Step 1 Take a Closer Look at the Mighty Oak

BASIC ACTIVITY

Classroom Activity:

- **Students will learn to use a basic tree key and create a simple key to identify some oak species in their community, or identify their state tree or tree common to their region.**

Objectives:

Students will be able to:

- **Describe several ways oaks have affected the development of the United States**
- **Use a simple classification key**
- **Identify characteristics unique to oaks that separate them from other trees**
- **Research oaks (or common tree genus) found in their community and create a simple key that uses characteristics of two or three different species to distinguish one from one another**

Time Recommended:

- **One 60 minute class period**

Materials Needed:

- **Copy of handouts on page 12 & 13 (one per student)**
- **Pencil and paper**
- **Tree field guides/books or Internet access**
- **A list of oak species common to your area**
- **Leaf samples from as many different kinds of trees as possible – include conifers and broadleaves (for broadleaf samples, bring in a twig with several leaves attached)**
- **Acorn sample (if available)**

National Science Standard Correlation:

Students will develop an understanding of:

- **Structure and function in living systems**
- **Populations and ecosystems**
- **Diversity and adaptations of organisms**

National History Standard Correlation:

Students will:

- **Develop an understanding of national symbols through which American values and principles are expressed**
- **Engage in historical analysis and interpretation**

Instructional Sequence

Anticipatory Set

Ask students to name some symbols of our nation. Record responses on the board without comment. Fill in the list of remaining symbols on the board as you tell the class that the United States has a national flag, a national bird - the bald eagle, a national anthem - the "Star Spangled Banner," a national motto - "In God We Trust," a national flower - the rose, and even a national march -"Stars and Stripes Forever."

Tell students that other nations have similar symbols that reflect their history and culture but, in addition, many countries also have a national tree. Examples include:

- Canada - maple
- Denmark - beech
- Finland - birch
- India - Banyan
- Lebanon - cedar
- Honduras - Ceiba (kapok tree)

Trees are also depicted on a number of flags and coats of arms. *Ask students why they think a country would have a national tree*. (Answers may include important food or timber products the tree provides to the nation, beauty, shelter, shade, etc.) Comment that while every state in the United States has a state tree, America has never had a national tree.

Previously all United States symbols had been selected by politicians, but in 2001, for the first time, the American public had the opportunity to vote for a national symbol – a national tree. The voting process, hosted by The National Arbor Day Foundation, made it possible for Americans of all walks of life to help select the tree they felt best reflected our country to serve as this important national symbol. Not only adults, but schoolchildren across the country had their first opportunity to vote for something of national significance.

Hundreds of thousands of people participated in the vote. On April 27, Arbor Day 2001, votes were tallied and the oak was announced as the people's choice for the national tree. In celebration, Presidential cabinet members, government

Damon Higgins

2002 National Poster Contest Winner, Allison Sauls, joins dignitaries in planting an oak tree at the United States Capital. The oak was selected as people's choice for America's National Tree.

officials, special dignitaries, and the 2001 Arbor Day National Poster Contest winner planted a young oak tree on the United States Capitol grounds.

Explain that the United States has a wealth of tree species, more than twice as many as in all of Europe. America has the largest, the oldest, and perhaps the most beautiful trees in the world. *Ask students why, out of all these trees, the oak might have won ... what would people have considered important in selecting a tree that represents the spirit of America, and of its people?* (Allow discussion for several minutes.)

Draw a tree trunk on the board and write the word OAK in it. Using comments from students, guide discussion to create a visual "map" to illustrate possible considerations why the oak might have been selected as the national tree (see Illustration 1). (If time allows, do Enrichment Activity on page 8).

If not already mentioned, offer as possibilities that perhaps people wanted to select a tree that:

Grows in many places across the country

- About 60 different oak species grow in the United States. Oaks are the most widespread broadleaf trees in our country.

Has multiple uses

- Oaks have strong wood, with a beautiful grain, that is prized for furniture and flooring.
- Oak is valued in shipbuilding and for railroad crossties, which was important in the development of our nation.
- White oak was prized for barrels because it holds liquids better than almost any other kind of wood.
- Oaks contain tannin, a chemical used by Native Americans and early settlers to pound into animal skins to make them soft and long lasting.
- The bark of some oaks has been used in medicine, for dyes, and even for cork.
- Acorns are one of the most important food sources for wildlife.

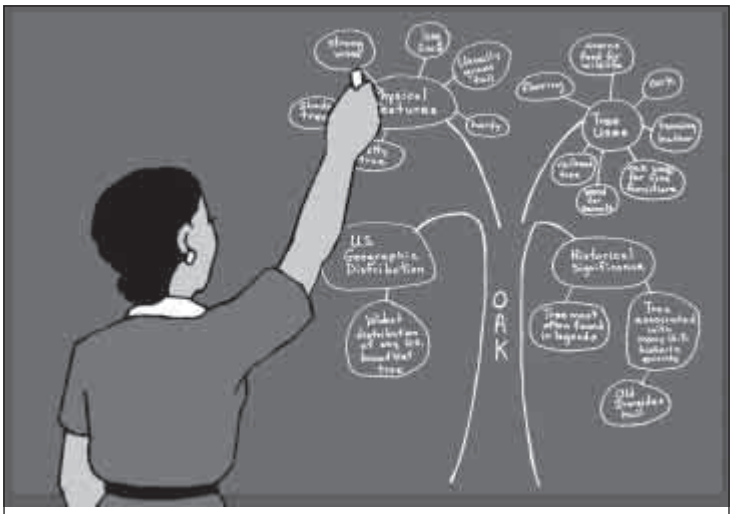


Illustration 1
Using comments from students, guide discussion to create a visual "map" to illustrate possible considerations why the oak might have been selected as the national tree.

