 feet; crown rounded, with some of the branches often hanging.

**Bark:** Gray, separating into long, shreddy scales giving the trunk a shaggy appearance.

**Leaves:** Alternate, pinnately compound, with 5-7 leaflets; leaflets ovate, obovate, or less commonly lance-shaped, usually short pointed at the tip, tapering to the base, up to 10 inches long, up to 5 inches wide, finely toothed along the edges, with the tip of each tooth with a minute tuft of hairs, green or yellow-green and smooth on the upper surface, paler and smooth or somewhat hairy on the lower surface.

**Fruit:** Spherical or occasionally punching bag shaped, up to 2 inches across, the husk yellow-green to reddish-brown, up to 1/2 inch thick, splitting all the way to the base, the nut 4 angled, nearly white, the

**SILVER MAPLE**  
(*Acer saccharinum* L.)



**Other Name:** Soft Maple

**Growth Form:** Medium to large tree up to 100 feet tall; trunk diameter up to 5 feet; crown usually broadly rounded.

**Bark:** Gray or silvery, smooth at first, becoming loose and scaly or even somewhat shaggy when old.

**Leaves:** opposite, simple; blades up to 8 inches long, nearly as broad, deeply palmately 5-lobed, the edges of the leaves sharply toothed, pale green and smooth on the upper surface, silvery-white and usually smooth on the lower surface, except in the leaf axles; leafstalks smooth, up to 5 inches long, often reddish.

**Fruit:** Borne in pairs, composed of a curved wing with a seed at the base, green or yellow, up to 3 inches long.

**Wood:** Hard, close-grained, pale brown.

**Uses:** Furniture, sometimes grown as an ornamental, but the branchlets are brittle.

**Habitat:** Wet soil.

**OTHER COMMON TREES OF IOWA ILLINOIS**

