

Field Enhancement 1: Tree Identification

NUTSHELL

In this lesson, which takes place in location with a variety of Wisconsin trees, 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.

ENDURING UNDERSTANDING

- A tree is a perennial plant (lives more than one growing season) with a well-defined woody stem, crown, and roots.

ESSENTIAL QUESTION

- What tree characteristics can be used to differentiate one species from another?

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

- Introduction 10 minutes
- Activity 1 20 minutes
- Activity 2 40 minutes
- Conclusion 15 minutes

STANDARDS CONNECTIONS

Standards for this lesson can be viewed online at the LEAF website (www.leafprogram.org).

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.

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 nonnative 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 online tree key to help you learn about other common trees in Wisconsin (www.leafprogram.org).

MATERIALS LIST

For Each Student

- Copy of Student Pages  **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



For Every 2 to 3 Students

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

For the Teacher

- Tree and plant identification books (optional)
- String and scissors (optional)
- Whistle (optional)

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.leafprogram.org. Laminate for durability (optional) **NOTE:** A sample is found on page 199 for reference.
- Marker board

TEACHER PREPARATION

- 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 188).

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?

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 the first question. Based on the categorization of “this” or “that,” jump to the number given to the right of your response as the next step to narrow into identification.
 - 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 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 Pages  **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 a 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.



Teacher 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 marker board, unless you have a portable option.

1. Divide the class 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 whether a correct answer was given.
- 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:

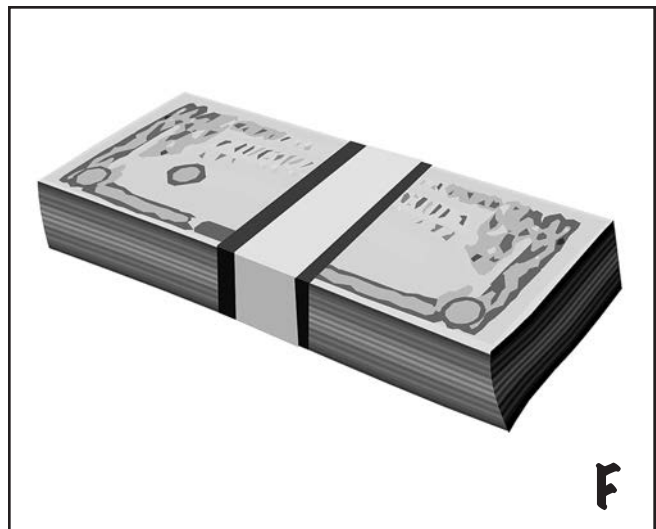
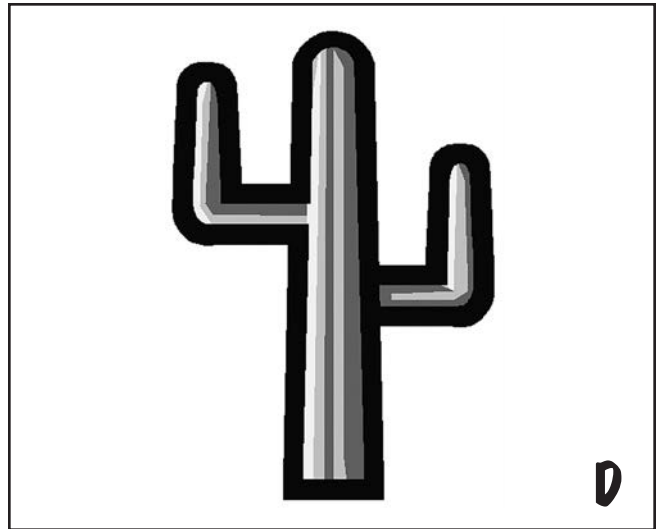
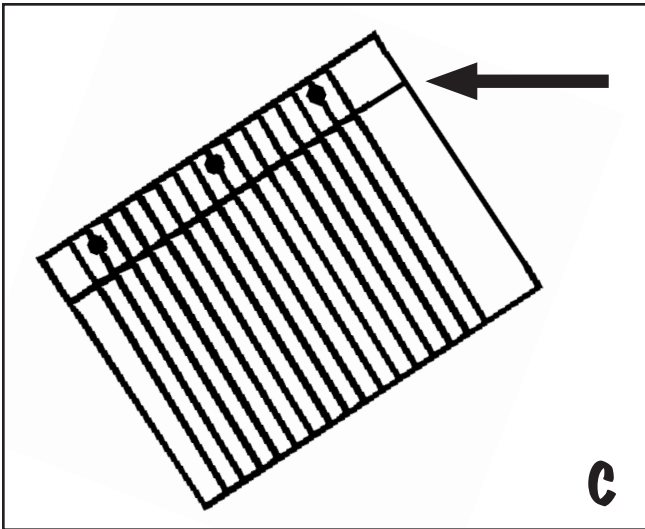
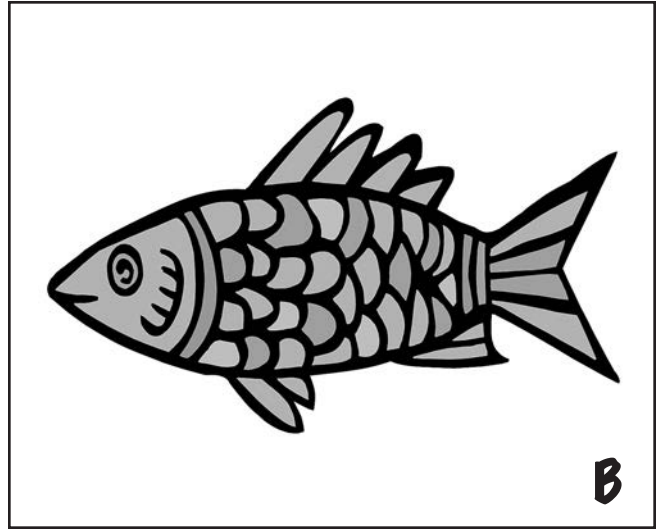
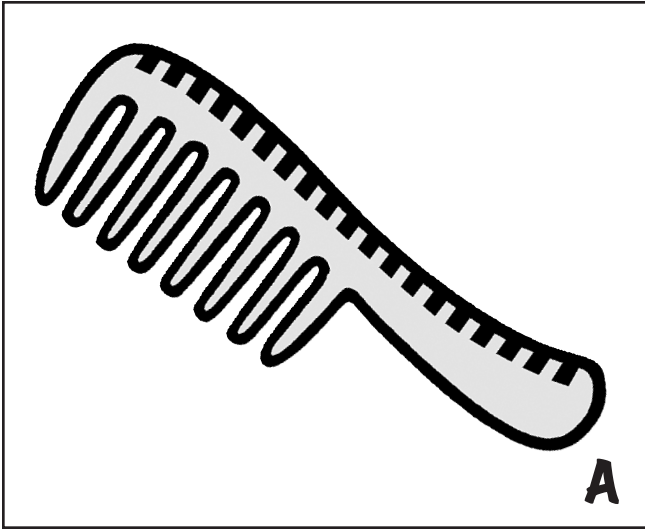
Kinds of Branching	Leaf Me Alone	Hodgepodge	Key Features
5 Points	5 Points	5 Points	5 Points
10 Points	10 Points	10 Points	10 Points
15 Points	15 Points	15 Points	15 Points
20 Points	20 Points	20 Points	20 Points