Has good physical features or characteristics

- Oaks are hardy and can live up to 300 years or more.
- Oaks generally have a spreading shape which provides lots of shade.
- Oaks are sturdy.
- Oaks often grow tall (some red oaks grow to well over 100 feet).
- Oaks are attractive trees, some red oaks change color in the fall.

Has played an important role in the history of the United States

- Oaks are the trees most commonly found in legends.
  - One tribe of Native Americans believed a white oak was the ancestral guide for when to plant corn.
- Oaks are associated with many historic events and famous people
  - Abraham Lincoln found his way across a river near Homer, Illinois, using the Salt River Ford Oak as a marker.
  - Jeremiah Wadsworth saved the Connecticut Charter by hiding it in the hollow of an old oak tree. The tree later became known as the Charter Oak.
  - Andrew Jackson took shelter under Louisiana's Sunnybrook Oaks on his way to the Battle of New Orleans.
  - The Republican Party was founded under the Republican Party Oaks in Michigan.
  - "Old Ironsides," the ship USS Constitution, earned its nickname from the strength of its live oak hull, famous for easily repelling British cannonballs.

Enrichment Activity

If you have extra time to devote to this activity you may wish to keep the visual map simple at first. Allow students to do research and report back to the class on these four topic areas. Then they can fill in details on the visual map themselves. Information about oaks can be found in reference books or on the Internet at arborday.org/oaks.

Help students understand that, no matter why people voted for oak as the national tree, oaks are an important part of our nation's heritage. They are also damage-resistant, hardy trees that have merited admiration and respect for the shelter and many vital products their wood has long provided Americans.

Ask students how many of them can recognize an oak? Can they describe how it is different from other kinds of trees? Tell students they are going to have a chance to identify several different kinds of trees and learn a little bit more about oaks in detail. (Note - If students are to be graded on the activity, put the performance assessment criteria (page 11) on the board.

Key Concept: Explain that despite their great variety, oaks share several distinctive characteristics that separate them from other tree species.

- Oaks produce acorns and grow from acorns.
- Most oaks can live for centuries.

Many oak species also share a common shape, being rounded with a broadly spreading crown. Some oaks hold onto their dead leaves through the winter and shed

Latin is the language of **taxonomy**, and each species is referred to by a single Latin name. Using a common language that is understood by scientists all over the world, no matter what their native language, helps provide distinct identification for plants that have many common names. The Latin name consists of two words (occasionally three.) The first word is the name of the genus (a group of closely related species) and the second word is usually descriptive and designates the particular kind or species of plant or animal. For example: *Quercus rubra* is the Latin name for Northern Red Oak…*Quercus* is the genus name and *rubra* is the species name.

The Activity - Use a basic tree key and create a simple key to identify some oak species in your community. (If oaks are not available, students can learn to use a basic tree key and create a simple key to identify their state tree or a tree common to their region.)

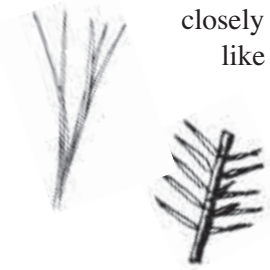
Preparation: Start the activity by introducing students to some of the necessary concepts they must have for tree identification. Have several examples of conifers on hand, some with scale-like leaves and some with needle-like leaves. If possible, have actual examples of broadleaf trees, one that shows an opposite attachment to the twig, one that shows an alternate attachment to the twig, one that shows a compound leaf and one that shows a simple leaf. When actual samples are not available, draw examples on the board or overheard. (See illustrations on page 8 and 9.)

Basic information - Explain that there is a scientific process scientists use to classify plants and animals. This process is called **TAXONOMY**.

Taxonomy provides an organized system for grouping things based on certain "like" characteristics. When scientists classify trees, they start by dividing trees into two main groups-conifers and broadleafs.

1. CONIFERS – Conifers are cone-bearing trees and most are evergreen. Conifers have needle-like or scale-like leaves.

A. **Conifers with needle-like leaves** – Tell students to closely examine a conifer sample with needle-like leaves. Have them look to see if each needle attaches individually to the twig or if the needles are attached to the twig in bundles of needles grouped together. This is one clue they may need to look for when identifying a mystery tree.



