



FIELD ENHANCEMENT 1

Tree Identification

NUTSHELL

In this lesson, students learn to use a dichotomous key to identify Wisconsin trees. Students also participate in hands-on activities that help them learn tree identification vocabulary. Students work in groups to study and identify trees and discover the process is not difficult when broken into steps.

OBJECTIVES

Upon completion of this lesson, students will be able to:

- Recognize and describe characteristics that differentiate trees.
- Recognize common trees of Wisconsin by examining their characteristics.
- Use a dichotomous key to identify trees.

SUBJECT AREAS

Language Arts, Science

LESSON/ACTIVITY TIME

- Total Lesson Time: 85 minutes
- Time Breakdown:
 - Introduction 10 minutes
 - Activity 1 20 minutes
 - Activity 2 40 minutes
 - Conclusion 15 minutes

TEACHING SITE

Classroom and schoolyard, school forest, or park with a variety of native Wisconsin trees.

NOTE: If you are unsure about the trees in your area, it is advised that you contact your local forester. Some trees in urban areas may be decorative hybrids or of different varieties than trees commonly found in Wisconsin. Your city or municipal forester can help you identify these trees.

CLASSROOM LESSON CONNECTIONS

This lesson ties closely with Classroom Lesson 1, *Discovering Wisconsin's Forests*.

BACKGROUND INFORMATION

Tree identification is a useful skill for people of any age and background. All trees have different requirements. In order to know what conditions a tree requires, you must know what kind of tree it is. Knowing a tree's requirements can help determine what tree should be planted in an area, why a particular tree may be unhealthy, or why certain trees are not found in a particular location. Tree identification is also useful in management. Decisions for planting, harvesting, thinning, conducting prescribed burns, etc., are all based on the tree species present and what the site can support. Finally, tree identification is important for communicating with others. If two people know tree characteristics and can identify species, they share a common language and can each understand what the other is trying to communicate.

There are estimated to be more than 20,000 kinds of trees in the world. Can you imagine the size of a field guide with all of those trees? It would be enormous! How do we go about accurately identifying trees with so many trees in the world? Simple – we have to break it down into steps.

(Continued on page 184.)



MATERIALS LIST

FOR EACH STUDENT

- Copy of Student Page **2A-B**, *Tree Identification Terms*
- Copy of Student Pages **4A-C**, *Tree Identification Key*
- Copy of Student Page **1**, *Dichotomous Key to Identify Students* (optional)
- Clipboard/notebook to use as a writing surface

FOR EVERY 2 TO 3 STUDENTS

- Copy of Student Page **3**, *Tree ID Data Sheet*

FOR THE CLASS

- Student Page **1**, *Dichotomous Key to Identify Students* to project (optional)
- Examples of dichotomous keys (choose your own adventure books, basketball tournament diagram) (optional)
- Set of cards copied onto cardstock and cut

out from Teacher Pages **1A-B**, *Tree ID Vocabulary Cards*

- Paper bag and grab bag items: comb, piece of lined paper, lollipop, etc. (optional)
- Samples of leaves, branches, etc. that represent the vocabulary terms on the *Tree ID Vocabulary Cards* (optional)
- *Tree Identification Cards* printed in color from the LEAF website www.uwsp.edu/cnr/leaf. Laminate for durability (optional) Note: A sample is found on page 199 for reference.
- Marker/chalk board

FOR THE TEACHER

- LCD or overhead projector (optional)
- Tree and plant identification books (optional)
- String and scissors (optional)

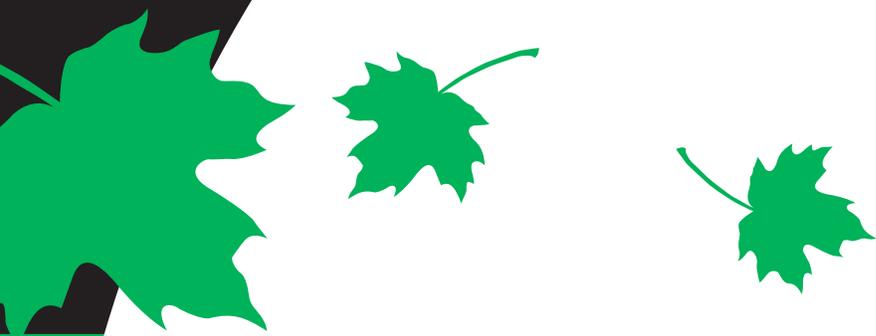
TEACHER PREPARATION

- Determine if you will do the introduction inside or outside and prepare accordingly.
- Determine if you will use Student Pages **1A-B**, *Tree ID Vocabulary Cards* or grab bag items and prepare as needed.
- Choose an area where students can easily move from tree to tree. Be aware of the distance between students and the trail length, as this may affect the lesson time needed. Become familiar with trees along the trail and choose an example tree to identify.
- Prepare a chalk/marker board for the concluding *Jeopardy Game* (see page 187).

SAFETY PRECAUTIONS

Visit the teaching site ahead of time to locate any hazards such as holes, hanging branches, protruding tree roots, poison ivy, etc. Encourage students to walk at all times. Consider these:

- Are you in sight or earshot of students?
- Are boundaries for students clear?
- Have you set expectations for being out of the classroom?
- Do you have a whistle, first aid kit, insect repellent, and sunscreen?
- Is everyone dressed appropriately?



VOCABULARY

Alternate Branching: A branching pattern where the side branches and leaves do not grow directly across from each other.

Axillary Bud: A bud that grows just above the leaf petiole. It is capable of developing into a flower cluster or branch shoots.

Broadleaf: A tree that has broad leaves rather than needles.

Bundle: Group of conifer needles held together at the base by a small papery wrap called a fascicle.

Compound Leaf: A type of leaf that has many smaller leaflets that attach to its petiole, which is attached to a twig.

Conifer: A tree that bears cones and has needles.

Entire: A type of leaf margin that is smooth and has no wavy or pointed edges.