JEOPARDY GAME

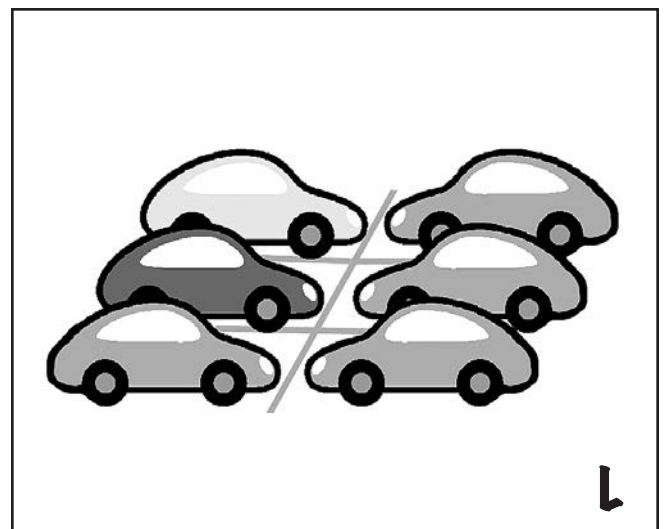
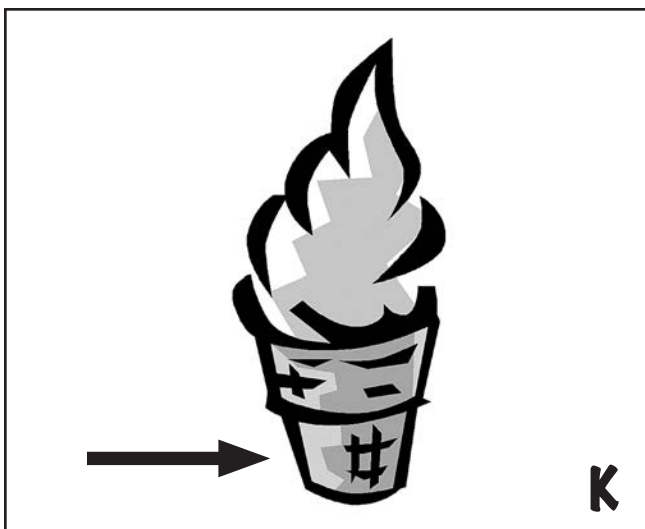
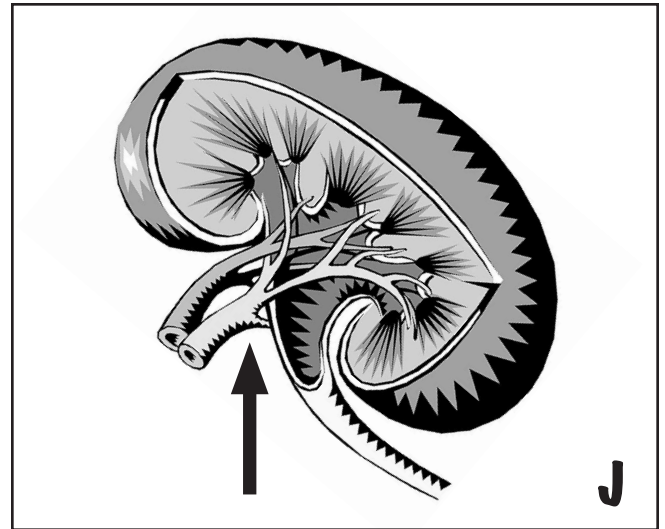
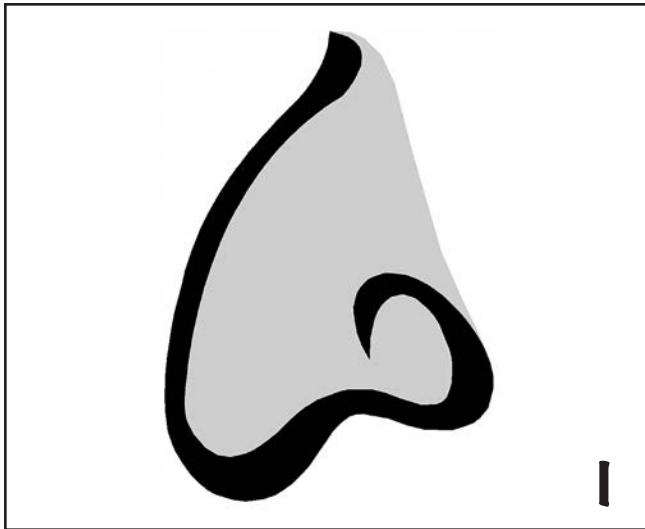
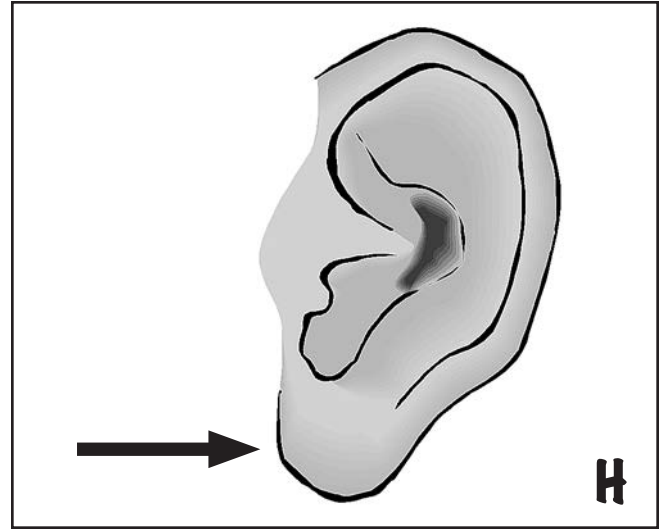
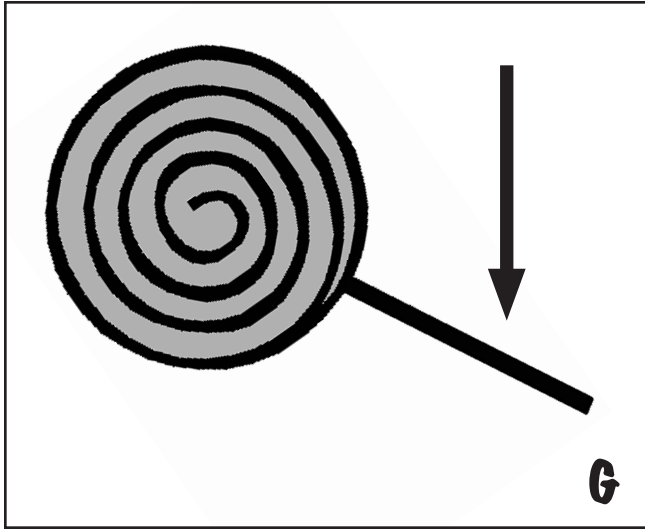
You read the **ANSWER**, and the students must give the **QUESTION**.