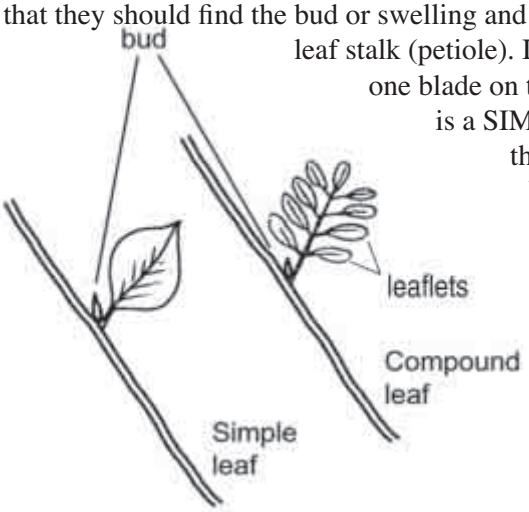
B. **Conifers with scale-like leaves** – Have students look closely at a sample of a conifer that has scale-like leaves. Point out how the tiny, scale-like leaves overlap each other. Explain to students that some of these conifers may have cones that look more like small berries.

Make sure students can distinguish between conifers with needle-like and scale-like leaves before proceeding to a discussion of broadleaf trees.

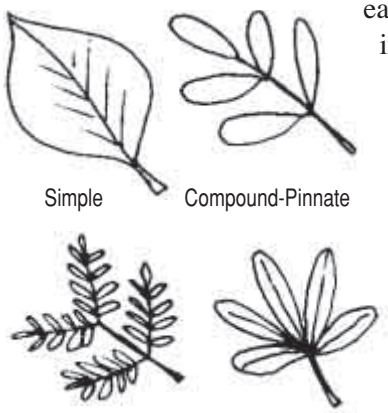
2. BROADLEAF TREES – Broadleaf trees have thin, flat leaves that are usually shed annually (deciduous). Broadleaf trees bear a variety of fruit and flowers.

Carefully explain to students that where the leaf stalk attaches to the twig there is usually a **BUD**. That bud is next year's leaf, already on the tree. The leaf will fall off, but the bud will remain on the twig through the winter, opening into a new leaf the following spring. Point out that if a bud is not exposed or visible, look for a swelling at the base of the leaf stalk to determine attachment. Tell students that the bud (or swelling) is an important clue...it tells them THE LEAF STARTS HERE! In the classification process of broadleaf trees, scientists look at two important clues to further separate these trees into groupings.

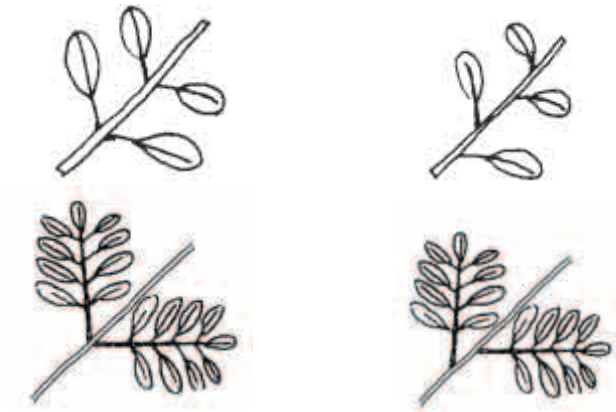
A. Simple leaves OR Compound leaves – One important reason to look for the bud is to determine if the tree has simple leaves or compound leaves. Draw sample pictures on the board to illustrate what students should look for. Explain that they should find the bud or swelling and then look at the leaf stalk (petiole). If there is just one blade on the leaf stalk, it is a SIMPLE LEAF. If there are many blades on the leaf stalk, it is a COMPOUND LEAF. Tell students that the multiple blades of the compound leaf are called LEAFLETS.



Also important for students to know is that the leaflets of the compound leaves are attached to the leaf stalk (not the twig) in several ways. When leaflets are attached across from each other on the leaf stalk in a pattern that resembles a feather, that leaf is referred to as a PINNATELY COMPOUND LEAF. If the leaf stalk comes up and branches out again giving the appearance of a number of feathers attached to the leaf stalk, that leaf is referred to as a BIPINNATELY or TWICE COMPOUND LEAF. If the leaflets are arranged on the leaf stalk in a pattern that looks like the fingers on the palm of a hand, that leaf is referred to as a PALMATELY COMPOUND LEAF.



B. Opposite Arrangement OR Alternate Arrangement Another important reason for students to look for the bud or swelling where the leaf stalk attaches to the twig is that it will also help them determine the ARRANGEMENT of the leaves on the twig. When two or three leaves are arranged directly across from each other on the twig it is called an OPPOSITE ARRANGEMENT. When leaves stagger up the twig and are not located directly across from each other on the twig that is called an ALTERNATE ARRANGEMENT. It is very important to stress to students that opposite and alternate arrangement refers to the way the leaves are arranged on the twig, not the way the leaflets are arranged on the leaf stalk.



Encourage students to closely examine the leaf attachment. Sometimes many buds will be clustered close together near the end of the twig giving the impression of being opposite (often common with oaks). But if students look down a little further on the twig, they will see that these buds or leaves actually have an alternate arrangement.

Even when leaves have fallen from the tree, the buds, as well as the branching pattern, still remain to provide the clue to arrangement.

Mention that many other factors are important in tree identification. Other things scientists look at are:

- ***Leaf characteristics*** – like leaf margin (the edge of the leaf) which can be lobed, toothed or entire (smooth). Also look at leaf shape, size and color.
- ***Bark*** - Tree bark can be smooth, rough, or scaly. Each tree species has a characteristic way of expanding or breaking its bark forming patterns by which many

trees can be identified.

