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The Native  
Trees of Iowa

# Trees For Teens



*Red Oak*  
*Quercus Rubra*

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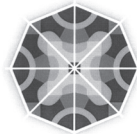
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### Major Financial Support Provided by the Following:



Aquila



ALLIANT ENERGY.

### Other Financial and In-Kind Support Provided by the Following:



*Teaching Teens the Value  
of Trees for 16 Years*



*To plant trees is to give  
body and life to one's  
dreams of a better world.*  
~ Russel Page

## The Program

Trees For Kids/Teens is a tree education and planting program that targets Iowa's elementary and secondary school students. Its goals are to educate students about the values of trees and to encourage tree planting projects at schools or other public areas around the state of Iowa. In 2005 12,670 teachers and their students were involved with the Trees For Kids/Teens programs, planting over 77,729 trees.

This unique program is sponsored by the Iowa Department of Natural Resources (DNR), the Iowa Nursery and Landscape Association (INLA), the Iowa Banker's Association (IBA), MidAmerican Energy, Aquila, Alliant Energy, Iowa State University Extension Forestry, the Iowa Tree Farm Committee, the USDA Forest Service, Trees Forever, the Iowa Society of American Foresters, Iowa Woodland Owners Association and the Iowa Conservation Education Council.

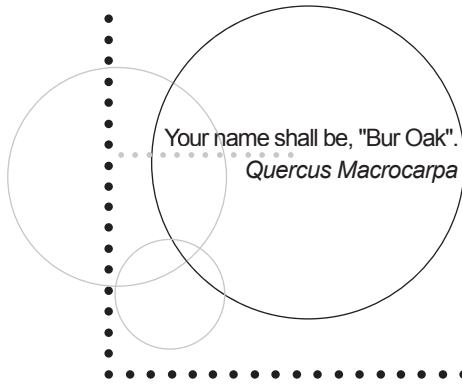
This teacher's packet of tree information and classroom activities is designed to complement science, reading, math, geography, computer skills, history and other subjects. Feel free to utilize any or all of the packet and/or to photocopy specific activities and lesson plans. Should you need more copies of the materials, please contact the DNR at (515)281-4915 or download individual activities off the web at [www.iowadnr.com/forestry/](http://www.iowadnr.com/forestry/).

## The Trees

A landscape tree is available "free" to your class to plant in celebration of Iowa's Earth/Arbor Day in the spring of 2006. Contact Trees For Kids Coordinator Tiffany Summy at (515)281-4915 or e-mail [ffkids@dnr.state.ia.us](mailto:ffkids@dnr.state.ia.us) (after May 15 contact John Walkowiak at [john.walkowiak@dnr.state.ia.us](mailto:john.walkowiak@dnr.state.ia.us)), for the names of participating Iowa nurseries (INLA members) who will sell trees at reduced or wholesale costs to participating Trees For Kids teachers. Tiffany will also give you local funding source contacts from the Iowa Bankers Association (IBA) and local Tree Committees who will assist you in getting the remaining funds to pay for your trees. In the end, there is no cost to your school!

We suggest that you do the following in preparation for planting your tree. Discuss planting trees with your principal and grounds keeper, locate a site, and contact a local INLA nursery. Next, contact a funding source at your local IBA bank or Tree Committee and explain that you are working on a Trees For Kids project for Earth Week/Arbor Day 2006 that needs funding. When sponsors agree to fund the project, have the nursery bill the bank or committee directly for the tree. Once you have secured funding, make arrangements for delivery with the nursery and set a planting date. Now you're ready to plant a tree with your students!

## How Do They Name Trees?



The “common names” which most people use when referring to trees have been handed down from generation to generation and can be traced back to one of several origins: (1) habitat where it grows, (2) distinctive features of leaves or bark, (3) product that comes from the tree; (4) botanist that discovered it, (5) geographic location and (6) Native American name.

Swamp white oak a native and hardy tree in Iowa got its name from the type of wet and low oxygen soils in which it grows.

Quaking or Trembling aspen also a native tree in Iowa but more famous and abundant in the Lake and Rocky Mountain States got its name from distinctive feature of its leaves moving in the slightest breeze. White or Paper birch got its name from the peeling white bark that was used to make canoes.

Sugar maple another Iowa native tree got its name from the distinctive sweet sap that provides maple syrup for our pancakes.

Hill's oak also known as Northern pin oak located in extreme North Central Iowa is named for E.J. Hill who originally described it.

Ohio buckeye, a native also to Iowa is named for the state, Ohio, in which the tree is very common in their forests. Chinkapin oak also a rare and unusual oak found on dry bluffs and ridge tops is a Native American name.

But the use of “common names” for trees can cause great confusion – when several refer to the same tree species. For example, the Osage Orange, not a native to Iowa was planted for fence rows or living fences across the southern regions of our state is referred by some as “hedge apple” due the large fruit. The native understory tree known as American Hornbeam is also known by many as “iron wood” or “muscle wood” or “blue beech”.

Botanists use a scientific name to ensure positive identification of a tree worldwide using the scientific language – Latin. Scientific names for trees consist of two words – the generic or genus name and the specific or species name. Most tree genera are natural clearly defined groups of trees that are easy to recognize such as oaks, maples, willows, etc. The genus name in Latin is always capitalized for example, the genus names for oak are Quercus; for maple it is Acer and for willow it is Salix. Species are variable units distinguished by less obvious characteristics than the genera. Species names are always in lower case in Latin. For example the genus and species name for Bur oak is Quercus macrocarpa.

For more information about Native Trees of Iowa refer to the Iowa DNR Forestry publication – Common Native Trees of Iowa available at [www.iowadnr.com/forestry/](http://www.iowadnr.com/forestry/).

## Upland Forests

Comprised mostly of various species of oak and hickory trees, or central hardwoods, upland forests make up the largest portion of Iowa's forest land. There is approximately 900,000 acres of oak-hickory and 500,000 acres of sugar maple-basswood forests in Iowa.

The types of trees found in the upland forests of Iowa depend upon the amount of moisture as well as many other variables. White and bur oak as well as shagbark and bitternut hickory survive where the land is drier. As the soil slopes and gains moisture, red oaks join into the mixture. In the more moist areas of the Iowa upland you can find black walnut, sugar maple, basswood, ironwood and white ash.

Trees of the upland forests are beloved for a variety of reasons. Whether it is the brilliance of autumn's colors, blooming in the spring or a home for wildlife, the trees of the upland forest are most valuable in sustaining an ecosystem. These trees are also used by humans for a variety of products. Oak, walnut and sugar maple are most recognized in the making of furniture but are also used for flooring, paneling, and fuelwood. Hickory, because of its great strength, is valuable in making tool handles. The sap of the sugar maple is used to make maple syrup. The wood of basswood is used for musical instruments and wood carving.

## Human Planted Forests

Windbreaks are multiple rows of trees and shrubs planted on the north and west sides of buildings. People plant windbreaks to reduce home heating bills, protect farmsteads, livestock, crops and soil, and to provide critical wildlife habitat.

Plantations are areas of trees planted for future forest products. About 7200 acres are planted in Iowa each year. Christmas tree plantations, fuelwood plantings, nut-producing groves and fruit tree orchards are the most well known.

Located near Iowa's major rivers, floodplain forests make up another large portion of the forest life in the state. Also known as bottomland forests, roots of trees such as silver maple, green ash, hackberry, cottonwood, willows, elm and boxelder are developed to withstand flooding and a lack of oxygen for long periods of time. Dutch elm disease has greatly reduced the amount of native American elm. Bottomland forests make up 500,000 acres of Iowa's forest land.

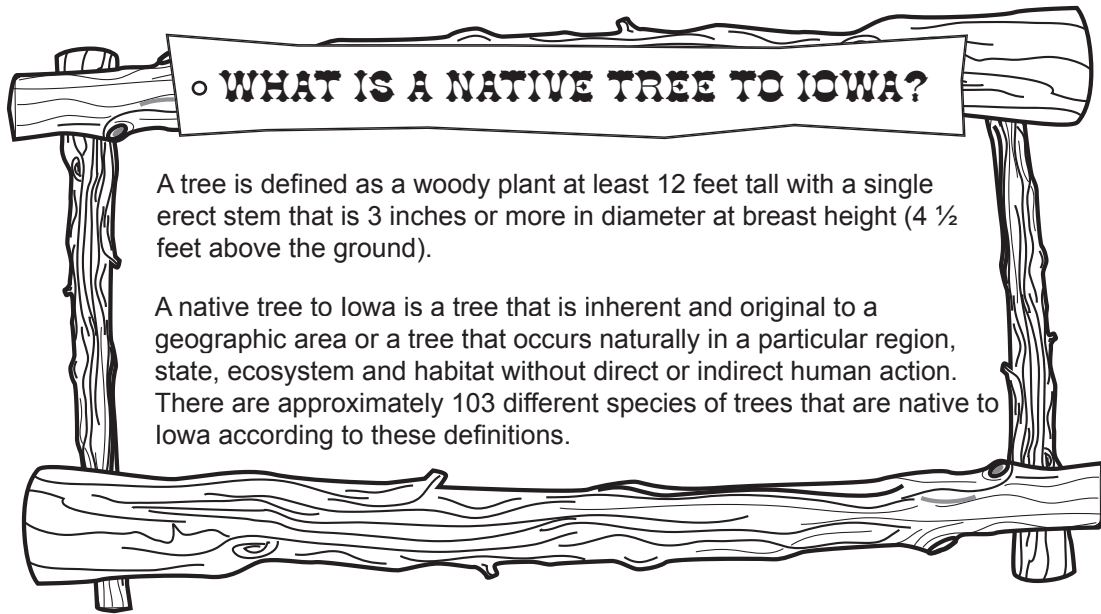
The trees of the floodplain are used for lumber, veneer and firewood. They are also home to a large number of native wildlife.

Perhaps the greatest value of floodplain forest is the ability to control soil erosion, minimize flooding impacts and filter out herbicides and other chemicals to maintain our water quality. Known also as riparian areas, there are great efforts to expand these forests abutting productive agricultural ground as "buffer strips." These buffers are made up of some of the trees mentioned above, as well as shrubs like dogwood and chokecherry, and native grasses and hedges.

