4-H Virtual Forest User's Guide

The Tree Detective

Concept

This module will help youth understand the basics of tree identification. Students will learn how to combine clues provided by leaves, twigs, buds, bark, and other features to identify forest trees. Students will also learn specific information about ten tree species, including common identifying features and uses.

This module supports the following Science SOLs:

Living Systems and Processes

4.2 a) the survival of plants and animals depends on photosynthesis;
4.2 b) plants and animals have different structures and processes for obtaining energy

Earth Resources

4.8 d) forests, soil, and land

Module Description

Begin. An introductory frame that contains the title "The Tree Detective" and three menu options:

- Tree I.D.
- 10 Cool Trees of Virginia
- Solve a Mystery

The information presented in "Tree I.D." and "10 Cool Trees of Virginia" will provide important background information that will help students 'solve the mystery'. As a result, we recommend that users navigate through these two options first and then conclude with the "Solve a Mystery" component.

Tree I.D., Frame 1. Contains background information on tree identification, beginning with the importance of learning to identify trees.

> "Learning to identify trees is interesting, fun, and important! To properly manage the trees in a forest--or even in a yard--you must know what kind of trees you are

dealing with because different tree species need different amounts of light, water, and nutrients to grow. Also, many insects and diseases favor particular species of trees. Knowing a tree's identity can help us figure out what is "bugging" a sick tree! Tree identification is so important that it is one of the first skills foresters learn. If you don't know which species a tree is, there are a variety of clues you can use to figure it out."

Throughout the module, the user can click "Next" to advance to the next frame. Click "Home" to return to the main menu. Click the back arrow to move backward through the module.

Tree I.D., Frame 2. We can follow several steps to properly identify a tree. First of all, we need to decide if we are looking at a tree, a shrub, or a vine.

- Trees are at least 13 to 15 feet tall. They usually have a single trunk and a crown.
- Shrubs are smaller and usually have several stems. Some trees may look like shrubs when they are young, or when they are growing in harsh climates.
- Some climbing vines, like poison ivy and wild grape, may get very large and look like trees at first glance. But vines need something else to support them, like a tree, fence, or trellis.

Tree I.D. Option, Frame 3. At this point, the user can operate the mouse to select each of seven different features in a menu at the left of the screen. These features provide important clues to assist with tree identification. The module automatically takes the user to "Tree Type," the most general category.

Tree Type. An angiosperm produces seed that is surrounded by flesh called an "ovary." Like an apple, for example. Trees in this group are also referred to as "hardwoods" and "deciduous." Most of these trees have broad leaves that change color and die every fall. Examples include oaks, maples, and flowering dogwood, Virginia's state tree! However, there are some angiosperms that keep their leaves throughout the winter, including southern magnolia, live oak, and American holly.

By contrast, gymnosperms produce seed that are not enclosed in an ovary. In fact, the word "gymnosperm" means "naked seed"! Most of these trees have needles or scales that stay green throughout the year, like pines, cedars, spruces and firs. Some gymnosperms, like baldcypress, do lose their needles each fall.

Leaves. Once someone has identified a tree as an angiosperm or gymnosperm, most people go straight to the leaves for clues. Leaf arrangement, type, border, shape, base, and color can all help you identify the tree, but be careful. Leaves from different tree species can look the same. Also, the leaves on one tree may have different shapes. And, in the winter, leaves may not even be available for us

to look at! In these types of situations we need to search for other clues to help us correctly identify the tree.

Select the bar “Click here for more information” to learn about compound leaves and simple leaves. Then, select “Close Window” to return.

Bark. At first, all bark might look the same. Look closely, and you will notice that bark comes in many different colors, shades, and patterns. Bark can also be rough or smooth, depending on the species or the even the age of the tree. Bark is often smooth on younger trees, getting rougher as the tree grows older.

Buds and Twigs. Twigs grow in a variety of shapes, colors and sizes. They can be thin or thick, straight or crooked, smooth or hairy. We can look at the shape of the leaf scar left behind when the leaves fall from the tree. Within that scar, there are even bundle scars that come in different numbers, arrangements, and sizes. Bundle scars show where the nutrients passed back and forth between the twig and the leaf. Buds also come in a wide variety of shapes, sizes, colors and arrangements.