- ***Seeds/fruits*** – Most trees grow from seeds. A mature plant produces seed that is the genetic material for new plants of that same kind to grow. Some trees have seeds, seed pods, or fruits which aid in tree identification (oaks have their characteristic acorns).
- ***Tree shape*** – ie. spreading, columnar, triangular
- ***Buds and twigs*** – Buds can be large and fat, like the magnolia; long, sharp and slender, like the beech; button-shaped, like the dogwood; or tiny, like the hawthorn. All offer clues that help identify a tree.

Once you have reviewed the basic information with your students and they understand the terms they will need to know to answer the classification questions, it is time to begin the activity.

Give each student a copy of the Basic Tree Identification Key (page 12). Take students outside to observe some of the characteristics previously discussed by examining trees on the school grounds or in the neighborhood. This will help them sharpen their observation skills. Practice using the key together as a class.

Gather students in front of a tree. Instruct students to look at the descriptions above the two big boxes on the worksheet that say, "BEGIN HERE." *Ask students to look carefully at the tree and determine which of the two descriptions best describes the tree*. (If it is a conifer, students will work with the clues in the left text box. If it is a broadleaf tree, students will work with clues in the right box.)

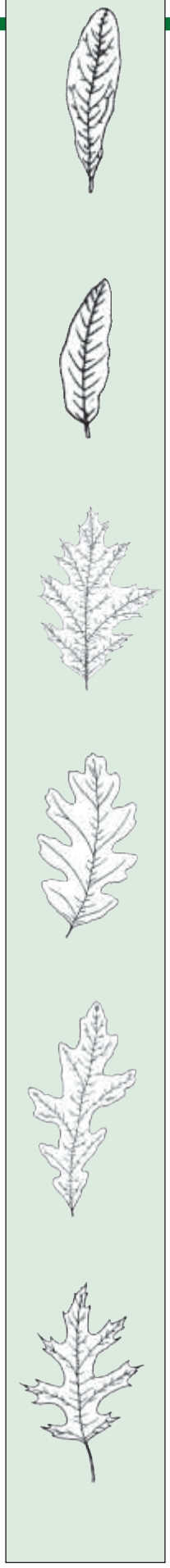
Explain that in each step, as they move from the top of the box down, they will need to choose between two clues that give tree characteristics. They need to pick the box with the clue that best describes their mystery tree then go from that box to the next set of clues until they come to the last box that gives them an idea of what kind of tree they are examining.

NOTE: The Basic Tree Identification Key will only get students to certain groupings of trees with similar characteristics. After some practice, students may wish to go online at www.arborday.org/treeid and use the more detailed *What Tree Is That?* tree key to identify their mystery tree down to a genus or species.

In some areas, depending on the time of year, only conifers may be available for classification. Have students use the classification key to discover what kinds of trees they are likely to be. Students work in pairs and record their results. Determine if any oaks are growing near your school. If so, let students closely examine them. If the oak has not leafed out, look for dead leaves under the tree and remnants of acorns. Some oaks in warmer parts of the United States are evergreen (they keep their leaves through the winter) and some oaks hang onto their dead leaves into the next spring making them easier to identify year round.

Explain that they are going to take a closer look at the oak. Return to the classroom and hand out copies of the Student Worksheet (page 13). Review the General Characteristics of Oaks section together. Then take a look at the sub-groupings of red oak and white oak. Use the information provided on the handout to fill in the first two sections on the worksheet. Write the list of oaks common to your area on the board. Allow students to work together to research characteristics that would help classify these oak species and enter those in the bottom section of the worksheet. Students now have a working key they can use to identify some of the oaks in their community.

(If there are no oaks in your community, have students look at the model on the worksheet and work together as a class to create a key for trees common to your area.)



Assessment:

The ability of a student to key out actual tree groups and create a key for several species within a genus serves as authentic assessment.

Performance evaluation. Student should be able to:

- identify the seed that is unique to oaks and draw an accurate example of that seed 0-2 points
- use the Basic Tree Identification Key to correctly classify several unknown trees 0-2 points
- accurately describe two ways the Oak was used in the building/settling of our nation 0-2 points
- accurately complete the worksheet and classify at least two oak species (or trees common to your area) 0-4 points

Resources

The Audubon Society Field Guide to North American Trees, Knopf Publishing, New York

Antunez de Mayolo, Kay - Investigating the Oak Community, California Oak Foundation

Brockman, C. Frank - Trees of North American, Golden Press, New York

Burnie, David - Trees, Eyewitness Books. Alfred A. Knopf, New York

Davis, Brian - The Gardener's Illustrated Encyclopedia of Trees and Shrubs, Rodale Press, Emmaus, PA

Duncan, Wilber and Marion - Trees of Southeast United States, University of Georgia Press

Elias, Thomas S. - The Complete Trees of North America, Van Nostrand and Reinhold Company, New York

Johnson, Hugh - Encyclopedia of Trees, Gallery Books

Miller, Howard & Samuel H. Lamb - Oaks of North America, Naturegraph Publishers Inc.