## Urban Forests

The trees in Iowa's communities make up another important forest resource in Iowa, its urban forest. Each Iowa community boasts about 30-45 different tree species. Green ash, silver maple, Norway maple, and sugar maple have been the most popular species in Iowa's urban forest since the 1960's. Before then, the American elm dominated the streets of Iowa cities. However, overplanting and an outbreak of "Dutch elm disease" virtually wiped out our elms.

Urban forests enhance our communities by shading to cool our homes during the summer, preventing soil erosion, and actually increasing property values. Trees provide urban dwelling animals sources of shelter and food. In many Iowa cities, tree maintenance, replacement, and planting do not keep up with tree removal. Local governments' limited budgets and urban sprawl reduce the quality and quantity of the urban forest.



## ◦ WHAT IS A NATIVE TREE TO IOWA?

A tree is defined as a woody plant at least 12 feet tall with a single erect stem that is 3 inches or more in diameter at breast height (4 ½ feet above the ground).

A native tree to Iowa is a tree that is inherent and original to a geographic area or a tree that occurs naturally in a particular region, state, ecosystem and habitat without direct or indirect human action. There are approximately 103 different species of trees that are native to Iowa according to these definitions.

## Benefits

Using available and under-utilized native tree and shrub species in your landscaping offer several benefits:

- Native trees/shrubs are better adapted to Iowa's extremes in weather and planting sites.
- Native trees/shrubs provide superior native wildlife habitat.
- Native trees/shrubs have the ability to be in balance with natural insect and disease issues.
- Native trees/shrubs are less invasive and offer better management opportunities.
- Native trees/shrubs are Iowa's link to our heritage.

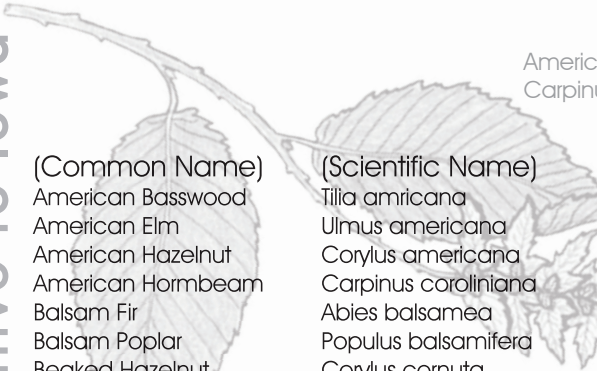


## WHY PLANT NATIVES?

*The creation of a thousand forests is in one acorn.*

*~ Ralph Waldo Emerson ~*

Trees & Shrubs Native to Iowa



American Hornbeam  
*Carpinus caroliniana*

(Common Name)	(Scientific Name)	(Common Name)	(Scientific Name)
American Basswood	<i>Tilia americana</i>	Margaret's Hawthorn	<i>Crataegus margareta</i>
American Elm	<i>Ulmus americana</i>	Meadow Willow	<i>Salix petiolaris</i>
American Hazelnut	<i>Corylus americana</i>	Mexican Plum	<i>Prunus mexicana</i>
American Hornbeam	<i>Carpinus caroliniana</i>	Missouri River Willow	<i>Salix eriocephala</i>
Balsam Fir	<i>Abies balsamea</i>	Mountain Maple	<i>Acer spicatum</i>
Balsam Poplar	<i>Populus balsamifera</i>	Nannyberry	<i>Viburnum lentago</i>
Beaked Hazelnut	<i>Corylus cornuta</i>	Northern Pin Oak	<i>Quercus ellipsoidalis</i>
Bebb Willow	<i>Salix bebbiana</i>	Ohio Buckeye	<i>Aesculus glabra</i>
Bigtooth Aspen	<i>Populus grandidentata</i>	Pagoda Dogwood	<i>Cornus alternifolia</i>
Bitternut Hickory	<i>Carya cordiformis</i>	Paper Birch	<i>Betula papyrifera</i>
Black Ash	<i>Fraxinus nigra</i>	Peachleaf willow	<i>Salix amygdaloides</i>
Black Cherry	<i>Prunus serotina</i>	Pear Hawthorn	<i>Crataegus calpodendron</i>
Black Maple	<i>Acer nigrum</i>	Pecan	<i>Carya illinoensis</i>
Black Oak	<i>Quercus velutina</i>	Pignut Hickory	<i>Carya glabra</i>
Black Walnut	<i>Juglans nigra</i>	Pin Cherry	<i>Prunus pennsylvanica</i>
Black Willow	<i>Salix nigra</i>	Pin Oak	<i>Quercus palustris</i>
Blackhaw Viburnum	<i>Viburnum prunifolium</i>	Post Oak	<i>Quercus stellata</i>
Blackjack Oak	<i>Quercus marilandica</i>	Prairie Crabapple	<i>Malus ioensis</i>
Blue Ash	<i>Fraxinus quadrangulata</i>	Prickly Ash	<i>Zanthoxylum americanum</i>
Boxelder	<i>Acer negundo</i>	Pussy Willow	<i>Salix discolor</i>
Buffaloberry	<i>Shepherdia argentea</i>	Quaking Aspen	<i>Populus tremuloides</i>
Bur Oak	<i>Quercus macrocarpa</i>	Red Maple	<i>Acer rubrum</i>
Butternut	<i>Juglans cinerea</i>	Red Mulberry	<i>Morus rubra</i>
Canada Plum	<i>Prunus nigra</i>	Red Oak	<i>Quercus rubra</i>
Canadian Yew	<i>Taxus canadensis</i>	Red-Osier Dogwood	<i>Cornus stolonifera</i>
Chinkapin Dwarf Oak	<i>Quercus prinoides</i>	River Birch	<i>Betula nigra</i>
Chinkapin Oak	<i>Quercus muhlenbergii</i>	Rock Elm	<i>Ulmus thomasii</i>
Chokecherry	<i>Prunus virginiana</i>	Rough-Leaf Dogwood	<i>Cornus drummondii</i>
Cockspur Hawthorn	<i>Crataegus crus-galli</i>	Roundleaf Dogwood	<i>Cornus rugosa</i>
Common Juniper	<i>Juniperus communis</i>	Roundleaf Serviceberry	<i>Amelanchier sanguinea</i>
Common Pawpaw	<i>Asimina triloba</i>	Sandbar Willow	<i>Salix interior</i>
Common Persimmon	<i>Diospyros virginiana</i>	Saskatoon Serviceberry	<i>Amelanchier alnifolia</i>
Cottonwood	<i>Populus deltoides</i>	Shagbark Hickory	<i>Carya ovata</i>
Coyote Willow	<i>Salix exigua</i>	Shellbark Hickory	<i>Carya laciniosa</i>
Dotted Hawthorn	<i>Crataegus punctata</i>	Shingle Oak	<i>Quercus imbricaria</i>
Downy Hawthorn	<i>Crataegus mollis</i>	Shining Willow	<i>Salix lucida</i>
Downy Serviceberry	<i>Amelanchier arborea</i>	Showy Mountainash	<i>Sorbus decora</i>
Eastern Red Cedar	<i>Juniperus virginiana</i>	Silky Dogwood	<i>Cornus obliqua</i>
Eastern Redbud	<i>Cercis canadensis</i>	Silver Maple	<i>Acer saccharinum</i>
Eastern Wahoo	<i>Euonymus atropurpureus</i>	Slippery Elm	<i>Ulmus rubra</i>
Elderberry	<i>Sambucus canadensis</i>	Smooth Sumac	<i>Rhus glabra</i>
Fleshy Hawthorn	<i>Crataegus succulenta</i>	Speckled Alder	<i>Alnus incana</i>
Gray Dogwood	<i>Cornus racemosa</i>	Staghorn Sumac	<i>Rhus typhina</i>
Green Ash	<i>Fraxinus pennsylvanica</i>	Sugar Maple	<i>Acer saccharum</i>
Hackberry	<i>Celtis occidentalis</i>	Swamp White Oak	<i>Quercus bicolor</i>
Heart-Beaved Willow	<i>Salix rigida</i>	Sycamore	<i>Platanus occidentalis</i>
Honeylocust	<i>Gleditsia triacanthos</i>	White Ash	<i>Fraxinus americana</i>
Hoptree/Water Ash	<i>Ptelea trifoliata</i>	White Oak	<i>Quercus alba</i>
Hortulan Plum	<i>Prunus hortulana</i>	White Pine	<i>Pinus strobus</i>
Inland Serviceberry	<i>Amelanchier interior</i>	Wild Plum	<i>Prunus americana</i>
Ironwood/Hophornbeam	<i>Ostrya virginiana</i>	Witchhazel	<i>Hamamelis virginiana</i>
Kentucky Coffeetree	<i>Gymnocladus dioica</i>	Yellow Birch	<i>Betula alleghaniensis</i>

adapted from: Iowa State University Forestry  
Extension: Trees & Shrubs Native to Iowa;  
Ames, IA 2001

# Can we get People to Stop Killing our City Trees?

News Flash-Des Moines: Arrest warrants have been issued by the Police Department for a elderly man who beats his Norway Maple tree with a lawn mower and weed eater, for the young couple who planted their blue spruce too deep and for the mother of two who neglected the watering needs of her bur oak. Has the world gone mad and the government gone too far???

No, these statements are fiction in the sense of the issuance of arrest warrants. But the actions of the few examples above are real. Many of us are guilty of causing premature tree death. Perhaps trees are like the Rodney Dangerfield's of the plant world. Instead of the respect they deserve for hundreds of benefits freely provided, they are too often treated like a pair of worn out shoes. At best, even well-meaning tree lovers can forget that a tree is a fragile system of living tissue that requires proper planting and care to grow and thrive. The American Forestry Association reports that the average for all trees living in a city is 32 years of age. This is a far cry from the 150+ years that the same trees could be expected to live in their native forest habitat.

So lets discuss below the more common clues that could signal preventable tree death in your yard, on the school grounds or in your community.

