



FIELD ENHANCEMENT 1

Tree Identification

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

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*.

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.

BACKGROUND INFORMATION



Tree identification is a useful skill for people of any age and background. Imagine you are trying to research your family history. You need to know a family name to begin identifying your family members. In the same manner, you need to know the names of trees in order to learn about them. All trees have different requirements. 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. These requirements include environmental factors like the amount of sunlight or shade tolerated, temperature requirements, and water and nutrient levels needed for growth. The requirements can also include such things as space or salt tolerance in the soil. Trees may be affected by pests or disease. Certain pests and diseases only affect certain species of trees. Knowing what kind of tree is being affected might help to determine what the pest or disease is. 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.

(Continued on page 184.)



MATERIALS LIST




FOR EACH STUDENT

- Copy of Student Page  **2**, *Tree Identification Terms*
- Copy of Student Pages  **5A-C**, *Tree Identification Key*
- Clipboard/notebook to use as a writing surface

FOR EVERY 2 TO 3 STUDENTS

- Copy of Student Page  **4**, *Tree ID Data Sheet*


FOR THE CLASS



- Student Page  **1**, *Dichotomous Key to Identify Students* (as an overhead or one per student)
- Examples of dichotomous keys (choose your own adventure books, basketball tournament diagram) (optional)
- Set of Student Pages  **3A-B**, *Tree ID Vocabulary Cards*
- Paper shopping bag and grab bag items: comb, piece of lined paper, newspaper (in place of money), lollipop, glove, etc. (optional)
- Samples of leaves, branches, etc. that represent the vocabulary terms on the *Tree ID Vocabulary Cards* (optional)
- Student Pages  **6A-B**, *Tree Identification Cards*. Laminate for durability (optional)
- Chalk/marker board

FOR THE TEACHER

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

TEACHER PREPARATION

- Determine if you will do the introduction inside or outside. If inside, make an overhead of Student Page  **1**, *Dichotomous Key to Identify Students*. If outside, make a copy for each student.
- Familiarize yourself with how to use a dichotomous key.

- Copy and cut out a set of Student Pages  **3A-B**, *Tree ID Vocabulary Cards*. As an option you can replace some of the cards with grab bag items. If possible, gather actual leaves and branches that represent the vocabulary terms.
- 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 uncommon trees along the trail that students may have questions about.
- Choose an example tree to identify.
- Print and laminate a set of Student Pages  **6A-B**, *Tree Identification Cards*. Four sample cards are printed in this lesson for reference. A full set of cards in color is available on the LEAF website at www.uwsp.edu/cnr/leaf. Cards are good reference when leaves, fruit, or seeds are not present or are too high on the tree to be examined. Identify common native Wisconsin trees in your outdoor teaching area. Place cards on some or all of the trees to be identified.
- 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 marked?
- 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

BRANCHING

Alternate Branching: A branching pattern where branches, leaves, and leaf scars do not grow directly across from each other.

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

CONIFERS

Bundles: Groups of needles held together at the base by a small papery wrap called a fascicle.

Coniferous: A tree that bears cones and has needles. Also called evergreen.

Evergreen: A tree that bears cones and has needles. Also called coniferous.

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

DECIDUOUS

Broad-leafed: A tree that sheds all its leaves annually. They have leaves as opposed to needles. These trees are also called deciduous.

Compound Leaf: A type of leaf that has one stem and many smaller leaflets. A leaf begins where the petiole attaches to the twig.

Deciduous: A tree that sheds all its leaves annually. These trees are sometimes called broad-leafed.

Leaflets: Smaller parts of compound leaves that often resemble leaves themselves. They join together along the petiole. The petiole attaches to the twig.

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

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

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

LEAF MARGINS

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

Lobed: A type of leaf edge that has large rounded parts. The spaces between the lobes are called sinuses.

Margin: The outer edge of the leaf.