Leaf Base: The lower edge of a leaf.

Leaflet: A small leaf that is part of a compound leaf.

Leaf Margin: The outer edge of a leaf.

Leaf Scar: The mark left behind on a twig when a leaf falls from a tree.

Lobe: A projection that extends outward from the center of the leaf.

Opposite Branching: A branching pattern where side branches and leaves grow directly across the stem from each other.

Petiole: The stalk that supports a leaf and attaches the leaf to the twig. They can be round, flat, or square.

Scaly: Conifer needles that are flat and overlapping, like fish scales.

Simple Leaf: A type of leaf that has one blade attached to a twig by a petiole.

Sinus: The space between lobes on a leaf.

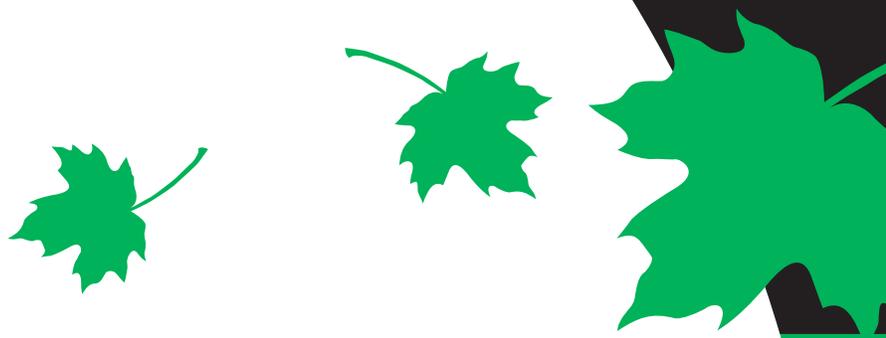
Toothed: A type of leaf margin that has small points along it (teeth).

Veins: Distinct lines of tissue that form the framework of a leaf. Used for food and water transport.

(Continued from page 182.)

The first step is to identify our geographic location. For this lesson we are only looking at Wisconsin trees. There are upwards of 80 species of trees in Wisconsin. Additionally, there are non-native trees planted for landscaping, hybrid trees, and shrubs that look like trees. For this lesson, we've chosen common trees

in Wisconsin. Depending on your location, you may not have some of the trees listed on our tree list. Select the ones that you do have for your lesson purposes. LEAF has an on-line tree key to help you learn about other common trees in Wisconsin. (www.uwsp.edu/cnr/leaf)



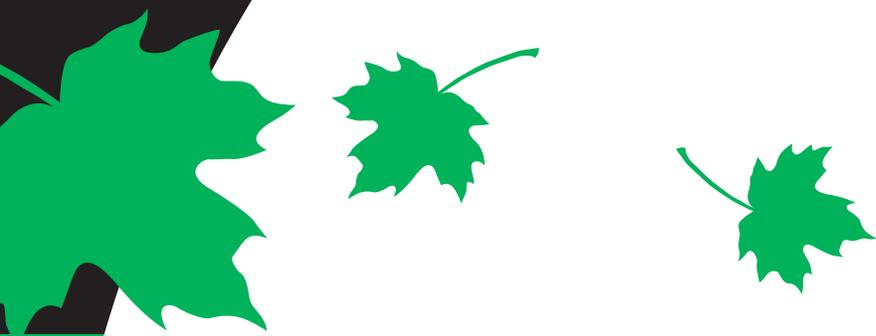
To identify a tree, you can use a field guide and compare the picture to the real thing. However, a dichotomous key can be more accurate than visual estimation. A dichotomous key contains a series of choices that lead the user to the correct name of an item. The key is based on a simple two (di) choice method. The key will ask a question like, “Does the tree have opposite branching?” The answer will determine which question you go to next, and eventually lead to the species name. Dichotomous keys can also be used to identify other things such as wildlife and plants.

PROCEDURE

INTRODUCTION - IDENTIFYING STUDENTS

NOTE: The Introduction and Activity 1 can be done inside or at your outdoor teaching location.

1. Ask students if they think everyone in the class is exactly the same. Give some examples of features that differentiate people and have them come up with a few. (*Eye color, straight or curly hair, base of earlobes attached or unattached.*) Tell students that we can use these characteristics to separate the class into groups. Let’s try one as a class. Take out Student Page  1, *Dichotomous Key to Identify Students* (project if you are inside) and key out a student using the steps below.
 - Choose a student to key out.
 - Start with number one and follow the instructions on the key.
 - When you get to a line with a blank space, fill in the student’s name.
2. Have a student volunteer key out another person in the class. The goal is to help students understand the process of using a dichotomous key. Continue until all students have had an opportunity to participate or until you feel there is a general level of understanding.
3. Explain to the students that the tool they have been using with the class is called a dichotomous key. A dichotomous key gives you two choices, and your answer will lead you to a correct identification. Remind them that the “di” in dichotomous means two. Examples of items similar to dichotomous keys they may be familiar with are choose your own adventure books and basketball tournament diagrams. Show students how these work if you have examples.
4. Explain that today they will be studying trees in a forest. Ask why it is important to know about trees in a forest. (*To determine what products they can be made into, what wildlife might depend on them, types of recreation that would be favorable, aesthetics, etc.*) Explain that even though they may not live in a forest, they may be part of the large percentage of Americans that live in an urban forest. Whether you visit a forest, live near a forest, or live in a city, trees are an important part of your life. Ask if all trees have the same characteristics. (*No.*) Ask how we can tell them apart. (*Type of leaf, shape of leaf, type of branching.*) Explain that we can use a dichotomous key for trees just like we did for the students in the class. The first step in using a dichotomous tree key is to determine characteristics that differentiate trees, just as we did with students. Explain that trees have special names for characteristics that might not be familiar. The next activity will help them learn some of those words.