## Planting - many trees are injured right at the start by:

- drying out the roots by leaving the tree out in the sun and wind prior to planting. (need to protect tree roots planting from exposure during extended periods of time)
- through root girdling by forgetting to remove all strings, tags, burlap and containers from around the tree root system (remove all foreign materials from the tree at planting)
- suffocating the root system by digging their planting holes too narrow and deep (make the planting hole twice the diameter of the root ball and same depth it had in the nursery)
- allowing roots to dry out by forgetting to water their tree after planting (5 to 15 gallons of water recommended)

## Lack of Tree Care - when trees are young by:

- lack of watering during dry conditions (5 to 15 gallons every 7 to 10 days recommended)
- stangling trunks with wire and hose during staking and forgetting about it ( Ok to stake trees and tie them to gain support - but remove within a year to allow growth)
- poisoning trees with improper applications of fertilizers, especially weed and feed products (keep all chemicals away from the driplines of the trees)
- banging trees with lawn mowers and weed eaters that damage tree trunks (place 4 to 6 inches of composted wood chip mulch around the tree in a saucer fashion to protect the tree, increase soil fertility and maintain good soil moisture).
- rubbing the bark off of the tree trunk by chaining bikes or pets to the tree (do not tie or place any foreign objects on the tree)
- taking away the tree's food sources by overpruning to get clearance for lawn mowing (never remove more than 1/3 of the live branches at any one time, prune branches when they get approximately 1 to 2 inches in diameter)

## Poor Care for big trees:

- taking away food sources by topping or mutilating branches (hire qualified arborists for practice target pruning that protects branch collars)
- stomping tree roots during nearby construction that compacts the soil and restricts water and nutrient up take (fence off the driplines of trees to protect them from heavy equipment)
- cutting the roots when placing underground utilities (trench around the dripline or tunnel the utility right underneath the tree to avoid root damage)

## Hurting trees for kicks:

- breaking small trees destroying form and growth (plant larger caliper trees)
- breaking branches and limbs for fun which reduces the trees growth and cause it to be more susceptible to insects and diseases (Stake trees and involve youth in plantings)
- Remember that most tree premature tree death is preventable - think before you do!



## Fast Facts about Natives

- Native plants are plants that have evolved over thousands of years in a particular region. They have adapted to the geography, hydrology and climate of that region.
- Native plants do not require fertilizers.
- Native plants require less water than lawns.
- Native plants require fewer pesticides than lawns.
- Native plants help reduce air pollution by reducing the need for fossil fuelled lawn and garden equipment which reduce the associated air pollution and health risks.
- Native plants reduce noise pollution by reducing the use of lawn and garden equipment.
- Planting native plants can facilitate the removal of carbon dioxide from the atmosphere.
- Native plants provide shelter and food for wildlife.
- Native plants promote biodiversity and stewardship of our natural heritage through the use of native landscaping and reestablish homes for birds and butterflies.
- Native plants save money – the cost of maintaining a prairie or wetland for 20 years is \$17,000 cheaper than maintaining a non-native turf area for the same amount of time.
- The soil that the plant is growing in should match that of its native habitat.
- Native plants are very versatile – growing in both wet and dry conditions, sand or clay soil, full sun or partial shade and sometimes in full shade.
- It may take 3-5 years to complete the establishment of a native plant landscape.
- The roots of native plants are very dense, fine and often very deep which helps reduce soil erosion.



Trees in the schoolyard provide beauty and shade, and can serve as visual screens. Unfortunately, it can be difficult to get a shade tree established in the tough growing conditions of schoolyards. The soils in the schoolyard are often poorly drained and compacted, making it difficult for a shade tree to survive and thrive.

Not all sites are appropriate for trees. Before planting, envision how the mature tree will fit into the site. Will it interfere with buildings, utilities, sidewalks, playground equipment, or block the view of traffic near corners? Will the tree selected produce maintenance problems due to unwanted fruit or messy leaf litter? Selecting a durable tree that best fits the planting site can reduce these problems.

During the planning, match the soil drainage on the property to the tree species, making sure that the tree will not outgrow the site. Diversify the species of trees you are planting to maximize the protection against diseases, insects, and environmental stresses. Proper planting and post planting care will help insure a healthy tree. Below is a list of trees and their growing requirements. Use this list to help determine what species is right for your school grounds.

**Shade, Low-growing, and Landscape Trees:**

Species	Life span	Growth rate	Shade tolerance	*Soil drainage	Height (ft)
Alder, Black	short	fast	intolerant	mp, mw, well	40-60
Ash, Black	short	fast	intolerant	poor, mp	40-50
Ash, Green	long	fast	intolerant	mp, mw, well	50-60
Ash, White	long	medium	intermediate	mp, mw, well	50-80
Aspen, Bigtooth	short	fast	very intolerant	mp, mw	20-40
Aspen, Quaking	short	fast	intolerant	mp, mw, well	40-50
Basswood, Amer.	long	medium	tolerant	mw, well	60-80
Boxelder	short	fast	very intolerant	poor-well	15-20
Cedar White	long	medium	tolerant	poor-well	40-60
Cherry, Black	long	medium	intermediate	mw, well	50-60
Cherry, Choke	long	medium	intermediate	poor-well	20-30
Coffeetree, Kent.	long	medium	intermediate	mp, mw	60-75
Cottonwood	short	fast	intermediate	poor-well	50-75
Hackberry	long	medium	intolerant	mp, mw, well	40-60
Hawthorn	short	slow	intolerant	mw, well	15-30
Hickory, Shagbark	long	slow	intermediate	mp, mw, well	60-80
Larch, European	long	medium	intermediate	mp, mw, well	40-80
Locust, Honey	short	fast	intolerant	mw, well	50-70
Maple, Amur	long	medium	intermediate	mw, well	15-20
Maple, Red	long	medium	intermediate	poor-well	40-60
Maple, Silver	short	fast	intermediate	poor-well	50-70
Maple, Sugar	long	slow	intolerant	mw, well	60-75
Mulberry, Red	short	fast	intolerant	poor, mp, mw	40-50
Oak, Bur	long	slow	intermediate	mp, mw, well	70-80
Oak, Pin	long	medium	intermediate	poor, mp, mw	60-70
Oak, Red & Black	long	medium	intermediate	mw, well	60-75
Oak, Shingle	long	slow	intolerant	mp, mw, well	50-60
Oak, Swamp White	long	fast	very intolerant	poor, mp, mw	50-60
Oak, White	long	slow	intermediate	mw, well	50-80
Pine, Jack	short	medium	very intolerant	poor, mp, mw	35-50
Pine, Red	long	medium	intermediate	mw, well	60-80
Pine, White	long	medium	intolerant	well	50-80
Poplar, White & Hybrid	short	fast	intolerant	mw, well	50-80
Red Cedar, Eastern	long	slow	very tolerant	mp, mw, well	40-50
Spruce, Blue	long	slow	intermediate	poor-well	30-60
Spruce, Norway	long	medium	tolerant	poor-well	40-60
Sumac, Smooth	short	fast	intolerant	poor-well	9-15
Spruce, White	long	slow	tolerant	mp, mw, well	40-60
Sycamore	long	fast	intermediate	poor-well	70-100
Walnut, Black	long	fast	intolerant	mw, well	50-75
Willow, Austree	short	fast	very intolerant	poor-well	30-50
Willow, Black	short	fast	very intolerant	poor, mp	30-50

\*Poor, Moderately Poor, Moderately Well, and Well. Shade intolerant trees require full sunlight, intermediate trees can handle some shade, and shade tolerant trees can handle low, partial, or full sunlight. A short-lived tree has an average life span of less than 65 years of age. Trees with a long life span averages more than 70 years of age. As always, there are exceptions to these general rules.

*"He who plants a tree, plants a hope."*

*-Lucy Larcom*



### Shade and Landscape Tree Selection:

Each year millions of trees are planted throughout Iowa. Many of these trees will be planted in urban communities. There are a few basic guidelines that should be considered to help insure a successful planting, including planning/site selection, species selection, and proper planting.

### Planning/Species Selection:

- Consider where the above and below ground utilities are located (i.e. electric wires, phone and television cables, sewer and water pipes). Call Iowa One Call at 1-800-292-8989 at least two days before you start digging to find the exact location of underground utilities.
- Examine the soils in the selected site to make sure they match the tree species you will be considering. Does the soil stay wet or saturated for an extended period of time after rains? Or does the soil seem dry and somewhat sandy? Is this a high traffic area such as a playground that will have compacted, poorly drained soils?
- Pick a species that will fit in the site selected. The site should be a minimum of 40 feet away from electrical power lines and light poles, and 20 to 30 feet away from buildings for large shade trees.
- Consider low-growing trees for planting areas that are closer to power lines and light poles. Utility companies recommend keeping the vegetation at least 10 feet away from existing lines. Keep in mind that most power lines are 30 to 35 feet above the ground.
- Avoid planting low-growing trees near signs, street corners, and other areas where they could block people's view. Is the planting site in full sun, partial sun, or full shade?

### Proper Planting:

- Dig the planting hole 2 to 3 times wider and no deeper than the root ball.
- Do not plant the tree too deep or too shallow, the root collar, (swelling where the trunk meets the roots), should be at or slightly above ground level.
- Lower the tree by the root ball, (not the trunk), carefully into the hole to avoid damaging the trunk or root system.
- Remove the twine and plastic labels from the branches and trunk, and at least the top one-third of the burlap and wire from the root ball. If the tree is container grown, remove it from the container.
- Fill the hole with the original soil, and do not use amendments such as moss or potting soil.
- Gently settle the soil in around the roots by hand when filling the hole, making sure that air pockets are not created.
- Slowly water the area to remove any air pockets that remain. Mulch around the tree with wood chips to keep the site moist.
- Add organic mulch around the tree being sure that the mulch is not piled up against the tree trunk. The mulch depth should be four to six inches deep and out as far as the branches spread.