Mitchell, Alan - Trees, Illustrated by David More, Gallery Books

Nature Study Guild - Master Tree Finder
Pacific Coast Tree Finder
Desert Tree Finder
Winter Tree Finder
Rocky Mountain Tree Finder
Write: Nature Study Guild,
Box 972, Berkerley, CA, 94701

Petrides, George - A Field Guide to Trees and Shrubs, Houghton Mifflen Company

Phillips, Roger - Trees of North America (A photographic guide), Random House, Inc., New York

Rabinette, Gary D. - Trees of the South, Van Nostrand Reinhold Company

Sarge, C.S. - Manual of the Trees of North America, Dover Publications, New York, NY

Symonds, George W., The Tree Identification Book, Quill

Thomson, Ruth - Trees, Usborne First Nature Book, EDC Publishing, Tulsa, OK

U.S. Department of Agriculture - Trees Native to the Forests of Colorado and Wyoming, U. S. Government Printing Office

U.S. Department of Agriculture, Forest Service - Important Trees of Eastern Forests, Western Publishing Company, Inc.

Zim, Herbert and Alexander Martin - Trees, A Guide to Familiar American Trees, Golden Press, New York, NY

Websites

www.plants.usda.gov/

www.horticopia.com

www.nearctica.com/nathist/vascular/trees.html

www.treeguide.com/NorthAmericanTree.asp

www.arborday.org/oak

Basic Tree Identification Key

Look carefully at the tree you wish to identify. Every part of the tree – the tree shape, the bark, the buds, the fruits/seeds, and the leaves - all will provide clues to help you identify the mystery tree. This simple Tree Key will give you an idea of what kind of tree it might be. Closely examine the tree, then read the first two choices. Which best describes the mystery tree?* If it has cones and needle-like or scale-like leaves, you will begin selecting from tree clues in the left box. If it has leaves that are thin, flat and broad, you will begin selecting from tree clues in the right box.

If the tree has cones and needle- or scale-like leaves BEGIN HERE

THIS IS A CONIFER

OR

- The tree has **needle-like** leaves
  - OR
  - Needles clustered in **bundles**.
    - OR
    - Needles in bundles of 2-5, evergreen. *These are pines.*
    - Needles in clusters of many, deciduous. *These are larches.*
  - Needles attached **singly** to the twig.
    - OR
    - **Needles are flat**, hard to roll between your fingers. *These are Douglasfir, redwood, hemlock, or fir, if evergreen; baldcypress, if deciduous.*
    - **Needles are square**, easy to roll between your fingers. *These are spruce.*
- The tree has **scale-like** leaves that hug the twig. *These are cedars, sequoia, or cypress.*

If the tree has leaves that are thin, broad and flat BEGIN HERE

THIS IS A BROADLEAF

OR

- The tree has **simple** leaves (one leaf blade)
  - OR
  - Leaves arranged **opposite** on the twig. *These are maple, catalpa, or dogwood.*
  - Leaves arranged **alternately** on the twig. *These are oak, elm, ginkgo, poplar, beech, aspen, tuliptree, kukui, cottonwood, magnolia, mulberry, tupelo, pawpaw, redbud, willow, holly, hackberry, linden, sycamore, hophornbeam, sweetgum, or birch, to name a few.*
- The tree has **compound** leaves (more than one leaf blade)
  - OR
  - Leaves arranged **opposite** on the twig.
    - OR
    - **Palmate shape** *These are buckeye or horse-chestnut.*
    - **Pinnate shape** *These are ash or boxelder.*
  - Leaves arranged **alternately** on the twig. *These are honeylocust, mimosa, walnut, pecan, locust, hickory, yellowwood, mountainash, paloverde, tesota, goldenraintree, mesquite, tree-of-Heaven, Kentucky coffeetree or pagodatree, to name a few.*

**Palms are more closely related to grasses than to conifer and broadleaf plants commonly known as trees. Members of the palm family, like cabbage palmetto, have largely unbranched, column-shaped trunks which vary in height. They are not included in this key.*

The Oak - General Characteristics

Oaks are broadleaf trees that bear seeds called acorns. They have simple leaves, arranged alternately. They are often separated into two main groups - red oaks & white oaks. (The Latin scientific genus name for oak is *Quercus*).

The White Oak Group - Characteristics

- The bark is generally light gray or brown.
- Acorns mature during one year.
- Acorn cups contain no hair inside.
- Leaves are lobed or serrated (saw-toothed) without bristles.
- Acorns are sweeter, with less tannin than the red oaks.
- The white oak produces the most valuable oak lumber because the cells contain bubble-like structures called tyloses that make the heavy wood leak proof. Used for furniture and barrels.

Species include: (deciduous) white oak, post oak, bur oak, swamp white oak, chinkapin oak, overcup oak, chestnut oak, Gambel oak, English oak, blue oak, Oregon white oak; (evergreen) Arizona white oak, live oak, to name just a few.

The Red Oak Group - Characteristics

- The bark is often dark gray, brown or black.
- Acorn cups take almost two years to mature.
- Acorn cups contain fine, silky hairs inside.
- Leaf lobes are usually pointed and bristle-tipped; some are unlobed with the leaf ending in a bristle and a few are oval with smooth edges.
- Acorns are more bitter, with more tannin, than white oaks.
- The wood is not watertight, but is used for lumber, flooring, railroad ties and furniture.
- The name "red oak" probably refers to the red fall coloration some red oaks display in some years.