ACTIVITY 1 - TREE ID TERMS

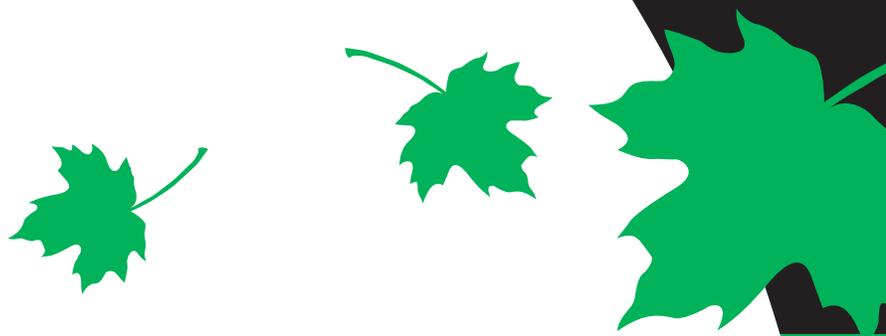
1. Divide your students into groups of two or three. Hand out Student Page **2A-B**, *Tree Identification Terms* to each student and have group members take turns reading the words and definitions aloud.
2. Bring out the cards you've cut out from Teacher Pages **1A-B**, *Tree ID Vocabulary Cards* OR grab bag full of items. One at a time, ask a member from each group to come up and choose a card or pull an item out of the grab bag and show the class.
3. Once a card or item is chosen, the student's teammates need to decide which vocabulary word the item represents. If they don't have the answer, then the item passes to the next group, etc., until the vocabulary word is determined.
4. Once all the cards or items have been identified, quickly review the object and why it represents a certain word relating to tree species. If possible, compare the items with actual collected examples of tree leaves, needles, and branches.

Key to Tree ID Vocabulary Cards

A: Toothed	E: Opposite	I: Sinus
B: Scaly	F: Bundle	J: Veins
C: Margin	G: Petiole	K: Conifer
D: Alternate	H: Lobe	L: Compound

ACTIVITY 2 - TREE ID

1. Set expectations, rules, safety considerations, and boundaries for the tree identification course. Have students work in the same groups that they did for Activity 1. Hand out Student Page **3**, *Tree ID Data Sheet* to each group. Tell students the number of trees on the course and that they will be using a dichotomous key to identify each tree. They should also fill in additional information on each tree they identify. Go over the *Data Sheet*. Show students where to check if the tree is a conifer or broadleaf, opposite or alternate. Review the terms if necessary. They should note any signs of wildlife they see, describe the bark, and draw the overall shape of the tree. Explain that it works best to share roles and allow each group member an opportunity to identify trees and make observations.
2. Hand out Student Pages **4A-C**, *Tree Identification Key* to each student. Point out that there are two keys, one for broadleaf trees and one for conifers. Make sure students also have Student Pages **2A-B**, *Tree Identification Terms* with them.
3. Use the key to identify one tree as an example for the group. If leaves or other identifiers are out of reach, use the Tree Identification Cards you printed from the LEAF website as supplemental information.
4. Start each group at a different point along the tree ID trail you have marked. Tell the students to meet back at the start tree at the end of the allotted time, or when they hear your whistle.
5. At the end, walk the trail with the entire class. Ask what they had for tree names and observations for each tree. It is also helpful to point out some unique characteristics that may make it easy for students to remember a tree. Consult tree field guides for suggestions.



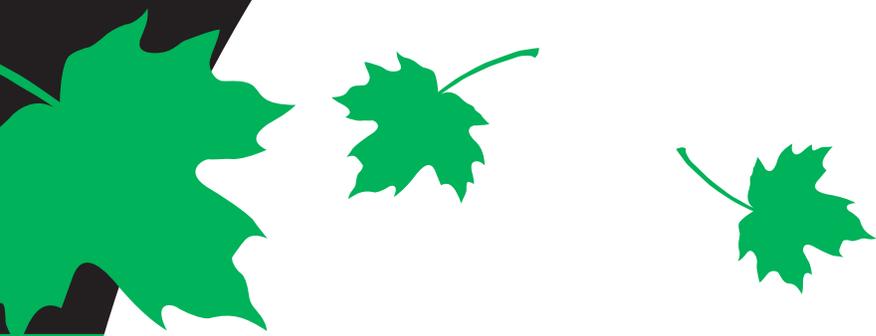
CONCLUSION - TREE GAME

This activity works best in a classroom with a chalk/marker board, unless you have a portable option.

1. Divide the class up into four groups and have each group choose a spokesperson.
2. Play the game just as is done in *Jeopardy*. You will be the host, "Alex Treebark."
 - a. Choose a team to go first.
 - b. The team chooses a category and point value.
 - c. The team must give the correct answer in the form of a question. (Example: If the clue is, "Conifers have these." Students answer, "What are needles?")
 - d. If an incorrect answer is given, the next group has the opportunity to answer.
 - e. Play passes to the next team after each question, regardless of if a correct answer was given or not.
 - f. Keep score for each team on the board.
 - g. Play until all questions have been answered or time runs out.
3. The last question is the final *Jeopardy* question for all the groups. The groups can wager any amount of the points that they have earned. Answers should be written on a piece of paper. The final *Jeopardy* question should be chosen by the instructor based on the class. (Example: A tree we identified today with scaly, flattened needles and fan-like branches. "What is a northern white cedar?")
4. Read the question and allow 30 seconds to answer the question. Have each group share their answer. Tally the scores.

DRAW THIS CHART ON THE BOARD.

Kinds of Branching	Leaf Me Alone	Hodgepodge	Key Features
5 Points	5 Points	5 Points	5 Points
10 Points	10 Points	10 Points	10 Points
15 Points	15 Points	15 Points	15 Points
20 Points	20 Points	20 Points	20 Points



JEOPARDY GAME

You read the **ANSWER** and the students must give the **QUESTION**.