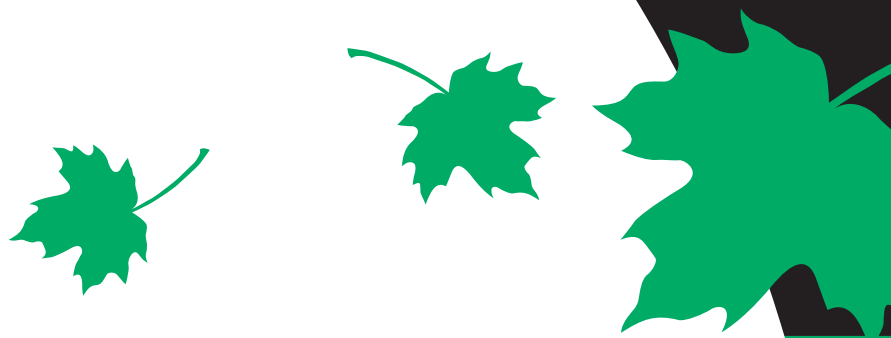
Sinuses: The spaces in between lobes on a leaf.

Toothed: A type of leaf edge that has small points or bumps along it (teeth). Single-toothed means that all the teeth are about the same size. Double-toothed means that on each tooth there is a smaller tooth.

(Continued from page 182.)

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 would we ever identify a tree in our yard with a book like that? 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 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




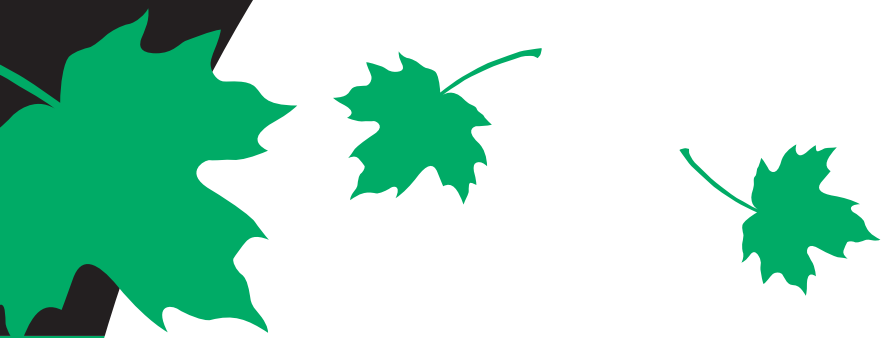
tree list. Select the ones that you do have for your lesson purposes. LEAF has an on-line tree key to help you learn about other common trees in Wisconsin. (www.uwsp.edu/cnr/leaf)

To identify a tree, you can use a field guide and compare the picture to the real thing. A more precise method is to use a dichotomous key. A dichotomous key contains a series of choices that lead the user to the correct name of an item. For trees, the key works by comparing and contrasting important characteristics of that tree. 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. A dichotomous key can be more accurate than visual estimation. Dichotomous keys can also be used to identify other things such as wildlife and plants.

PROCEDURE INTRODUCTION

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* (use as an overhead 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 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

1. Divide your students into groups of two or three. Hand out Student Page **2**, *Tree Identification Terms* to each student and have group members take turns reading the words and definitions aloud.
2. Bring out Student Pages **3A-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: Sinuses
B: Scaly	F: Bundle	J: Vein
C: Margin	G: Stem	K: Coniferous
D: Alternate	H: Lobed	L: Compound

ACTIVITY 2

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 **4**, *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 coniferous or deciduous, 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 **5A-C**, *Tree Identification Key* to each student. Point out that there are two keys, one for deciduous trees and one for coniferous trees. Make sure students also have Student Page **2**, *Tree Identification Terms* with them.
3. Use the key to identify one tree as an example for the group.
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.