Species include: (deciduous) Northern red oak, black oak, Shumard oak, blackjack oak, pin oak, scarlet oak, Southern red oak, shingle oak, water oak, willow oak, bear oak; (evergreen) interior live oak, to name just a few.

Student Worksheet

Name _____

DIRECTIONS: Now that you know how to use a tree identification key, expand the key to identify oak species in your region. This key starts with broadleaf trees that have simple leaves with an alternate arrangement which includes oaks, elms, poplar, beech, etc. Use reference books or the Internet along with this worksheet to get the information you need to create your own tree key to identify oaks in your community. Fill in the blanks where indicated. (If you do not have oaks in your area, research some of the nation's most common oaks to fill in this worksheet or, on a new sheet, create a key to help you identify your state tree.)

BEGIN HERE
This key begins with broadleaf trees that have simple leaves and an alternate arrangement.

OR

Fruit/seed is an _____.
It is an oak.

Fruit/seed is NOT an acorn. It could be an elm, ginkgo, poplar, beech, aspen, cottonwood, kukui, redbud, sweetgum, birch, or many other species.

OR

The inside cup of the acorn is smooth, not hairy. Acorns mature in one year.

It is in the _____ oak group.

The inside cup of the acorn is slightly hairy. Acorns mature in two years.

It is in the _____ oak group.

OR

OR

_____
_____
_____
_____
_____
_____
_____

It is a _____ oak.
(Describe what makes this oak species unique.)

_____
_____
_____
_____
_____
_____
_____

It is a _____ oak.
(Put information about what makes your species of oak unique.)

_____
_____
_____
_____
_____
_____
_____

It is a _____ oak.
(Put information about what makes your species of oak unique.)

_____
_____
_____
_____
_____
_____
_____

It is a _____ oak.
(Put information about what makes your species of oak unique.

Step 1

Take a Closer Look at the Mighty Oak

EXTENSION ACTIVITY 1

Acorn Survivor

Classroom Activity:

- **Students will play a game that demonstrates what an acorn needs to germinate and grow and some of the factors that affect the likelihood an acorn will survive to become an oak tree.**

Objectives:

Students will be able to:

- **Name the main components a seed needs to germinate and grow into a tree.**
- **Identify several of the many factors that can impact the germination and survival of a young oak tree.**

Time Recommended:

- **One 30 - 45 minute class period**

Materials Needed:

- **Activity Cards – page 16 (Number determined by class size – one card per child)**
- **Pencil and paper**
- **Tape player/tape (optional)**

National Science Education Standards Correlation:

Students will develop an understanding of:

- **Populations and ecosystems**
- **Populations, resources, and environments**
- **Natural hazards**

For a fun, hands-on experiment your students can do that compares the strength of oak to pine, visit our website at arborday.org/oakexperiment

Set up: Photocopy and cut out the needed number of Acitvity Cards on page 16. You should make:

- Two to three acorn cards
- Four or five of each Tree Needs cards
- One of each Tree Danger card

EXAMPLE: For a group of 22 students, you would need the following number of cards:

Tree Needs	Tree Danger
5 good soil	1 insect pest
5 water	1 deer
5 sunlight	1 squirrel
3 acorn	1 blue jay

(For smaller groups, you may remove one of the tree danger cards or the game can be too difficult to win.)

Background: A tree is a living organism. Like any living thing, a tree has certain needs that are essential for it to grow and thrive. Some trees can reproduce from cuttings, but most trees, like oaks, start from a seed. Starting as a seed, a tree requires water, soil, sun, air (carbon dioxide), and space to grow.

The seed of an oak is an **acorn**. An acorn can be described as a baby oak in a box with its lunch. The acorn shell houses and protects the seed. There is enough food stored within the acorn to feed and sustain the young oak as it begins to grow until it develops leaves and can start to produce its own food through the process of photosynthesis. Sometimes acorns, particularly red oak acorns, need a period of dormancy over the winter before they will germinate.

Water is an essential ingredient for life. Often water is required to soften the seed coat so the tiny plant inside can germinate. Water is a vital part of a tree's basic structure and is one of the main components of photosynthesis. It also transports nutrients from the soil to the tree roots.

Soil sustains and supports the tree. The soil holds the water and contains essential nutrients the tree needs to grow. Tree roots spread out in the soil, sucking up water and pulling in the nutrients. There are many different soil types, each capable of supporting different kinds of trees.

Oaks, like all green trees and plants, get their energy from the **sun**. It is the catalyst for the process of

photosynthesis. Each of the tree's leaves is like a tiny factory - taking in sunlight and air (carbon dioxide) and mixing them with water and nutrients from the tree's roots. When this happens, the leaves make a sugar-like food that feeds the tree.

As trees mature they need **space** to grow. Without enough space, trees may have to compete with other plants for light, soil nutrients, and water.

The average number of acorns produced by oaks varies species to species and can even vary tree to tree. A study by Goodrum and Reid reported that 10 inch diameter Northern red oaks produced an average of 1,127 acorns per tree. However, very few of these acorns ever become oaks.