*"To be able to walk under the branches of a tree that you have planted is really to feel you have arrived with your garden."*

*~ Mirabel Osler*

# Speaking the “Native” Language

**Acre:** an area of land that contains 43,560 square feet or 0.405 hectares.

**Biological Diversity:** a combination of different kinds of plants and/or animals that make up a healthy ecosystem.

**Bottomland:** an area close to a body of water, a floodplain where it is covered by water during a flood, a place where cottonwood and silver maple grow.

**Canopy:** the layer of vegetation in a forest made up of tree crowns.

**Carbon:** Green plants remove carbon from the atmosphere, extracting carbon dioxide from the air, separating the carbon atoms from the oxygen atoms and returning oxygen to the atmosphere.

**Cone:** a coniferous fruit, having a number of woody, leathery, or fleshy scales, each bearing one or more seeds, and attached to a central axis.

**Conifer:** a tree that is cone bearing, has needle like leaves and often referred to as a softwood.

**Coniferous:** cone bearing.

**Conservation:** the careful management and wise use of natural resources

**Crown:** the leaves and branches of a tree.

**Deciduous Tree:** a tree that loses its leaves during the winter, sometimes referred to as a hardwood.

**Ecosystem:** complex array of organisms, their natural environment, the interactions between them, the home of all living things and the ecological processes that sustain the system.

**Environment:** all the living and non-living things that surround and affect living things.

**Erosion:** the wearing away or washing away of soil by wind or water.

**Extinct:** a species no longer found on earth.

**Foliage:** leaves on a tree or other plant.

**Forestry:** the science, art, and practice of managing trees and forests and natural resources for human benefit.

**Habitat:** a place that provides seasonal or year-round food, water, shelter, or other environmental conditions.

**Invasive Species:** an alien or exotic species whose introduction could harm the environment, economy or human health.

**Mast:** tree produced nuts and fruits that are edible to wildlife.

**Photosynthesis:** a chemical reaction that takes place in green plants in which carbon dioxide and water combine to produce sugar and oxygen.

**Native:** occur naturally in an area.

**Natural Resources:** raw materials provided by the earth, such as water, plants and minerals.

**Overstory:** the highest canopy in a forest.

**Prescribed Fire:** a fire started by people to reduce wildfire danger and/or to restore ecosystems.

**Preserve:** a natural area of unique value.

**Range:** the geographic area in which a tree species grows.

**Roots:** the portions of the tree that generally is underground and that functions in nutrient absorption, anchorage, and storage of food.

**Sapling:** a small tree that is between 1” and 4” in diameter and between 3 and 10 years old.

**Shade Tolerance:** ability of a plant to reproduce and grow under shade.

**Snag:** a standing dead tree.

**Species:** a group of living things that are very similar and can reproduce among themselves.

**Sprout:** a tree that has grown from the stump of another tree.

**Succession:** the process by which one plant community is gradually replaced by another.

**Topography:** the shape, elevation and terrain of the land.

**Tree:** a woody plant.

**Tree Farm:** a privately owned forest dedicated to the production of trees.

**Trunk:** main stem or bolt of a tree.

**Understory:** plants growing close to the ground in a forest.

**Upland:** an area usually on a slope where water drains away, a place where red and white oaks grow in Iowa.

# Native Tree/Term Wordsearch

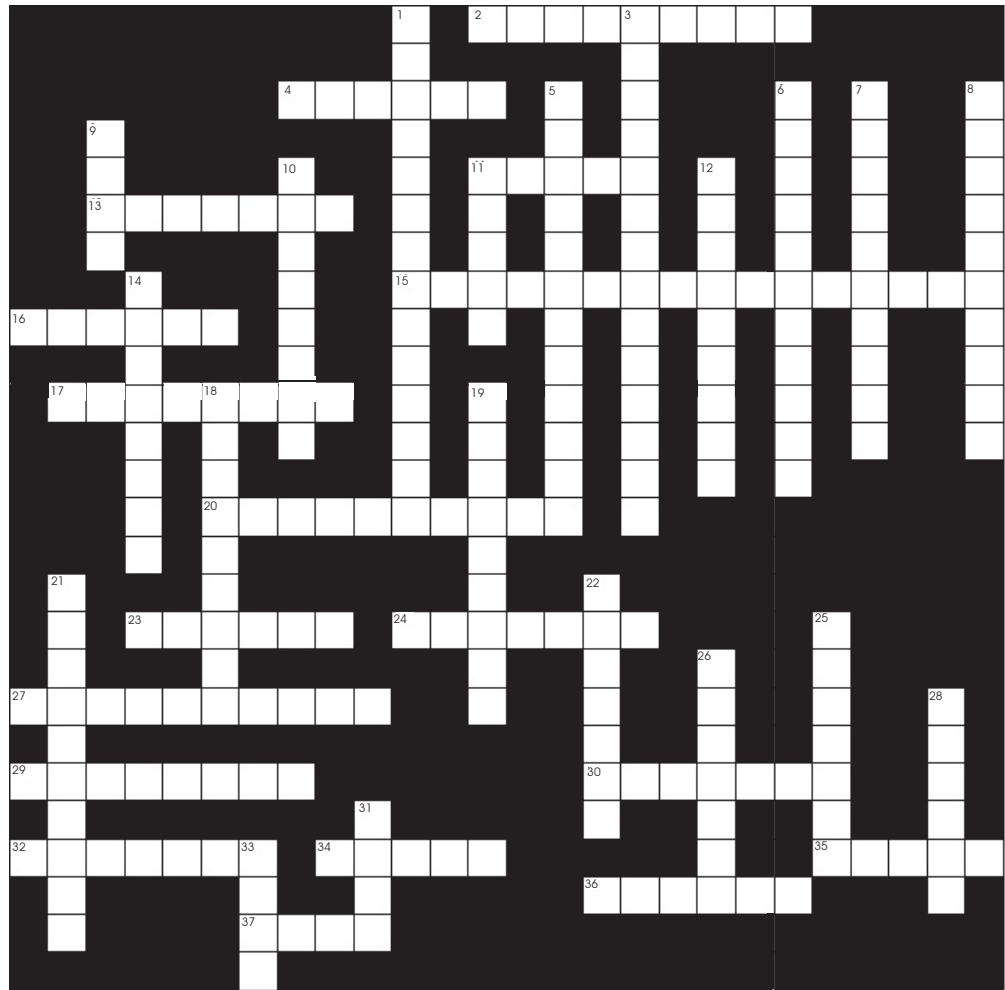
## Native Tree Word Search



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

ACRE	HABITAT	SPECIES
BOTTOMLAND	INVASIVE	SPROUT
CANOPY	MAST	SUCCESSION
CONIFER	NATIVE	TOPOGRAPHY
CONSERVATION	OVERSTORY	TREE FARM
CROWN	PHOTOSYNTHESIS	TRUNK
DECIDUOUS	PRESCRIBED	UNDERSTORY
DIVERSITY	PRESERVE	UPLAND
ECOSYSTEM	RANGE	
ENVIRONMENT	RESOURCES	
EROSION	ROOTS	
EXTINCT	SAPLING	
FOLIAGE	SHADETOLERANCE	
FORESTRY	SNAG	

# Native Tree Crossword



## Across

- 2 General term for the highest layer of the forest
- 4 The layer of the forest primarily made up of the crowns of the trees
- 11 The geographic area in which a tree species grows
- 13 A small tree 1-4 inches in diameter and 3-10 years old
- 15 Raw materials provided by the earth - water, plants, minerals
- 16 A tree that has grown from the stump of another tree
- 17 A natural area of unique value, protected by a government or group
- 20 The process by which one plant community is gradually replaced by another
- 23 Occurs naturally in an area
- 24 The wearing away or washing away of soil by wind and water
- 27 A location in the landscape where Cottonwood and Silver Maple trees like to grow.
- 29 A privately owned forest, dedicated to the production
- 30 A species no longer found on earth
- 32 A group of living things that are similar and can reproduce among themselves
- 34 The leaves and branches of the tree
- 35 Main stem of a tree
- 36 A plant community dominated by trees
- 37 An area of land that contains 43,560 square feet of trees

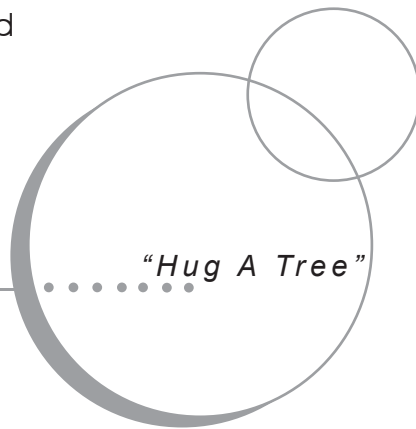
*Plant Iowa Native Trees to Help Restore our Native Ecosystems!*

*(Continued on page 15)*



# Word Key

- |                   |                 |
|-------------------|-----------------|
| Acre              | Resources       |
| Bottomland        | Roots           |
| Canopy            | Sapling         |
| Conifer           | Shade Tolerance |
| Conservation      | Snag            |
| Crown             | Species         |
| Deciduous         | Sprout          |
| Diversity         | Succession      |
| Ecosystem         | Topography      |
| Environment       | Tree Farm       |
| Erosion           | Trunk           |
| Extinct           | Understory      |
| Foliage           | Upland          |
| Forestry          |                 |
| Habitat           |                 |
| Invasive          |                 |
| Mast              |                 |
| Native            |                 |
| Natural Resources |                 |
| Photosynthesis    |                 |
| Prescribed        |                 |
| Preserve          |                 |
| Range             |                 |



## Down

- 1 The process used by green plants to convert carbon dioxide and water to sugar (food) and oxygen
- 3 Ability of a plant to reproduce and grow under shade
- 5 The careful management and wise use of natural resources
- 6 All the living and non-living things that surround and affect living things
- 7 "\_\_\_\_\_ " fire is started by people to reduce wildfire danger and/or to restore the ecosystem
- 8 General term for the layer of plants growing close to the ground in a forest
- 9 Edible, tree-produced nuts and fruits important to wildlife
- 10 A species is said to be "\_\_\_\_\_ " when its growth or reproduction is so great that it could harm the environment, economy or human health.
- 11 The anchor portion of the tree, generally found underground, that supplies the water and nutrients
- 12 Biological \_\_\_\_\_ is a combination of different kinds of plants and/or animals that make up a healthy ecosystem.
- 14 The science, art and practice of managing trees, forests and associated natural resources for human benefit
- 18 A term for the complex interaction between organisms and their environment
- 19 A category of trees that lose their leaves in the winter
- 21 The shape, elevation and terrain of the land
- 22 A category of cone-bearing trees with leaves shaped like needles
- 25 A place that provides seasonal or year-round food, water and shelter
- 26 Leaves on a tree or other plants
- 28 An area in the landscape, usually on a slope where water drain away; a place where white oak grows in Iowa
- 31 Tall woody plant
- 33 A standing dead tree

# "Growing Native" On The Web

## Background

This activity will give students an opportunity to learn about different native forest habitats in Iowa, native tree species that grow in those different habitats, and what and where are some of Iowa's biggest native trees. Students will also have the opportunity to learn how to identify some of Iowa's native tree species.