KINDS OF BRANCHING	LEAF ME ALONE	HODGEPODGE	KEY FEATURES
<p>ANSWER When leaves grow directly across from one another.</p> <p>QUESTION <i>Opposite</i></p>	<p>ANSWER Conifers have these.</p> <p>QUESTION <i>Needles</i></p>	<p>ANSWER Type of key used to identify trees.</p> <p>QUESTION <i>Dichotomous</i></p>	<p>ANSWER Conifers with needles in bundles of two or five.</p> <p>QUESTION <i>Pine</i></p>
<p>ANSWER Sugar maple have this.</p> <p>QUESTION <i>Opposite</i></p>	<p>ANSWER Entire or toothed, lobed.</p> <p>QUESTION <i>Leaf Margins</i></p>	<p>ANSWER Group of trees that have cones.</p> <p>QUESTION <i>Conifers</i></p>	<p>ANSWER A kind of tree that may have pointed or rounded lobes.</p> <p>QUESTION <i>Oak</i></p>
<p>ANSWER Alternate</p> <p>QUESTION <i>Leaves or branches that do not grow directly across from one another.</i></p>	<p>ANSWER Sinus</p> <p>QUESTION <i>The space between lobes.</i></p>	<p>ANSWER The mark left behind when a leaf falls.</p> <p>QUESTION <i>Leaf scar</i></p>	<p>ANSWER A kind of tree with a papery bark.</p> <p>QUESTION <i>Birch</i></p>
<p>ANSWER Oaks have this.</p> <p>QUESTION <i>Alternate</i></p>	<p>ANSWER Ash, hickory, and locust have these.</p> <p>QUESTION <i>Compound Leaves</i></p>	<p>ANSWER They can be flat, round, or square.</p> <p>QUESTION <i>Petiole</i></p>	<p>ANSWER A kind of tree with opposite branching and simple leaves.</p> <p>QUESTION <i>Maple</i></p>

SUMMATIVE ASSESSMENT

Have students select 10 items from their desk or locker and develop a dichotomous key for the objects.



REFERENCES

Kupkowski, G., et al. Urban Forestry Laboratory Exercises for Elementary, Middle, and High School Students. USDA Forest Service.

Strathe, S., Hylla, N., Kiser, S., Boyd, E., & Dreier, P. (2000). Wisconsin Forestree – Bridging the Gap Between Environment and Economy. Central Wisconsin Environmental Station.

Sebastian, K. (2002, October). Tree Trivia and Tree Myths. Wisconsin Natural Resource Magazine. (World Wide Web: www.wnrmag.com/supps/2002/oct02/trivia.htm)

Harlow, Wm., et.al. (1996). Textbook of Dendrology. McGraw-Hill Inc.

RECOMMENDED RESOURCES

●●● WEBSITES ●●●

LEAF On-line Tree Key www.uwsp.edu/cnr/leaf

Visit the LEAF site to use our on-line tree ID key. Identify a tree of your choice or use one of our mystery trees to learn basic ID skills.

University of Wisconsin-River Falls Agriculture Education Forestry Manual www.uwrf.edu/ag-education/forestry/

Under “teacher resources,” “forestry curriculum.” Read Chapter 4, Forest Ecology, to learn more about how trees grow and access an illustrated dichotomous tree key.

University of Wisconsin-Green Bay Herbarium

www.uwgb.edu/biodiversity/herbarium/

Click on the Trees of Wisconsin link for a long list of tree species with many pictures.

Wisconsin Department of Natural Resources - Division of Forestry

<http://dnr.wi.gov/forestry/treeid/>

Tree and shrub identification keys along with information about each species.

●●● BOOK ●●●

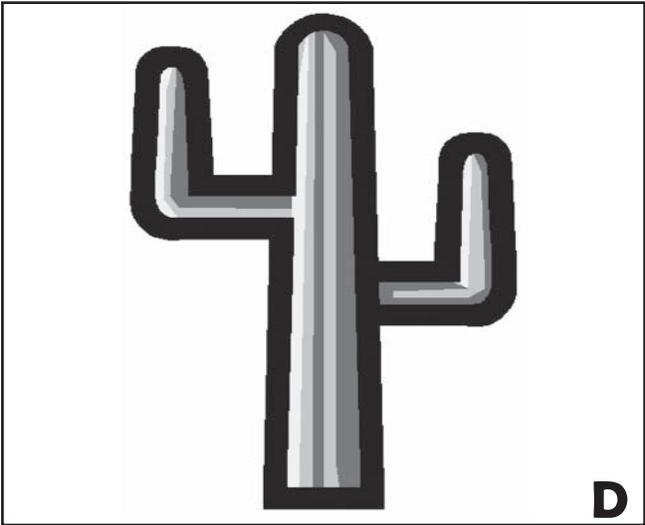
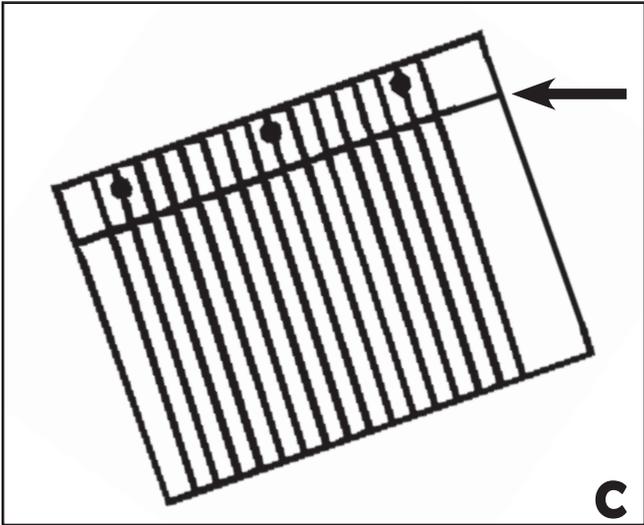
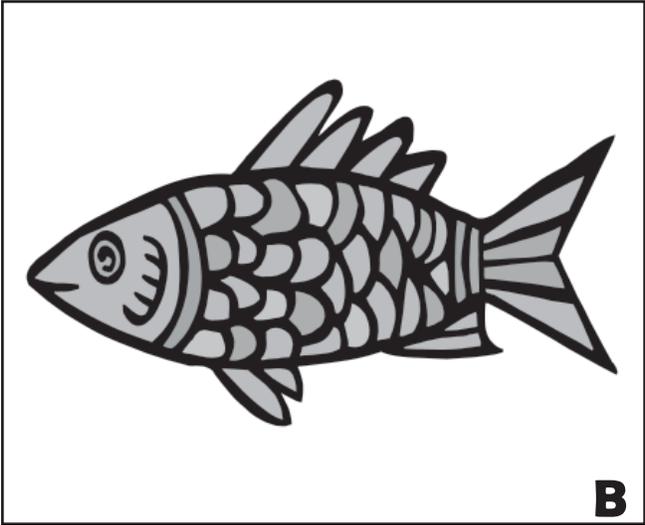
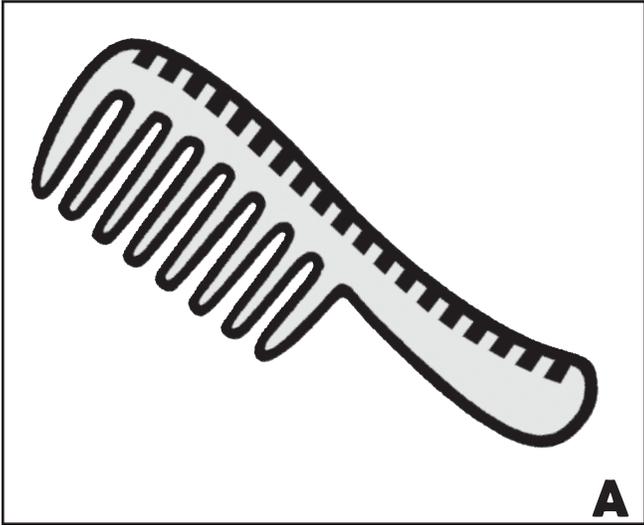
Trees of North America and Europe by Roger Phillips (New York: Random House, 1978.)