In the forest, oak trees drop many acorns every year. Once the acorns have been dropped, the oaks depend on outside forces, like squirrels and blue jays, to carry the acorns to other parts of the forest. Occasionally a bird will drop an acorn as it flies. Sometimes after a squirrel has buried an acorn in a different part of the forest, the squirrel will forget to go back and eat it. In either case, the acorn is then left on the ground and, if conditions are right, it will sprout into a young oak tree.

Many factors can limit an acorn's chance for survival. The acorn may fall directly under the tree where it will not get enough sunlight to grow, or it may fall in an area where the soil is poor. Too much rain or a flood could damage the acorn or a drought could prevent the young oak from growing. Animals might eat the acorn. It is estimated that 24 percent of an acorn crop is eaten by birds and squirrels. Insect larvae can damage up to 50 percent of the acorn crop. Acorns are also an important food source for deer, chipmunk, mice, and wild turkey. Even if the acorn sprouts, a lawnmower may cut the newly sprouted oak or someone might inadvertently step on it. An acorn's survival is chancy at best.

The purpose of this activity is to demonstrate to students the many challenges an acorn faces to survive and grow into an oak.

Anticipatory Set: *Initiate class discussion by asking students if they know what an oak tree needs to grow.* (Responses will vary.) As students respond, elaborate briefly on the function of each "tree need" mentioned and direct discussion so all factors {acorn (seed), water, soil, sun, air and space} are reviewed. List these needs on the board.

Next ask students to think of factors that might affect an acorn's chance for survival. Incorporate Background Information into the discussion if not mentioned by students. List these dangers on the board.

Activity: Explain that they are going to play a game called Acorn Survivor. Each student will play a role in the game. Some students will be tree needs - the things an oak tree needs to grow. Others will be tree dangers – factors that might keep an acorn or young oak from surviving.

Identify four bases equidistant around the room or on the playground. (Use three bases if you have fewer than 18 students.) Tell students that at each base enough air (carbon dioxide) and space are available for an acorn to start to grow, but other tree needs like water, good soil and plenty of sunlight are still required.

Put Activity Cards into a box and instruct each student to draw out a card, making sure to keep the picture on the card hidden from other students. Tell students they need to move from base to base (ecosystem to ecosystem) while the music is playing and when the music stops (or the teacher calls stop) they need to quickly get to the base nearest to them. (Make sure too many students don't all group at one base.)

Once all students have reached a base ask the students with acorn cards to raise their hands. Those bases then become ecosystems that might support the growth of an oak. Ask students with insect, squirrel, blue jay or deer cards to raise


Scarlett Oak


Shingle Oak


Shrub Live Oak


Southern Red Oak


Swamp White Oak


Valley Oak


Water Oak

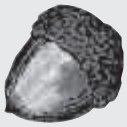
their hands. Any acorn in a group that contains one or more of these tree dangers does not survive.

Explain, even if animals do not eat an acorn, its survival is certainly not guaranteed. A number of factors are still required for the acorn to germinate and grow. Next ask the students with water, soil and sun cards to raise their hands. To survive and grow into an oak, an acorn must also be in a group that contains at least **one of each** of the tree needs.

Record the total number of acorns and the number that survived the first round of play. Have all students put their Activity Cards back into the box and draw again. Play several rounds until an acorn finally survives.

Return to the classroom and do some 'acorn math' to determine what percentage of acorns actually survived to become an oak.

Assessment:



Each student will write a creative story that details the struggle of an acorn to become an oak. The story should include tree needs and some dangers the acorn encountered as it grew to be a mature oak tree. Stories can be illustrated and displayed around the room.

ACTIVITY CARDS

Oak Tree Dangers

Squirrel

Insect Pest

Blue jay

Deer

Oak Tree Needs

Good Soil

Sun

Water

Acorn

EXTENSION ACTIVITY 2

Support the National Tree Bill

Classroom Activity:

- **Students will learn the process by which a bill becomes a law, follow the progress of a legislative bill proposing the oak as a national emblem of the United States, and participate in the legislative process by letter writing.**

Objectives:

Students will be able to:

- **Explain the process by which a bill becomes a law.**
- **Discuss critically the pros and cons of a proposed law for oak to be a national emblem.**
- **Recognize how the values and principles of American democracy can be promoted through participating in government (i.e. voting, keeping informed about public issues, writing to legislators).**
- **Gain personal experience by active participation in the legislative process.**

Time Recommended:

- **One or two class periods**

Materials Needed:

- **Pencil and paper**

National Social Studies - Civics Education Standards Correlation:

Students will develop an understanding of:

- **The role of the citizen in American democracy.**
- **The principles of American democracy and how the American political system provides for opportunities for participation.**

Background: In 2001, over one hundred-thousand school children in classrooms across the nation took time to cast their vote to select a national tree. The winner was the oak. Whether your students were involved in the vote or not, they can still learn about the political process by following the legislation required for the oak to be officially designated as America's national tree. Giving students real-life experiences in studying and participating in the legislative process helps young people prepare themselves for the voting rights and responsibilities they will one day assume as citizens. Recognizing that, even at the "grass roots" level, people, even students, can have an impact on issues of concern to them.