## Procedure

Have the students work in groups to answer the questions below by logging into the homepages associated with each set of questions. Some of the answers will not jump right out at the students, which will encourage them to read and research for their needed information. Have a group discussion on the answers and general topics once the students have completed the sheet.

### Section I. History of Iowa's Forests

Address: <http://www.extension.iastate.edu/pages/tree/history.html>

## Questions

- 1) About ten thousand years ago Iowa was cool and probably supported a \_\_\_\_\_-fir forest similar to modern-day \_\_\_\_\_ .
- 2) As the climate (weather) in Iowa became warmer and drier the conifers began to disappear and they were replaced by oaks, \_\_\_\_\_ , and other \_\_\_\_\_ trees. After this change the weather became even warmer and drier and many areas with deciduous trees gave way to the more heat and drought resistant \_\_\_\_\_ plants.
- 3) Most of Iowa's forest before settlement were found along \_\_\_\_\_ valleys, and were common in south-central and \_\_\_\_\_ Iowa. Many of the forests in Iowa before settlement were more than our woodlands today, with widely spaced \_\_\_\_\_ and other trees. Where fires burned into the woods on a regular basis, the understory was \_\_\_\_\_ and \_\_\_\_\_ .

### Section II. Native Habitats

Address: <http://project.bio.iastate.edu/trees/campustrees/Habitat.html>

Search the Natural habitat section and Common names Index for information

- 1) Common native tree species found on Iowa's moist slopes include sugar \_\_\_\_\_ , \_\_\_\_\_ maple, northern red oak, and \_\_\_\_\_ .
- 2) The tree species above are usually \_\_\_\_\_ - growing and \_\_\_\_\_ - lived.
- 3) These moist slopes naturally maintained by \_\_\_\_\_ in the understory.
- 4) The scientific name for black maple is Acer \_\_\_\_\_ .
- 5) Sugar maple wood is used for furniture, \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , toys, plywood cutting blocks, and \_\_\_\_\_ . Sugar maple is a source of maple syrup. It takes \_\_\_\_\_ gallons of sap to produce 1 gallon of syrup.



### Section III. Iowa's Big Native Trees

Address: <http://www.iowadnr.com>

Click on State Forests or Forestry under DNR Programs, and then click on Big Tree List.

http://

- 1) When measuring big trees in Iowa what 2 different measurements other than Crown Spread are used to determine the total points of a tree? \_\_\_\_\_ and \_\_\_\_\_.
- 2) How many total points \_\_\_\_\_ does the biggest bur oak have?
- 3) If you had a bur oak in your yard that was 16 feet in circumference, 80 feet tall, and had a 100 foot crown spread would it be larger than the current state record for bur oak?
- 4) If the northern red oak in you yard was 15 feet in circumference, 80 feet tall, and had a 60 foot crown spread how many points would it score? \_\_\_\_\_
- 5) If you used the yardstick method to estimate height of a tree how many inches would your stick read if the tree was 90 feet tall? \_\_\_\_\_
- 6) If you had a white oak that was 16 feet in circumference and 70 feet tall, what would it need to measure in crown spread \_\_\_\_\_ feet to have a total of 280 points?

### Section IV. Identifying Native Tree Species

Address: <http://www.extension.iastate.edu/Pages/tree/>

Work through the interactive key using the hints below to identify the unknown tree species.

- 1) This tree has broadleaf leaves, simple leaves, no thorns or spines, lobed leaf margins, alternate leaves, rounded lobe tips, undersides of leaves that are green, and an acorn that is oblong. Name of the tree is \_\_\_\_\_.
- 2) T or F The tree above is normally found on moist bottomlands along streams and on low areas.
- 3) This tree has needle-like leaves, needles occurring in multiple bundles of 3 or more, and needles 2 to 4 inches long in bundles of 5. Name of the tree is \_\_\_\_\_.
- 4) The tree above can grow 50 to \_\_\_\_\_ feet tall. This species is native to just a few locations in \_\_\_\_\_ Iowa.
- 5) This tree has broadleaf leaves, simple leaves, has no thorns or spines, lobed leaf margins, opposite leaves, has a 3-lobed leaf, and rounded leaf lobe sinuses. Name of the tree is \_\_\_\_\_.

WWW

URL

# Measuring Trees

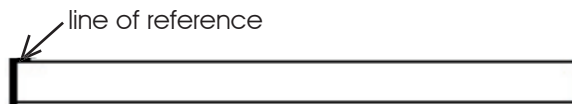
Foresters measure trees to assist them with timber management decisions. To determine the approximate timber yield of a tree or stand of trees, a forester must know how to estimate the volume of usable wood that a tree has produced. To determine the volume, the diameter of the tree must be measured at breast height (4-1/2 feet above the ground) on the up-hill side. This diameter measurement is called "d.b.h." Then the height must be measured. By using a prepared volume table, the forester can then determine the estimated volume of the tree.

## Measuring Tree Diameter

One tool that is commonly used by foresters to estimate diameter at breast height (d.b.h.) is called a Biltmore stick. To use a Biltmore stick, hold it horizontally against the tree at breast height and at arms length (25 inches from your eye is an industry standard for purchased Biltmore sticks). Line up the zero end with the outside of the tree. Then, without moving your head, glance at the other side of the tree and read the graduation where your line of sight and the edge of the tree cross the stick. — Because trees are commonly oblong, a measurement should be taken from at least two different sides of the tree and the estimated diameter averaged.

Making your own Biltmore stick:

1. Find a sturdy piece of lath, approximately 36" to 40" in length.
2. Identify a line of reference or a zero line at the far left end of the stick.



3. Hold the stick horizontally, near the midpoint, fully extend your arm at a height of 4 1/2 feet above the ground and have someone measure the distance from your eye to the stick.

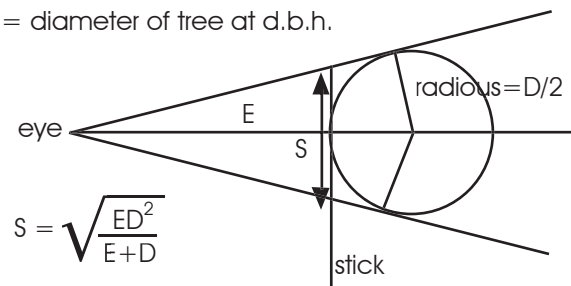
Distance from eye to stick with arm extended => E = \_\_\_\_\_ inches

4. For each inch in diameter (you may want to start at 4 inches dbh), calculate the distance on the stick from the line of reference, using the following equation:

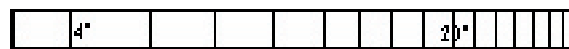
S = distance on stick from line of reference (inches)

E = distance from eye to stick with arm extended (inches)

D = diameter of tree at d.b.h.



5. Mark the distances for each diameter on your stick, identifying at each mark which diameter it was calculated for.



Note: The larger the diameter is the smaller the distance between the lines on your stick will become.

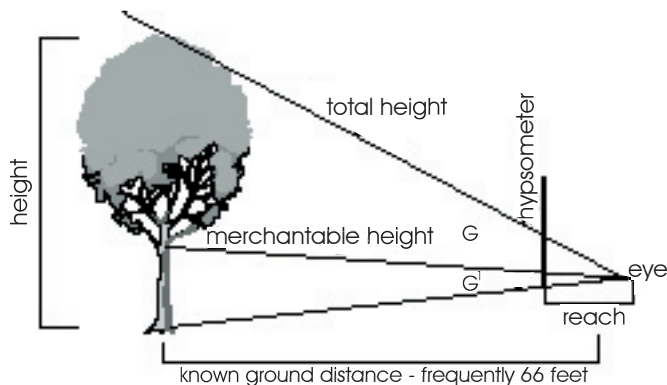
## Measuring Tree Height

It is necessary to know height as well as diameter (d.b.h.) when determining the volume of a tree.

1. Total height is usually measured from a 1 foot stump to the top of the tree. This height is often used in calculating firewood volumes. Although it is useful in many other situations just to know the total height of a tree.
2. Merchantable height is usually measured from a 1 foot stump to the point at which the tree is no longer usable for the desired product. This measurement is more commonly used when estimating yield for sawtimber and veneer type products.

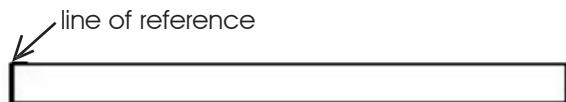
A tool that is commonly used to determine tree height is a Hypsometer. Often, commercially produced Biltmore sticks or cruising sticks have a side that is dedicated to a Hypsometer. Hypsometers are based on the concept of similar triangles. To use a Hypsometer, stand 66 feet from the base of the tree. Hold the hypsometer vertically, at arms length (25 inches from your eye is an industry standard). Line up the bottom of the hypsometer with the bottom of

the tree. Without moving your head, sight to the top (or merchantable top) of the tree. Read the number on the hypsometer where your line of site and the top of the tree cross. This number equals the height of the tree in feet. When the tree is more than 66 feet high, stand  $2 \times 66' = 132'$  from the base of the tree and remeasure. This time multiply your reading by 2.