This book features great colored photographs of leaves, bark, seeds, flowers, silhouettes, and descriptions of many trees.

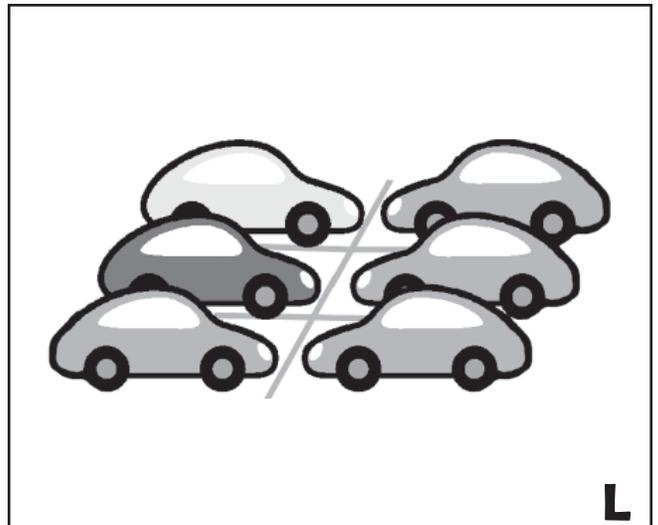
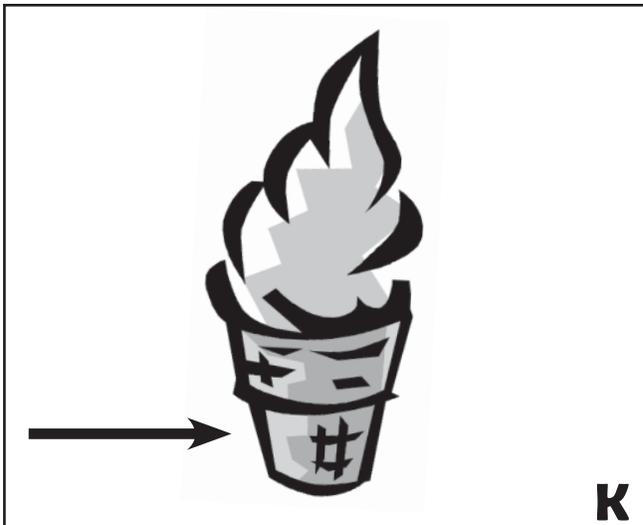
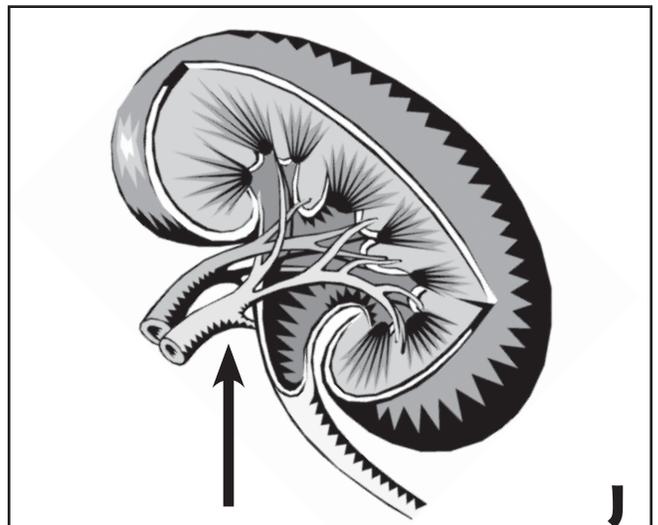
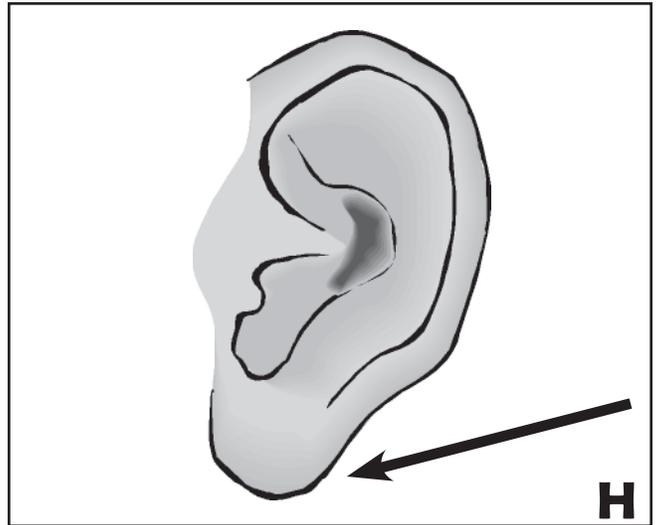
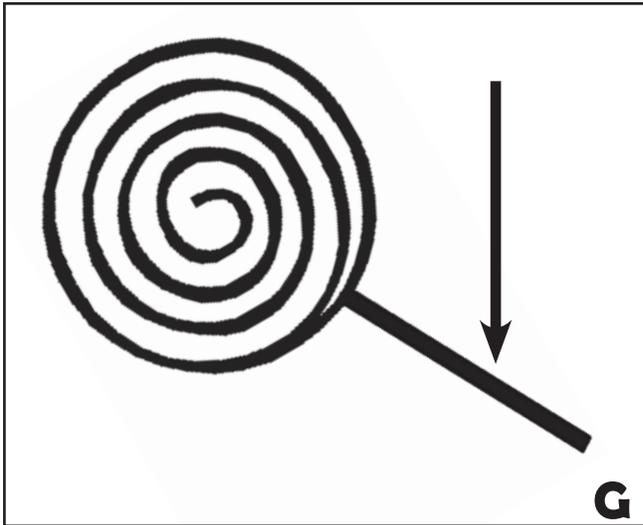
●●● BOOKLET ●●●