Kinds of Branching	Leaf Me Alone	Hodgepodge	Key Features
ANSWER When leaves grow directly across from one another. QUESTION <i>What is opposite?</i>	ANSWER The kind of leaf conifers have. QUESTION <i>What are needles?</i>	ANSWER Type of key used to identify trees. QUESTION <i>What is a dichotomous key?</i>	ANSWER Conifers with needles in bundles of two or five. QUESTION <i>What are pines?</i>
ANSWER Sugar maple trees have this kind of branching. QUESTION <i>What is opposite?</i>	ANSWER Entire or toothed, lobed. QUESTION <i>What are leaf margins?</i>	ANSWER The kind of trees that have cones. QUESTION <i>What are conifers?</i>	ANSWER A kind of tree that may have pointed or rounded lobes. QUESTION <i>What is oak?</i>
ANSWER Leaves or branches that do not grow directly across from one another. QUESTION <i>What is alternate?</i>	ANSWER The space between lobes. QUESTION <i>What is a sinus?</i>	ANSWER The mark left behind when a leaf falls. QUESTION <i>What is a leaf scar?</i>	ANSWER A kind of tree with a papery bark. QUESTION <i>What is birch?</i>
ANSWER Oaks have this kind of branching. QUESTION <i>What is alternate?</i>	ANSWER The kind of leaf ash, hickory, and locust trees have. QUESTION <i>What are compound leaves?</i>	ANSWER These can be flat, round, or square. QUESTION <i>What is a petiole?</i>	ANSWER A kind of tree with opposite branching and simple leaves. QUESTION <i>What is maple?</i>

TREE ID VOCABULARY CARDS



TREE ID VOCABULARY CARDS



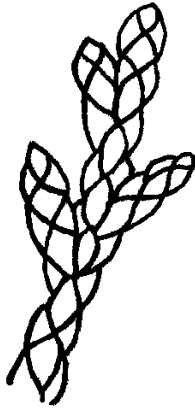
DICHOTOMOUS KEY TO IDENTIFY STUDENTS

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

Student Page

TREE IDENTIFICATION TERMS

CONIFER: A tree that bears cones and has needles.



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

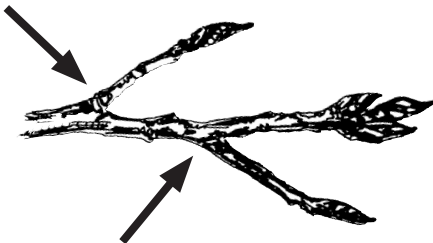


BUNDLE: Group of conifer needles held together at the base by a small papery wrap called a fascicle.

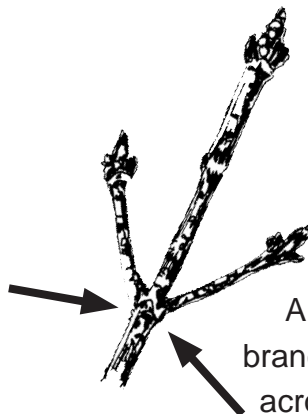


BROADLEAF: A tree that has broad leaves rather than needles.

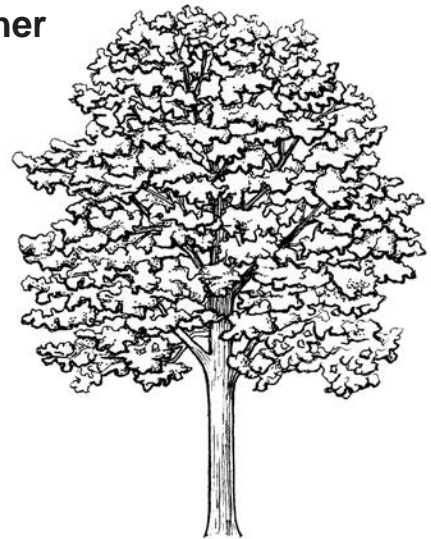
NOTE: We use “broadleaf” instead of “deciduous.” A deciduous tree loses all its leaves for part of the year. A tamarack is a conifer (has cones and needles) that loses its needles in the fall (is deciduous).