### Making Your Own Hypsometer

1. Use the back of your Biltmore stick or find a sturdy piece of lath, approximately 36" to 40" in length.
2. Identify a line of reference or a zero line at the far left end of the stick.



3. Hold the stick vertically, near the mid-point, fully extend your arm at eye level and have someone measure the distance from your eye to the stick.

Distance from eye to stick with arm extended => Reach = \_\_\_\_\_ inches

4. For each foot of height (you may want to do this in increments of 8 feet, as this represents a 1/2 log at industry standards), calculate the distance on the stick from the line of reference, using the following equation:

G = distance on stick from line of reference (inches)

$$G = \frac{\text{Reach} \times \text{Height}}{66 \text{ feet}}$$

# Measuring Trees

Mark these on your stick, identifying at each mark which diameter it was calculated for.

Note: The distance between the lines on your stick will be roughly the same.

### Determining Estimated Volume

Once you have measured the diameter and merchantable height, you can determine the estimated board-foot volume. One board foot is equivalent to a piece of lumber 1 inch thick, 12 inches wide, and 12 inches long.

Foresters typically use a prepared volume table to determine the estimated volume for a given tree. A volume table gives an estimate of the number of board feet of lumber that can be sawed from different sized trees.

Amount of Sawtimber in Trees (Scribner Rule — Tree Scale)					
Merch. Log Length		8'	12'	16'	20'
Dbh					
12"	28	37	48	57	
13"	34	46	59	70	
14"	40	55	70	83	
15"	47	64	81	95	
16"	54	73	93	111	
17"	63	86	109	128	
18"	72	97	122	145	
19"	81	110	140	164	
20"	90	123	156	184	
21"	100	138	176	208	
22"	111	152	194	228	
23"	125	169	214	254	
24"	137	186	236	277	

Let's take an example. You have measured a tree with the Biltmore stick and have found it to be 22 inches d.b.h. You have then measured the merchantable height using the Hypsometer and found it to be 16 feet. Now, find the diameter (22) in the left-hand column of the table and move across to the column headed by the Merchantable log length (16). The table shows that this tree contains 194 board feet of usable sawtimber volume.

# ... Keeping a Nature Journal

## *Introduction*

During the time of early America, people wrote down their thoughts in diaries and journals as a way to record and remember things they did and saw. Sometimes they would share these thoughts with others through stories, articles and even books. Famous naturalists and foresters, such as Aldo Leopold and many others used their personal journals like "A Sand County Almanac" to successfully communicate the needs for the conservation of our natural resources and the protection of wildlife to others. But today in our fast paced modern world, the art of "keeping a journal" has been lost - replaced by the instant gratification of television, computers and the Internet. This exercise is to bring students back to this "lost art of journal writing", perhaps they can communicate what they see and desire for Iowa's natural resources and later share that with classmates or even friends on the Internet.

## *Starting Your Nature Journal*

You will need a wirebound notebook or diary that you can dedicate to be your nature log, and your 5 senses to get started. A copy of one or two common field guides to help you identify plants, animals and birds will help, but are not required. Check with your parents or the library for field guides that you could use.

## *What Should I Write?*

Your journal can be general or it can be designed around special interest you may like, such as bird watching, tree identification or even playing outside with your favorite dog or cat. You can make daily entries, as in a diary or occasional remarks on special days. A journal with regular entries can be a valuable historical record. Record the date, weather and location of your observations. Don't make the mistake of recording only rare or unusual things because common events today may be uncommon ten years from now.

## *What You Could Write*

Don't worry about having to write too much - just write down what you see, hear, smell or feel while you are outside. Look for animals or birds, look for their tracks in the snow or mud. Look for tree holes, nests, stray feathers, scat, twig ends nipped off, holes or digging in the ground and countless other signs that indicate that animals are present. Draw what you see, record how many you see - was there more than one animal? Can you tell the story of what happened when they walked by? Come back to the same location later, did you see the same foot prints - are there more or less? Animals, birds and insects are often hiding when people walk by, but if you stop and stay quiet for a short time you will be able to listen for their sounds. Write down what sounds you heard, where do you think they were coming from? The same can be said for smells, especially during the growing season - when trees and flowers are breaking bud - can you describe the smell - what does it remind you of? Our ability to touch things is an extremely important tool of observation, touching a leaf of a Red or Slippery elm feels just like sandpaper between your fingers. Carefully touch and record how natural items feel, such as smooth or rough (remember to avoid touching or putting something in your mouth that you do not know what it is to avoid things like poison ivy).

# Forest Heritage

finding the roots

It was once written that Iowa's history is written in its trees, since our trees live a long time and are silent witnesses to the passing of human events and time. Iowa has many historic trees under whose shade Native American lived a nomadic life, and whose wood provided homes and fuel for early explorers and pioneers.

Back in 1996 as part of Iowa's sesquicentennial (150 years of statehood), Iowa Famous and Historic Trees publication was produced and can be viewed at [www.iowadnr.com/forestry/treesforkids.html](http://www.iowadnr.com/forestry/treesforkids.html). Iowa DNR and Iowa Public Television's K12 Connections ([www.k12connections.iptv.org](http://www.k12connections.iptv.org)) would like to update and expand this Famous and Historic Trees of Iowa publication with the help of Iowa teachers and students. This document would be available in electronic form and would be kept up to date for future teachers and students to use.

## What Qualifies as a Famous and Historic Tree or Forest?

A Famous and Historic Tree is one that has special significance to the Nation, State, County and or City. Trees that are significant to families here in Iowa also may qualify. It must possess the following qualities: (1) it must be living, (2) the species and size dimensions are verified, (3) its story of its significance must be documented in writing and confirmed by more than one person, (4) the tree's specific location is documented and (5) a digital photograph must included with the nomination.

## How to Nominate Your Famous and Historic Tree or Forest?

- (1) Download a Famous and Historic Tree Nomination Form from the Iowa DNR Forestry website at [www.iowadnr.com/forestry/treesforkids.html](http://www.iowadnr.com/forestry/treesforkids.html)
- (2) Start checking with student family members, senior citizens, local county historic societies, conservation professionals and others to find a Famous and Historic Tree in and around your community. Document in writing why your tree is famous or historic.
- (3) Once a possible Famous and Historic Trees is located seek property owner permission to identify the species, measure and take photos
- (4) Using the trees address go to [www.topozone.com](http://www.topozone.com) to get the Latitude and Longitude
- (5) Submit your nomination to [tfkids@dnr.state.ia.us](mailto:tfkids@dnr.state.ia.us) with a digital photo

# LEAD AN ENVIROTHON TEAM

...and win a free trip to Manitoba, Canada

If you and your students enjoy the practical, hands-on outdoor activities in this Trees for Teens packet, you should get involved in The Iowa Envirothon.

The Iowa Envirothon is the state affiliate of North America's largest high school environmental education program. Envirothon encourages students to work as a team and use critical thinking skills as they integrate and apply knowledge and skills learned in biology, chemistry, earth science, botany, zoology, and other science disciplines. While some leaders simply use the Envirothon materials as a framework for their investigations, others use the Envirothon to increase the motivation and enhance the learning experiences of their students by participating in the Envirothon competition.

Each spring at regional competitions, five-member teams from around the state are challenged to answer questions in the areas of aquatic ecology, forests, prairies, wildlife and soils. High-scoring teams are invited to the state contest where outdoor field testing and an oral presentation increase the level of competition.

The Iowa State Envirothon Champions earn a trip to the national contest in West Virginia where they join over 45 teams from the U.S. and Canada for a week of outdoor learning, competition and fun! The top teams win over \$30,000 in scholarships and Canon merchandise such as binoculars, cameras and printers for themselves and their schools.

## Highlights of the Envirothon Program:

- Free Material- including books, activity descriptions and resource information for team training
- Access to teacher/coach and team training sessions and workshops
- Interaction with working environmental science professionals
- Incentives for students-including the challenge of competition and the opportunity to win prizes including scholarships and a trip to compete at the national competition!

*If you would like more information  
about the Iowa Envirothon, feel free to  
contact:* \_\_\_\_\_

Iowa Envirothon  
Conservation Districts of Iowa  
P.O. Box 801  
1711 Osceola Ave - Suite 251  
Chariton, IA 50049  
(641)774-4461  
envirothon@cdiowa.org

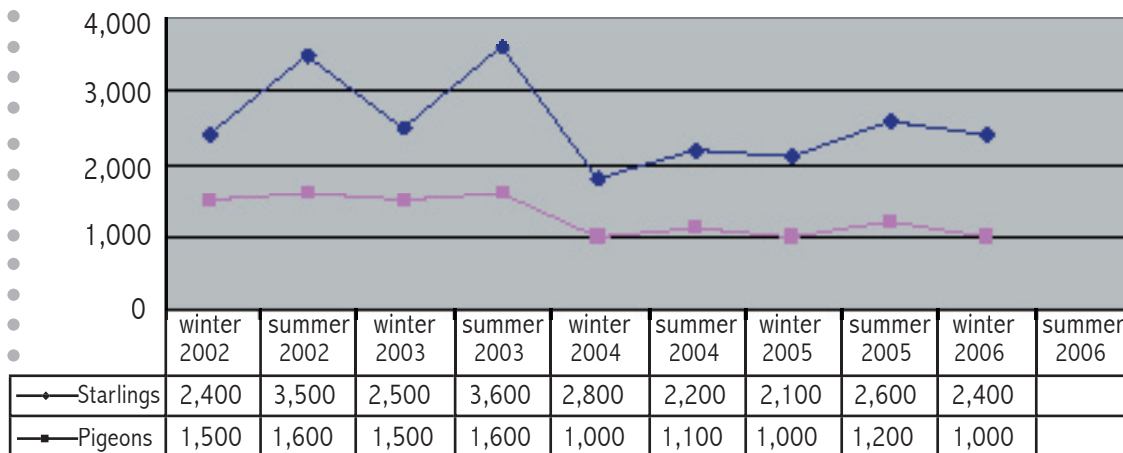
# The Birds: A True Horror Story .....