Forest Trees of Wisconsin: How to Know Them. (Wisconsin Department of Natural Resources PUBL-FR-053, 1990.) This tree ID booklet contains a dichotomous key, illustrations of Wisconsin trees, and tree uses.

TREE ID VOCABULARY CARDS



TREE ID VOCABULARARY CARDS



DICHOTOMOUS KEY TO IDENTIFY STUDENTS

- | | |
|-------------------------------------|-------------------------------------|
| 1. Female..... 2 | 17. Brown hair 18 |
| Male..... 17 | Not brown hair 21 |
| 2. Brown hair 3 | 18. Brown eyes..... 19 |
| Not brown hair 6 | Not brown eyes 24 |
| 3. Brown eyes..... 4 | 19. Earlobes attached..... 20 |
| Not brown eyes 9 | Earlobes unattached..... 26 |
| 4. Earlobes attached..... 5 | 20. Freckles student is _____ |
| Earlobes unattached..... 11 | No freckles..... student is _____ |
| 5. Freckles student is _____ | 21. Brown eyes..... 22 |
| No freckles..... student is _____ | Not brown eyes 27 |
| 6. Brown eyes..... 7 | 22. Earlobes attached..... 23 |
| Not brown eyes 12 | Earlobes unattached..... 29 |
| 7. Earlobes attached..... 8 | 23. Freckles student is _____ |
| Earlobes unattached..... 14 | No freckles..... student is _____ |
| 8. Freckles student is _____ | 24. Earlobes attached..... 25 |
| No freckles..... student is _____ | Earlobes unattached..... 30 |
| 9. Earlobes attached..... 10 | 25. Freckles student is _____ |
| Earlobes unattached..... 15 | No freckles..... student is _____ |
| 10. Freckles student is _____ | 26. Freckles student is _____ |
| No freckles..... student is _____ | No freckles..... student is _____ |
| 11. Freckles student is _____ | 27. Earlobes attached..... 28 |
| No freckles..... student is _____ | Earlobes unattached..... 31 |
| 12. Earlobes attached..... 13 | 28. Freckles student is _____ |
| Earlobes unattached..... 16 | No freckles..... student is _____ |
| 13. Freckles student is _____ | 29. Freckles student is _____ |
| No freckles..... student is _____ | No freckles..... student is _____ |
| 14. Freckles student is _____ | 30. Freckles student is _____ |
| No freckles..... student is _____ | No freckles..... student is _____ |
| 15. Freckles student is _____ | 31. Freckles student is _____ |
| No freckles..... student is _____ | No freckles..... student is _____ |
| 16. Freckles student is _____ | |
| No freckles..... student is _____ | |

TREE IDENTIFICATION TERMS

CONIFER: A tree that bears cones and has needles.



BUNDLE: Group of conifer needles held together at the base by a small papery wrap called a fascicle.

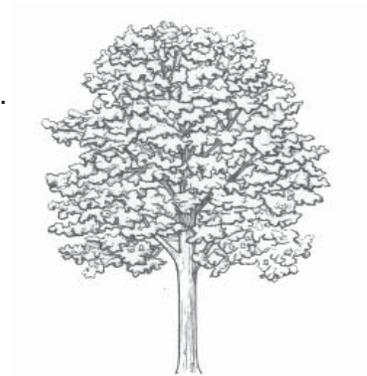


SCALY: Conifer needles that are flat and overlapping, like fish scales.

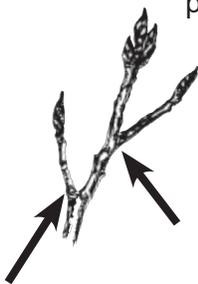


BROADLEAF*: A tree that has broad leaves rather than needles.

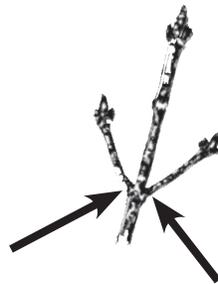
*Note: We use “broadleaf” instead of “deciduous.” A deciduous tree loses all its leaves for part of the year. A tamarack is a conifer (has cones and needles) that loses its needles in the fall (is deciduous).