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



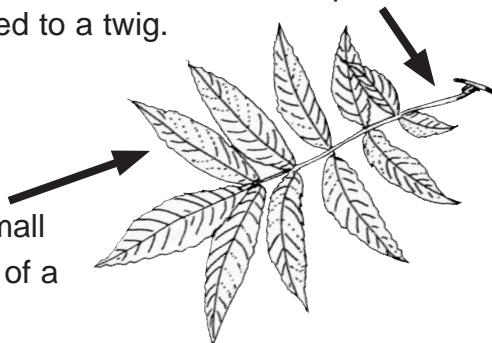
OPPOSITE BRANCHING: A branching pattern where side branches and leaves grow directly across the stem from each other.



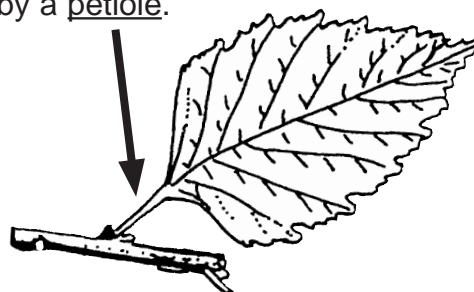
TREE IDENTIFICATION TERMS

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

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



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



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

LEAF MARGIN: The outer edge of a leaf.

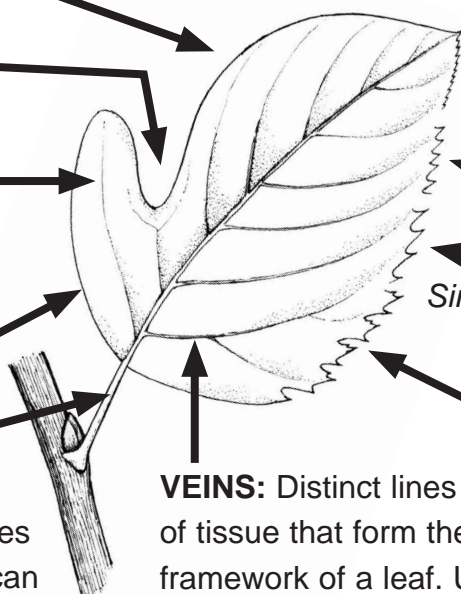
TOOTHED: A type of leaf margin that has small points along it (teeth).

SINUS: The space between lobes on a leaf.

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

LEAF BASE: The lower edge of a leaf.

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.

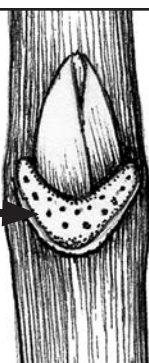
Fine-toothed means that the teeth are small.

Course-toothed means that the teeth are large.

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

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

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 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 ID DATA SHEET

TREE IDENTIFICATION KEY - CONIFER

BEGIN HERE:

Tree has needles.....GO TO CONIFER KEY (✎ 4A)
Tree has broad leaves..... GO TO BROADLEAF KEY (✎ 4B-C)

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 $\frac{1}{3}$ to $\frac{3}{4}$ inch long, twigs hairless.....**white spruce (*Picea glauca*)**
- b. Needles $\frac{1}{3}$ to $\frac{3}{4}$ inch long, twigs have
hair, grows in wet areas **black spruce (*Picea mariana*)**

6. Needles $\frac{1}{2}$ inch long with short petiole **eastern hemlock (*Tsuga canadensis*)**
6. Needles $\frac{3}{4}$ inch to $1\frac{1}{4}$ inches long, no petiole,
bubbles in bark..... **balsam fir (*Abies balsamea*)**

* NOTE: A tamarack is a deciduous conifer.

TREE IDENTIFICATION KEY - BROADLEAF

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 **boxelder (*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 $\frac{3}{4}$ 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

- 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 $\frac{1}{16}$ inch..... **trembling aspen (*Populus tremuloides*)**
- b. Leaves have large teeth.....**bigtooth 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 of a tree identification card found online at the LEAF website: www.leafprogram.org. On the left tab system, follow Curriculum & Resources > Leaf Tree Identification Tools. Cards are available for download and/or printing in full color for the most common Wisconsin trees.