In 1963, Hollywood’s master horror film producer, Alfred Hitchcock, produced a feature movie called “The Birds.” This film told the story of a small resort and fishing community along the California coast being attacked by “harmless” swarms of birds. Rather than being timid and afraid of humans, the birds would gather in large numbers and attack people. Could a story like this come true? Take for example, the common or European starling (*Sturnus vulgaris*) that was first found in Iowa in 1922. Today it is the most abundant bird species in the state. The starling was introduced to the U.S. in 1890, when Shakespeare fans released 120 of them into New York’s Central Park because he mentioned them in a play. Today there are 100 million of these birds in the country, which we spend millions of dollars to control each year! Starlings are found throughout Iowa year round, inhabiting farmsteads, feedlots and urban areas. After the nesting season, starlings often join several species of blackbirds in large communal roosts that may contain thousands of birds. Although there are no records of starlings attacking people, droppings below their roosts can be very messy and perhaps a health hazard.

Below is an exercise in reading scientific charts. Charts are visual representations of scientific data (records or observations) that can help determine trends (in bird populations, for example.) Your interpretation of data helps you determine whether a problem exists and what possible solutions there may be. Take a look at the charts below and answer the questions.

*Starlings and pigeons are problem birds in downtown Mt. Jackson, Iowa (a fictional town.) The city council wishes to know whether the bird population is rising and if additional birds could become a health hazard to citizens.*

Problem Bird Count Mt. Jackson, IA



1. What does the chart and graph show in terms of the number of starlings and pigeons in Mt. Jackson? Does it appear that there are seasonal differences in populations of birds (Yes or No)? Explain why or why not.
2. With a mild winter in 2006, what would you predict the number of birds to be in the summer of 2006? Give your best educated guess.
3. Can you list some suggestions that could help the Mt. Jackson City Council move the birds out of Mt. Jackson or at least decrease their numbers?

## Lesson:

You have gone to your local USDA Service Center and determined that cost share money is available for a Riparian Buffer Strip. Your next step is to use the Iowa Department of Natural Resources (IDNR) website to select trees and shrubs for a Riparian Forest Buffer planting.

## Materials:

Computer with Internet connection (recommend dedicated line for connection (dial-up and wireless connections might have speed/performance issues, but still work)  
 Web browser software (recommend Internet Explorer 5.0 or later version)  
 Printer (optional)

### Procedure (Part 1):


Determine the cost of trees and shrubs to plant a riparian buffer strip along Dead Briar Creek located in T82N R30W, NW ¼ of Section 17 in Greene County, IA.

1. Access the Watershed Atlas interactive map. Go to the IDNR'S website <http://www.iowadnr.gov>, and click on the Mapping (GIS Interactive) link in left menu.
2. Go to **Greene County** using your Zoom In tool.
3. Zoom to Township T82N R30W.
4. Zoom to the NW ¼ of Section 17.
5. Using the **Legend** record the following information for the Dead Briar Creek site:
  - a. The major soil type:
  - b. Soil loss in tons per acre per year:
  - c. If the soils are Hydric:
  - d. The predominant land cover in 2002:
  - e. If the soils are highly erodible:
  - f. The average annual precipitation:
  - g. The CSR (corn suitability rating):

### Procedure (Part 2):

6. Turn on the Air Photography (CIR) 2002 layer and draw a polygon along the North side of the creek (between N St. on the west to Neola St. on the east) to represent your riparian buffer strip site. Determine its perimeter in feet and meters:
7. Overlay this polygon onto the map of the soils and print the map (printing is optional).
8. Go to the IDNR Home Page at <http://www.iowadnr.gov>. For a shortcut you can click on the Interactive Map title and then find the DNR Home link at the bottom of the page.



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9. Select Forestry; next select Private Woodland Management; then select Woodland Soil Suitability Information.
  10. Using the soil type you recorded in question 5a, go to the Woodland Suitability Index and determine:
    - a. If the site is suitable for trees?
    - b. Would you recommend for the landowner to plant conifers in the Riparian Buffer Strip?
    - c. What is the Woodland Suitability Composite Group?
  11. Go “BACK” and select the Woodland Suitability Guide and:
    - a. Select three tree species to plant:
    - b. Select three shrub species to plant:
  12. Return to the Forestry Home Page. Locate the link to the State Nursery under the Buying Trees heading in the left menu.
    - a. Search the “Catalog” to determine if the tree and shrub species you selected are available for sale?
  13. Assuming you want to plant 500 trees and shrubs per acre, search the “Order Form” to determine the cost to plant 3 acres of:
    - b. 8’ to 16” Elderberry shrubs:
    - c. 17” and larger Silver Maple trees:

Answer Key

- |   |   |   |
|---|---|---|
| <ol style="list-style-type: none"> <li>5.           <ol style="list-style-type: none"> <li>a. Calco</li> <li>b. 2-5</li> <li>c. Yes</li> <li>d. Soybeans</li> <li>e. Not Hel</li> <li>f. 33"</li> <li>g. 75-83</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>11.           <ol style="list-style-type: none"> <li>a. Green Ash, Hackberry, Silver Maple, Cotton wood, Hybrid Poplar</li> <li>b. American Plum, Arrow wood, Hazelnut, Buttonbush, Silky Dogwood, Elderberry</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>13.           <ol style="list-style-type: none"> <li>a. It costs \$37 for 100, so \$555 for 1500</li> <li>b. It costs \$42 for 100, so \$630 for 1500</li> </ol> </li> </ol> |
| <ol style="list-style-type: none"> <li>10.           <ol style="list-style-type: none"> <li>a. Yes</li> <li>b. No</li> <li>c. 5W3</li> </ol> </li> </ol>  | <ol style="list-style-type: none"> <li>12.           <ol style="list-style-type: none"> <li>a. Yes</li> </ol> </li> </ol>   |   |

*Someone's sitting in the shade today  
because someone planted a tree a long  
time ago.*

~ Warren Buffett ~

Adapted from "Growing Seedlings from Seed", an article written by Paul H. Wray, Extension Forester.

Growing trees from seed can be educational and fun. It isn't a difficult project, but it takes time and patience. You'll find that the experience is most meaningful and rewarding when you undertake the whole process, from collecting the seed to the final transplanting of the seedling. This activity provides students with the opportunity to participate in a continuous educational experience where they can see how their efforts can actually make an impact on the environment.

## Step 1: Collecting Seeds

Always collect seeds from healthy trees that bear large quantities of seed.

### Conifers:

The seed inside the cone of the evergreen is what will be planted, not the cone itself. You must collect the cones from the trees before they open and release the seed, but not before the seed is mature. When the seeds have ripened, the cone scales will spread and the seeds will fall out. The cones of most coniferous trees open in the fall, usually in September lasting into October. There are two methods to determine if the cones are mature enough to collect. The first is to inspect the seed. If it is well filled and solid, not milky, it is mature. The other way is to observe when the squirrels begin hoarding the cones, this means they are mature enough to collect.

### Hardwoods:

Elms, silver maple, cottonwood, and the willows have seeds that mature in the spring (May-June). This seed is windblown, so look for drifts of seed in sheltered corners and along street curbs. Seeds that ripen in the spring lose their ability to grow after 3 to 4 weeks, so plant the seeds as soon as possible after gathering.

Some trees whose seeds ripen in late summer or early fall include: sugar maple, boxelder, oak, basswood, honey locust, hackberry, ash, black walnut, butternut, hickory, Kentucky coffee tree, wild plum, lilac, honeysuckle, and Russian olive. Some of these seeds fall to the ground, others can be picked from the trees.

## Step 2: Storing Seeds

### Conifers:

Store the cones in a warm, dry room and use either artificial or natural heat to open them. A small number of cones will open readily when spread on canvas in full sunlight. This method is recommended since there is no danger of damaging the seed during extraction. You can also use the oven of a kitchen stove, but be careful not to heat the cones too much or too long or you'll reduce the vitality of the seed. A temperature of 120°F for 4 hours should open the cones without seriously injuring the seed.

After the cones are open, the seeds can be shaken from them. You can rake the cones back and forth, shake them in a bag, or tumble them in a churn. To remove the wing attached to the seed, gently rub the seeds between your hands or over a screen. Pouring the seeds from one container to another when the wind is blowing will remove the wings and other debris. Whether you purchase or collect the seed yourself, store it in an airtight jar or bottle until spring. Place the bottle where rapid temperature changes do not occur, such as a fruit or vegetable room in the cellar, or store in a refrigerator.

### Hardwoods:

Some seeds germinate in the spring while others germinate in the fall. Any of the seeds you collect should be planted right away. The white oaks must be planted in the fall because they will germinate soon after they are mature, sending down a root which may be 3 to 8 inches in length. The red oaks will grow best if planted in the fall but do not germinate until the following spring.



## Step 3: Seedbed

### Location:

A seedbed takes very little space, but there are some important requirements in the location of a seedbed. Some of these requirements are: (1) an adequate source of water; (2) a well-drained site that is exposed to the sun; (3) a light sandy loam soil, although it is possible to raise seedlings in almost any type of soil; and (4) protection from animals and livestock.

### Preparation:

Dig and spade the soil thoroughly, breaking up all lumps. Remove all debris and stones. There should be little organic matter present. Under no circumstances should you add barnyard manure to the seedbed soil.

Make a wooden frame, 4 feet wide by 12 feet long, out of 1x4 inch or 1x6 inch lumber. Set the frame on edge about 1 inch into the ground. Firm the surrounding area, add enough soil to raise the surface of the bed about 1 inch. If the soil is loam, round it upwards toward the center of the bed. If it is sand, you can leave it flat. Firm, but do not pack, the soil with a board.

## Step 4: Planting

You will want to grow 10 to 50 seedlings per square foot of nursery bed. Plant 50 to 100 seeds per square foot. If the seedlings are too thick, they can be thinned to the desired number.

All fall planted seeds should be mulched. Materials which can be used are sawdust, burlap, ground corncobs, straw or hay. These mulches will prevent any erosion and frost heaving and may be left in place to delay spring germination until danger of frost is past. The corncob or sawdust mulch may be left on the seedbeds.