ALTERNATE BRANCHING: A branching pattern where side branches and leaves do not grow directly across from each other.



OPPOSITE BRANCHING: A branching pattern where side branches and leaves, grow directly across the stem from each other.



TREE IDENTIFICATION TERMS

LEAF MARGIN: The outer edge of a leaf.

ENTIRE: A type of leaf margin that is smooth and has no wavy or pointed edges.

TOOTHED: A type of leaf margin that has small points along it (teeth).

SINUS: The space between lobes on a leaf.

Fine-toothed means that the teeth are small.

Course-toothed means that the teeth are large.

LOBE: A projection that extends outward from the center of the leaf.

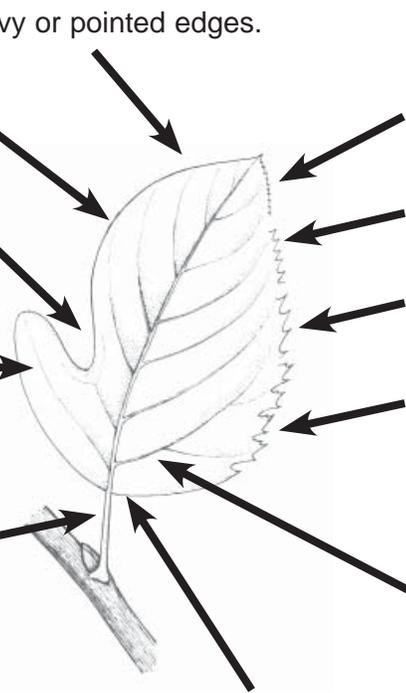
Single-toothed means that all the teeth are about the same size.

Double-toothed means that on each tooth there is a smaller tooth.

PETIOLE: The stalk that supports a leaf and attaches the leaf to the twig. They can be round, flat, or square.

VEINS: Distinct lines of tissue that form the framework of a leaf. Used for food and water transport.

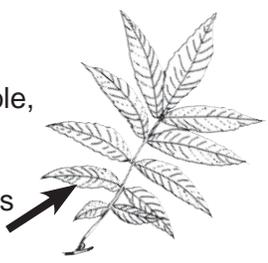
LEAF BASE: The lower edge of a leaf.



COMPOUND LEAF: A type of leaf that has many smaller leaflets that attach to its petiole, which is attached to a twig.

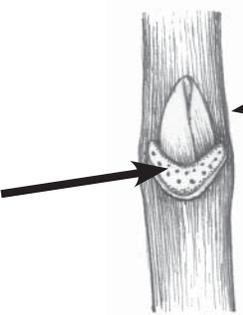
SIMPLE LEAF: A type of leaf that has one blade attached to a twig by a petiole.

LEAFLET: A small leaf that is part of a compound leaf.



LEAF SCAR: The mark left behind on a twig when a leaf falls from a tree.

NOTE: The axillary bud is just above the leaf petiole or leaf scar on the twig. Look for this bud to help you decide if it is a simple or compound leaf. Leaflets don't have this bud at their base.



Group Member Names: _____

TREE ID DATA SHEET

Tree Number	Tree Type		Branching Pattern		Tree Name	Wildlife Observations (nest, droppings, food remains, etc.)	Describe the tree bark (rough, scaly, dark, smooth, light, etc.)	Sketch the overall shape of the tree
	Conifer	Broadleaf	Opposite	Alternate				
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

TREE IDENTIFICATION KEY

BEGIN HERE:

- Tree has needles..... **CONIFER KEY**
- Tree has broad leaves**BROADLEAF KEY**

CONIFER KEY

- 1. Needles in bundles or groups (2)
- 1. Needles single or flattened and scaly (3)
 - 2. Needles in clusters of more than 5 needles.....**Tamarack* (*Larix laricina*)**
 - 2. Needles 2 to 5 per bundle: Pine species (see a-c below)
 -
 -
 -
 - a. Five needles per bundle..... **White Pine (*Pinus strobus*)**
 - b. Needles in pairs, 3 to 4 inches long..... **Red Pine (*Pinus resinosa*)**
 - c. Needles in pairs, under 2 inches long,
bark dark gray **Jack Pine (*Pinus banksiana*)**
 -
 -
- 3. Needles scaly and flattened (4)
- 3. Needles single (5)
 - 4. Has cones, scales flat, branches fan-like..... **Northern White Cedar (*Thuja occidentalis*)**
 - 4. Has berries, may have scaly and prickly needles on same tree, scales rounded..... **Eastern Red Cedar (*Juniperus virginiana*)**
- 5. Needles flat (6)
- 5. Needles square, 4-sided, stiff, sharp: Spruce species (see a-b below)
 -
 -
 - a. Needles 1/3 to 3/4 inch long, twigs hairless.....**White Spruce (*Picea glauca*)**
 - b. Needles 1/3 to 3/4 inch long, twigs have hair, grows in wet areas **Black Spruce (*Picea mariana*)**
 -
 -
- 6. Needles 1/2 inch long with short petiole.....**Eastern Hemlock (*Tsuga canadensis*)**
- 6. Needles 3/4 inch to 1 1/4 inches long, no petiole, bubbles in bark..... **Balsam Fir (*Abies balsamea*)**

*Note: A tamarack is a deciduous conifer.