Twigs and buds are *excellent* identifying features, especially in the winter when many trees have lost their leaves! Select the bar “Click here for more information” to view examples of the many different leaf scar shapes found in nature, and arrangement of bundle scars within those leaf scars. Then, select “Close Window” to return.

Fruit. Like twigs, fruits come in a wide variety of shapes, colors and sizes. Fruit can provide very helpful clues for tree identification. For example, did you know that the acorn from a scarlet oak tree has rings around the tip that look like a bullseye? These are called concentric rings, and can help you tell a scarlet oak from a black oak: something that can be tough to do without the acorn! Look carefully on the ground and in the tops of trees for fruit, but be observant. Acorns, hickory nuts, and other fruit will get mixed together on the forest floor, sometimes making it hard to tell which tree they fell from.

Growth Form. Many trees growing in the open develop characteristic shapes that you can use to identify groups of trees, or even individual trees. For example, a sugar maple will be round, and an elm might look like a vase that’s wide at the top and narrow at the bottom. Most trees develop these shapes only in the open. The form looks quite different on forest grown trees due to competition. A sugar maple growing in the forest will have a longer stem, fewer side branches, and a smaller crown.

Select the bar “Click here for more information” to view silhouettes of ten different tree species. Then, select “Close Window” to return.

Color. In the fall, we can often use the color of leaves to help us identify the tree.

Yellow-poplar leaves turn yellow, sourwood leaves are red, and downy serviceberry leaves are orange!

At this point, the user has completed the “Tree I.D.” background information portion of “The Tree Detective.” Click “Home” to return to the main menu, then “10 Cool Trees of Virginia” to learn about 10 forest trees commonly found in Virginia.

10 Cool Trees. An artistic frame with a scrolling bar located at the bottom. This bar contains the name of 10 trees found in the forests of Virginia. Click on the names of individual trees to learn more about identifying that species, its growth characteristics, and products that the tree provides.

Mockernut hickory. The scientific name of mockernut hickory is *Carya tomentosa*. The word “tomentose” basically means “hairy.” This is a good description for the compound leaves, which are dark green above and hairy/fuzzy orange beneath. The brown, stout twigs and large terminal buds at the end of the twigs are also fuzzy. Although different hickory species can look very similar, the nut produced by mockernut hickory has a very thick husk that can help with identification. Hickory nuts are an important wildlife food. The wood is used primarily for tool handles, but is also made into baseball bats, furniture, and other items.

Sugar maple. Sugar maple is one of the largest and most important hardwoods in the eastern forest! Like other maples, the leaves are opposite, with a characteristic shape that sets them apart. Sugar maple leaves turn brilliant shades of red, orange, and yellow in the fall. The sap is boiled and concentrated to make maple sugar and maple syrup. It takes about 34 gallons of sap to make 1 gallon of syrup or 8 pounds of sugar! Sugar maple is a popular shade and yard tree, and the wood is useful for many products, including furniture, flooring, and cabinets.

Sweetgum. Have you ever walked barefoot around your yard and stepped on a hard, woody, spiny fruit about an inch in diameter? Chances are that this was the fruit from a sweetgum tree. A sweetgum leaf is shaped like a star, and the twigs often have corky bark projections that look like wings. Sweetgum wood has many uses, and the sap was once used as chewing gum!

White oak. White oak is a very important tree in the oak-hickory forest type that covers much of Virginia. Wood from white oaks is heavy, hard, and strong. Pores in the heartwood are plugged with growths called tyloses, making the wood waterproof. As a result, white oak was once favored for shipbuilding, and is still used to make barrels, kegs and casks. The wood is also used for flooring, furniture, and many other products. White oak acorns are an important food source for many wildlife species. The distinctive, light gray bark will help you

identify this tree in the woods.

Eastern white pine. Eastern white pine occurs naturally throughout the mountains of Virginia and into the Piedmont region. The branches grow in circles, called “whorls” around the stem. You can tell how old a white pine is by counting the whorls of limbs! Eastern white pine has soft, greenish-blue needles that occur in bunches of five. The bark is thin and greenish on young trees, but becomes thicker, grayish brown, and furrowed on older trees. Eastern white pine is often grown for Christmas trees, and the light colored wood has many uses, including furniture, match sticks, and shelving.