Activity: Legislators are usually good about responding to letters from their constituents, especially students. They want to know how the people in their state feel about issues. The National Tree Bill is a non-controversial one, therefore a good one for class involvement. Helping children recognize that their voice can be heard in the political process can have a lasting impression on students, giving them the confidence to continue to be involved in the decision making process that shapes our nation.

- A detailed flow chart showing the process for a bill to become a law can be found at arborday.org/treebill.
- Information on the role many different kinds of trees, including the oak, had on the settling of our nation can be found at arborday.org/NationalTree.
- Information on the current status of the National Tree Bill can be found at http://thomas.loc.gov.

Anticipatory set: Students were introduced to the United States' symbols in the Basic Activity on page 6. Review those symbols quickly with students. *Ask students why they think countries have national symbols or emblems*. (Responses will vary.)

Ask why it might be meaningful for the United States to have a national tree. Responses could include the role trees played, and continue to play, in the development of our nation. Trees produce food, fuel, and valuable products - like paper, houses, baseball bats, and even medicines. Trees provide many environmental benefits. Trees…

- clean the air we breathe;
- provide shade and cool the air;
- make fresh oxygen;
- filter runoff to keep streams clear and clean;
- prevent soil erosion;
- muffle noise;
- and provide habitat for wildlife.

Trees also mark the changing of the seasons and create a more attractive landscape. Studies even show that hospital patients heal more quickly when they have a view of trees.

Ask your students if they participated in the vote for the national tree in 2001. Tell students that as a result of that popular vote, legislation is being proposed that will make the oak the official national tree. That proposal is called a bill.

The process for a bill to become a law starts in Congress. Congress is made up of two different groups, the House of Representatives and the Senate, whose members have been elected to represent the people in their states. The population of the state determines the number of

Congressional Representatives for each state. Each state has two United States Senators.

A bill may be introduced in either the House of Representatives or in the Senate. The House and Senate do a lot of their work separately, but they come together at the end to decide exactly how a bill will be written. In the end, they both have to pass the same exact bill. A bill must pass a vote with both Houses of Congress then it is sent on to the President. Once the President signs the bill it becomes a law. If the President vetoes the bill a 2/3 vote of Congress can override the veto and the bill becomes law. If the President doesn't take action on the bill within 10 days, the bill automatically becomes a law without the President's signature unless Congress has adjourned. If Congress has adjourned and the President does not sign the bill this is called a pocket veto.

After discussion, ask the students the following cause and effect questions to check for understanding:

- What happens if the Senate does not agree with the House of Representative's version of the bill? (The Senate can vote no on the bill and the bill dies, or they can amend the bill and send it back to the House of Representatives for consideration. The same situation is true if the House of Representatives does not agree with the Senate's version of a bill. In the end, both Houses of Congress must pass the same exact bill.)
- Where does the bill go after both Houses of Congress agree it on? (The bill goes to the President of the United States.)
- What happens if the President vetoes the bill? (The bill must go back to the House where it originated.)
- Can the bill still become a law if the President vetoes it and how? (A two-thirds majority vote can override the President's veto and the bill becomes a law.)

Following the popular vote in 2001, identical bills to amend title 36 of the United States Code to designate the oak tree as the national tree of the United States were introduced in both the House of Representatives and the Senate. The House of Representatives identified the initial National Tree Bill as H.R. 1936 and the Senate identified it as S. 811. When two identical bills are introduced to both Houses of Congress, they are called companion bills. These bills may or may not keep the same numbers as they go through the legislative process, depending on how quickly they are acted on and whether amendments are added.

Get Involved

1. Discuss the proposed National Tree Bill.

   The National Tree Bill legislation proposes that the current *US Code, Title 36, Subtitle 1, Part A, Chapter 3, would add a new section, Section 305, which would read as follows: Sec. 305 – National tree, The tree genus Quercus, commonly known as the oak tree, is the national tree*.

   Another minor part of the bill amends the US Code table of contents by adding the word "tree" to the current list of *"national anthem, motto, floral emblem, and march."*

2. Work in groups to gather background information about oaks, and trees in general.

3. As a class, put together a position paper that outlines reasons students wish to support the bill.

4. Find the current status of the National Tree Bill by checking the government web site at http://thomas.loc.gov./

5. Find the names and address of your state's Senators and your Representative. (Senate information can be found at www.senate.gov and House information found at www.house.gov/writerep)

6. Have each student select at least one Representative or Senator to whom they would like to write and compose letters supporting the National Tree Bill using information from the class position paper. (A lesson on letter writing fits in well here.) Make sure students check letters for grammar and spelling errors before sending them.

7. Make a National Tree Bill flow chart that can be left up in the room. Record on the chart when responses come back from Congressional officials. Use the chart to monitor the progress of the bill. Remind students not to be discouraged if the bill does not move along quickly. It sometimes takes several years for a bill to receive serious attention, but writing legislators can speed the process along. Students may wish to keep in touch with their Senators and Representative while they follow the progress of the National Tree Bill and even collaborate with next year's class to continue the effort.

Making a difference: Voting and writing legislators are ways citizens, including children, can influence elected officials. Efforts to support the National Tree Bill help remind citizens about the value of trees and encourage tree planting, which can have an impact for the good of the environment for many years to come.