TREE IDENTIFICATION KEY

BROADLEAF KEY

- 1. Opposite branching (2)
- 1. Alternate branching (4)
 - 2. Compound leaves (3)
 - 2. Simple leaves: Maple species (see a-c below)
 - a. Leaf margin entire, 5 lobes **Sugar Maple (*Acer saccharum*)**
 - b. Leaf margin double-toothed, 3 to 5 lobes **Red Maple (*Acer rubrum*)**
 - c. Leaf margin single-toothed, 3 to 5 lobes, lobes separated by deep, angular openings..... **Silver Maple (*Acer saccharinum*)**
- 3. 3 (rarely 5) leaflets **Box Elder (*Acer negundo*)**
- 3. 5 to 11 leaflets: Ash species (see a-c below)
 - a. 7 to 13 leaflets, leaflets do not have petiole **Black Ash (*Fraxinus nigra*)**
 - b. 5 to 9 leaflets, leaflets have petiole, smile-shaped leaf scar extending up sides of new bud..... **White Ash (*Fraxinus americana*)**
 - c. 7 to 9 leaflets, leaflets have petiole, leaf scar ends at base of new bud..... **Green Ash (*Fraxinus pennsylvanica*)**
- 4. Compound leaves (5)
- 4. Simple leaves (8)
- 5. 7 or fewer (usually 5) leaflets, egg-shaped nut..... **Shagbark Hickory (*Carya ovata*)**
- 5. 7 or more leaflets (6)
 - 6. Leaflets rounded..... **Black Locust (*Robinia pseudoacacia*)**
 - 6. Leaflets pointed (7)
- 7. Leaf 6 to 8 inches long..... **Mountain Ash (*Sorbus americana*)**
- 7. Leaf 8 to 24 inches long..... **Black Walnut (*Juglans nigra*)**
- 8. Leaves not lobed (9)
- 8. Leaves lobed: Oak species (see a-f below)
 - a. Rounded lobes, 5 to 9 deep even lobes and sinuses, leaves hairless..... **White Oak (*Quercus alba*)**
 - b. Rounded lobes, pair of deep sinuses near middle of leaf, hairy underside of leaves **Bur Oak (*Quercus macrocarpa*)**
 - c. Rounded lobes, leaf narrow at base and broad near middle, hairy underside of leaves **Swamp White Oak (*Quercus bicolor*)**
 - d. Pointed lobes, sinuses extend halfway to mid-vein, leaves hairless, dull green..... **Red Oak (*Quercus rubra*)**
 - e. Pointed lobes, deep sinuses extend 3/4 of the way to mid-vein, leaves hairless, bright green and shiny **Northern Pin Oak (*Quercus ellipsoidalis*)**
 - f. Pointed lobes, deep sinuses, young leaves hairy underneath, dark green and shiny, leathery..... **Black Oak (*Quercus velutina*)**

TREE IDENTIFICATION KEY

BROADLEAF KEY

9. Bark not papery (10)

9. Bark papery: Birch species (see a-c below)

-
- a. Leaf margin single-toothed, white peeling bark..... **White Birch (*Betula papyrifera*)**
- b. Leaf margin double-toothed, dull green leaves, yellow or bronzed bark **Yellow Birch (*Betula alleghaniensis*)**
- c. Leaf margin double-toothed, shiny green leaves, reddish-brown to silvery-gray bark **River Birch (*Betula nigra*)**
-

10. Leaf petioles flat (11)

10. Leaf petiole round (12)

11. Leaf triangular-shaped with coarse teeth **Eastern Cottonwood (*Populus deltoides*)**

11. Leaf oval: Aspen species (see a-b below)

-
- a. Leaves have small, fine teeth less than 1/16 inch..... **Trembling Aspen (*Populus tremuloides*)**
- b. Leaves have large teeth..... **Big-toothed Aspen (*Populus grandidentata*)**
-

12. Leaves nearly as wide as long (13)

12. Leaves longer than wide (14)

13. Leaf margin finely toothed..... **Balsam Poplar (*Populus balsamifera*)**

13. Leaf margin coarsely toothed..... **Basswood (*Tilia americana*)**

14. Leaf less than 3 times as long as wide (15)

14. Leaf at least 3 times as long as wide..... **Willow species (Common species include Weeping Willow and Black Willow)**

15. Leaf veins thin and branch often (16)

15. Leaf veins thick and run from center to edge of leaf without branching (17)

16. Fine blunt teeth, leaves 2 to 6 inches long, bark dark **Black Cherry (*Prunus serotina*)**

16. Sharp pointed teeth, leaves 2 to 4 inches long and hairy, leaf base asymmetrical **Hackberry (*Celtis occidentalis*)**

17. Leaf shiny and leathery (thick), coarse sharp teeth..... **Beech (*Fagus grandifolia*)**

17. Leaf dull and rough (18)

18. Most leaf bases even, seed in elongated clusters **Ironwood (*Ostrya virginiana*)**

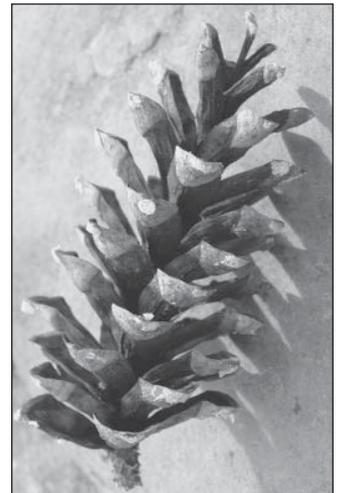
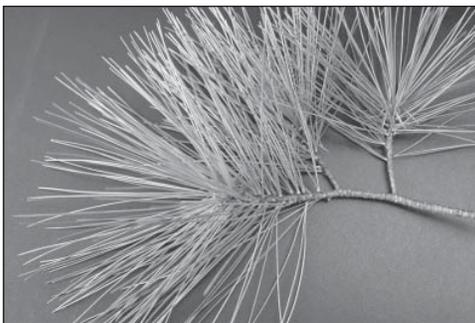
18. Leaf base uneven, seeds flat and papery..... **Elm species (Common species include American Elm, Rock Elm, and Slippery Elm)**

EXAMPLE TREE IDENTIFICATION CARDS A = TAMARACK • B = WHITE PINE

Tree identification cards in color for the most common Wisconsin forest trees are available on the LEAF website. www.uwsp.edu/cnr/leaf.



A



B