If rodents are a problem for the new seedbed, the seeds may be protected by covering the seedbed with anchored hardware cloth until they begin to germinate in the spring. Damping-off fungicides are available from most garden or drug stores. Treat the seedbed immediately after planting and again when 50 % of the seeds have germinated. Then, every 3 weeks until September 1, repeat treatment.

## Growing Seedlings from Seed

## Step 5: Caring for Seedlings

### Shade:

Seedlings injure easily from too much heat when they are young and tender. Fifty percent shade seems to be about right. You can use a snow fence as a seedbed cover or build a frame covered with wooden lathe. You can also use commercially available shade cloth.

### Weeding:

Weeds will smother the trees if not removed promptly. A weed often grows so large that weeds don't develop.

### Watering:

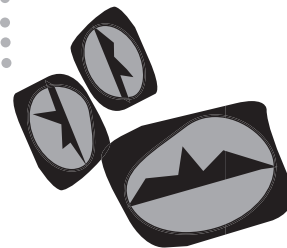
You will get better growth and survival by watering seedlings if rainfall is low or if it comes at irregular intervals. During the first 2 months, water twice a week. Later, one heavy soaking per week to a depth of 6 inches will be satisfactory.

### Fall Mulching:

After the first heavy frost, place a 3 to 4 inch mulch of leaves or straw over first year seedlings. This will help prevent frost heaving. Leave it on the seedbed until the frost is out of the ground in the spring.

### Transplanting:

If larger planting stock is desired, transplant 1 or 2 year old seedlings to transplant beds. Transplant in rows 8 inches apart, and 3 inches between seedlings. Continue to seed and cultivate. Watering is not necessary, but it will result in increased growth.



*Make a commitment  
to your community...*

*Plant a tree!*

# Careers working with Trees and Forests

## Forester

Forester

A forester is a person that has a strong background in science and liberal arts and uses that knowledge to manage forests to meet the increasing demands for forest resources (i.e. wildlife habitat, wood fiber, lumber, water quality, and aesthetics.) To possess the title of “forester,” you must have a college degree from a university offering a professional forestry education. In Iowa, foresters typically work for the Department of Natural Resources, public and private universities, county conservation boards, cities, private wood industries, consultants, and companies offering tree services. Since most of Iowa’s woodlands are privately owned, foresters provide technical expertise in implementing tree planting efforts, coordinating timber harvests, disease and insect control, designing windbreaks and trails, and urban forestry.

## Arborist

Arborist

An arborist is someone who has education and experience working with individual trees in city parks, along streets, and even in people’s backyards. In the past, these people were commonly referred as “tree surgeons” since they diagnosed and treated tree problems. Most arborists have a two or four year degree in forestry or other areas of natural resource management. They work for city parks and public works departments, tree service companies, or have their own businesses.

Swamp White Oak  
*Quercus bicolor*

## Landscaper

Landscaper

A landscaper is someone who has education and experience in designing and implementing tree and shrub plantings that enhance the aesthetics and can improve the value of property. They typically work for a nursery or landscape company that provides services to residential, commercial, and government properties. Landscapers have a two or five year degree in horticulture or landscape architecture.

## Activity Ideas

1. Contact a local tree care professional for an interview or invite them to speak to your class. Find out their likes and dislikes about their job. How did they find their job? Contacts could include DNR district foresters, county conservation board staff, community forestry and parks staff, tree care professionals, utility company representatives, and ISU Extension employees.
2. Search the web to find out how to become a forester and the many job opportunities available to foresters. Try these sites:  
<http://www.safnet.org>  
<http://www.forestry.iastate.edu/ext/ext.html>
3. Identify the parts of the United States that you think have the greatest demands for foresters, arborists, and landscapers. Why is this so?
4. How important are math and science in tree and forest professions? Find local universities and colleges that offer degrees in these areas and see what classes are required.

# Instructions

Try to fill in the missing numbers in the left box and decode the message below using the letters in the matching box on the right. Use the numbers 1 through 10 to complete the equations. Each number is used only once. Each row is a math equation. Solve the rows from left to right. Each column is a math equation. Solve the columns from top to bottom. The numbers in the boxes on the left are equal to the letters on the right. We have started to give you a hint. Good Luck!

# Math Decoder



	L			
1	7	2	3	10

3	2	10	5	6	8

	R		
10	4	8	8

Letter or box in right table

Value of box in left table

<input type="text"/>	×	<input type="text"/>	-	<input type="text"/>	15
-		+		-	
7	×	<input type="text"/>	-	<input type="text"/>	13
×		+		×	
4	+	<input type="text"/>	-	<input type="text"/>	9
12		11		3	

T	×	A	-	I	15
-		+		-	
L	×	N	-	E	13
×		+		×	
R	+	V	-	P	9
12		11		3	

C			
1	5	4	9

8	3	4	

		W		
2	3	6	5	7

					T
8	3	4	9	7	

Letter or box in right table

Value of box in left table

6	+	1	-	<input type="text"/>	4
×		+		×	
<input type="text"/>	×	<input type="text"/>	-	<input type="text"/>	5
÷		÷		-	
<input type="text"/>	-	<input type="text"/>	×	<input type="text"/>	20
3		1		22	

W	+	C	-	O	4
×		+		×	
I	×	S	-	E	5
÷		÷		-	
R	-	F	×	A	20
3		1		22	

## Books

- Cullina, William. Native Trees, Shrubs, and Vines: A Guide to Using, Growing and Propagating North American Woody Plants. 2002
- Gramlin, Linda. Trees. DK Publishing. 1997
- Neumann, Kay & Riley, Linette. Iowa Department of Natural Resources-Forestry Bureau. An Iowa Supplemental to Project Learning Tree, K-8. 1993
- Project Learning Tree Secondary Educational Program. The Changing Forest: Forest Ecology. American Forest Foundation. 1996
- Staub, Frank. America's Prairies. Earthwatch. 1994
- Sternberg, Guy & Wilson, Jim. Landscaping with Native Trees. 1995. Chapter Pub. (Vermont)
- Tresselt, Alvin. The Gift of the Tree. Lothrop, Lee and Shepard Book. 1992
- Vander Linden, J. Peter & Farrar, R. Donald, Forest and Shade Trees of Iowa (2nd Edition). ISU Press. 1993

## Websites

### **Page Title: ARTSEdge: Wonderful Woodlands: A Group Collage**

Includes students learning about leaves, forests, and seasonal changes, and then create group collages of forests.

<http://artsedge.kennedy-center.org/content/2081/>

### **Project Learning Tree**

Includes sample lessons and describes this interdisciplinary environmental education program.

<http://www.plt.org/>

### **Earth Day at Kids Domain**

Includes Earth Day history and activities

<http://www.kidsdomain.com/holiday/earthday/>

### **Iowa State University Forestry Extension**

Identification of common trees of Iowa with an interactive key

<http://www.extension.iastate.edu/pages/tree/>

### **U.S. Environmental Protection Agency**

Includes information on landscaping with natives, the benefits of natives, a and native plant fact sheet

<http://www.epa.gov/greenacres/>

### **EEK: Environmental Education for Kids. Wisconsin DNR**

Includes fun interactive and informational activities for kids on topics varying from Arbor Day to native trees, also has teaching activities and educational resources

<http://www.dnr.state.wi.us/org/caer/ce/EEK.index.htm>

### **Iowa DNR Forestry**

<http://www.iowadnr.com/forestry>

# Answer Page



(page 13)

EBT PHOTOSYNTHESIS  
 RHC AIN ENVIRONMENTH  
 PAATRESOURCESUNODA  
 RCNSUCCESSIONOONYD  
 EEOGROCUEYGRIRAH EE  
 SSPNELOITABSELPANT  
 CPYNIUNINLOIPAEBWO  
 REMKDFSSHRTURICIUUL  
 ICFIHREIESTGDNOTNE  
 BICDEDRUAQEPVSAADR  
 EEAVKVVFPMPFRAYTEA  
 DSINAEAROLLLOESSRRN  
 NQUECRTTLIALSITEESC  
 ARBERSICFNNEVEETE  
 TLREETOERGDAREMFORM  
 ITARTONPTORGVMARA  
 YOOSPROUTAWEE DC RYS  
 EFAFH YCEXTINCTJMLT

- Section I.  
 1) spruce, Canada 2) maples, deciduous, prairie 3) stream, eastern, open, oaks, prairie, wildflowers  
 Section II.  
 1) maple, black, basswood 2) slow, long 3) reproduction 4) nigrum 5) cabinets, flooring, veneer, musical instruments, 32  
 Section III.  
 1) Height, Circumference 2) 300 3) No 4) 275 5) 22.5 6) 72  
 Section IV.  
 1) swamp white oak 2) T 3) white pine 4) 100, northeast 5) black maple

## Native Tree Crossword (page 14-15)

### Math Decoder (page 29)

First

P	L	A	N	T	A	N	A	T	I	V	E	T	R	E	E
1	7	2	3	10	2	3	2	10	5	6	8	10	4	8	8

Second

C	A	R	E	F	O	R	I	O	W	A	S	F	O	R	E	S	T
1	5	4	9	8	3	4	2	3	6	5	7	8	3	4	9	7	

Across

2. Overstory
4. Canopy
11. Range
13. Sapling
15. Natural Resources
16. Sprout
17. Preserve
20. Succession
23. Native
24. Erosion
27. Bottomland
29. Tree Farm
32. Species
34. Crown
35. Trunk
36. Forest
37. Acre

Down

1. Photosynthesis
3. Shade Tolerance
5. Conservation
6. Environment
7. Prescribed
8. Understory
9. Mast
10. Invasive
11. Roots
12. Diversity
14. Forestry
18. Ecosystem
19. Deciduous
21. Topography
22. Conifer
25. Habitat
26. Foliage
28. Upland
31. Tree
33. Snag



Ironwood/Hophornbeam  
*Ostrya virginiana*

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For those who can not read the size of print in this publication, a larger sized version of the text is available by calling the DNR at (515)281-5145, TDD number (515)242-5967, or by writing the DNR at 900 East Grand Avenue, Des Moines, Iowa, 50319-0034.

Thanks for caring  
about Iowa's  
Native Trees



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