Loblolly pine. Loblolly pine is the main commercial pine species in the southeastern United States because of its wide range, abundance, and ability to grow on many different sites. Although you will often see loblolly pine growing in plantations--where the trees have been planted in rows—it is native to 15 southern and mid-Atlantic states and is commonly found in the wild. Wild turkeys, squirrels, and some songbirds eat loblolly pine seeds, and the wood is used for lumber and pulp. Look for needles about 5 to 9 inches long and thick, dark brown bark.

Yellow-poplar. Yellow-poplar grows best on deep, moist soils along streams and in the lower mountain coves. Because yellow-poplar grows with a straight central trunk that is often clear of limbs for 50 feet and more, it is often called the “forester’s friend.” Spongy moth caterpillars, a major insect pest of our hardwood forests, do not eat yellow-poplar leaves. The leaves turn a beautiful yellow in the fall, and the greenish, tulip-shaped flowers appear around April. Yellow-poplar is also called “tulip-tree” and “tulip-poplar” because of these flowers. Deer eat young poplar sprouts, and the wood is used for lumber, veneer, furniture, and pulpwood, among many other products.

American sycamore. When walking through the woods along streams and rivers you may notice that the upper branches and trunk of some trees are white, almost like bones! These branches belong to the American sycamore tree. The bark of this tree grows in patterns of brown, green, and white/gray. Sheets of the darker
colored outer bark frequently fall off, exposing the white bark beneath. American sycamore grows throughout Virginia, but is most common on bottomland sites. Some uses of the wood include butcher blocks, pulpwood, and particleboard.

Baldcypress. You can find baldcypress growing on very wet, swampy soils that have standing water. The trunk flares out at the base, and the roots send up woody knobs called “knees”. Although a lot of research has been done, the purpose of cypress knees still isn’t known! The light-green leaves are about ½ to ¾ -inch long, 1/16th-inch wide, and drop off in the fall. Yup, you guessed it. Baldcypress is one of the few deciduous gymnosperms! The wood resists decay,

and has many uses, including construction of buildings, docks, caskets, paneling, and wooden boats.

Eastern redcedar. Eastern redcedar is the most widely distributed conifer in the eastern United States. It grows on many types of soil, from swamps to dry, rocky ridges. You will find this tree growing all over Virginia, except in the high mountains. The dark green leaves are short, needlelike, and prickly when they are young. As they get older, the leaves become more smooth and scale-like. The bark is light brown, thin, and shreds in long strips. There are both male and female trees, and the females produce a small blue fruit that is eaten by many wildlife species. The wood is used for fenceposts, storage chests, closets, and other products.

At this point, the user has completed the “10 Cools Trees of Virginia” portion of the module. Click “Home” to return to the main menu, then “Solve a Mystery” to participate in an interactive learning activity.

Solve a Mystery. In this learning activity, the user will help The Tree Detective find four baby birds by solving clues.

Clue #1. A thorough search of the bird house turned up a bundle of three 5-9 inch long green needles. What kind of tree does this item match? The correct answer is “loblolly pine.” Selecting any other option will result in a buzzer and explanation why the answer is incorrect. Proceed to the next clue.

Clue #2. Draped across a low branch of the loblolly pine, The Tree Detective finds a cluster of unusual compound leaves—dark green above and hairy fuzzy orange below. Can you identify this clue? The correct answer is “mockernut hickory.” Selecting any other option will result in a buzzer and explanation why the answer is incorrect. Proceed to the next clue.

Clue #3. Mixed in among thick-husked hickory nuts, the Tree Detective discovers a hard woody spiny fruit about an inch in diameter. He leaves the scene to look for… The correct answer is “sweetgum.” Selecting any other option will result in a buzzer and explanation why the answer is incorrect. Proceed to the next clue.

Clue #4. The third bird hiding in the sweetgum tree is eating small blue fruit. The Tree Detective knows he’s cracked the case because the fruit belongs to… The correct answer is “eastern redcedar.” Selecting any other option will result in a buzzer and explanation why the answer is incorrect.

Following a screen that provides positive reinforcement, the user can return to the main menu, thereby completing the module.

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