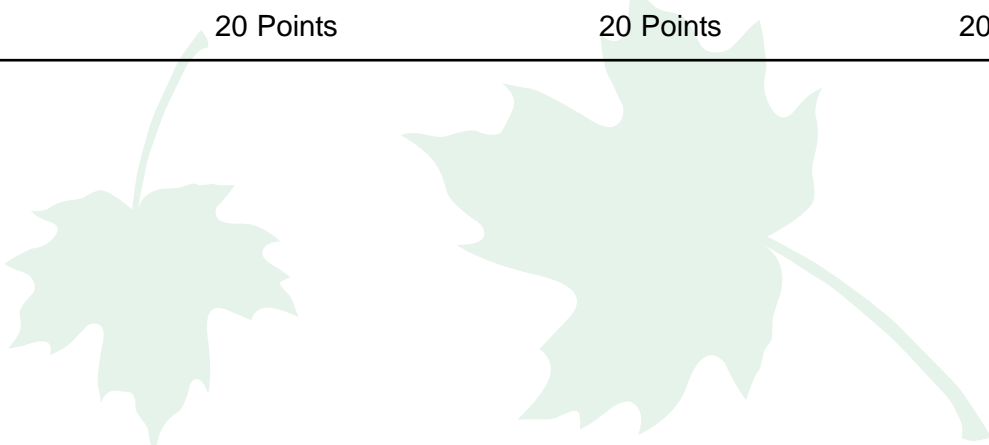
CONCLUSION

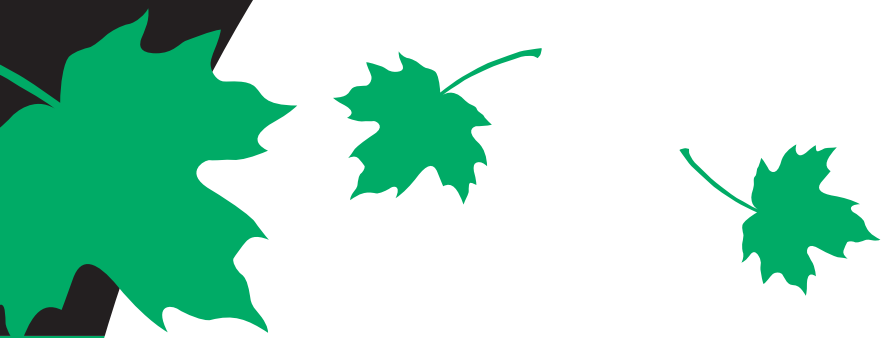
This activity works best in a classroom with a chalk/marker board, unless you have a portable option.

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, 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 Another name for a deciduous tree.</p> <p>QUESTION <i>Broad-leafed</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 Forestry – Bridging the Gap Between Environment and Economy. Central Wisconsin Environmental Station.

Tree Identification. [Lesson Plan]. Eagle River, WI: Trees For Tomorrow.

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

RECOMMENDED RESOURCES

●●● WEBSITES ●●●

Dragonfly Web Pages

www.units.muohio.edu/dragonfly/index.html

Choose the link for trees and seeds. Read about tree shapes and play a game to design your own tree for three different environments.

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/

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

www.dnr.state.wi.us/org/land/forestry/treedid/index.htm

Click on the Tree ID link for beginner and advanced tree and shrub identification keys.

Wisconsin Department of Natural Resources - Division of Forestry

www.dnr.state.wi.us/org/land/forestry/Look/highlights1996.htm

Read the highlights of Wisconsin's 1996 forest inventory to get statistics on specific types of forests and trees in the state.

●●● 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.

DICHOTOMOUS KEY TO IDENTIFY STUDENTS

- | | |
|------------------------------------|------------------------------------|
| 1. Female2 | 17. Brown hair18 |
| Male.....17 | Not brown hair21 |
| 2. Brown hair3 | 18. Brown eyes.....19 |
| Not brown hair6 | Not brown eyes24 |
| 3. Brown eyes.....4 | 19. Earlobes attached20 |
| Not brown eyes9 | Earlobes unattached26 |
| 4. Earlobes attached5 | 20. Frecklesstudent is _____ |
| Earlobes unattached.....11 | No frecklesstudent is _____ |
| 5. Frecklesstudent is _____ | 21. Brown eyes.....22 |
| No frecklesstudent is _____ | Not brown eyes27 |
| 6. Brown eyes.....7 | 22. Earlobes attached23 |
| Not brown eyes12 | Earlobes unattached29 |
| 7. Earlobes attached8 | 23. Frecklesstudent is _____ |
| Earlobes unattached14 | No frecklesstudent is _____ |
| 8. Frecklesstudent is _____ | 24. Earlobes attached25 |
| No frecklesstudent is _____ | Earlobes unattached30 |
| 9. Earlobes attached10 | 25. Frecklesstudent is _____ |
| Earlobes unattached15 | No frecklesstudent is _____ |
| 10. Frecklesstudent is _____ | 26. Frecklesstudent is _____ |
| No frecklesstudent is _____ | No frecklesstudent is _____ |
| 11. Frecklesstudent is _____ | 27. Earlobes attached28 |
| No frecklesstudent is _____ | Earlobes unattached31 |
| 12. Earlobes attached13 | 28. Frecklesstudent is _____ |
| Earlobes unattached16 | No frecklesstudent is _____ |
| 13. Frecklesstudent is _____ | 29. Frecklesstudent is _____ |
| No frecklesstudent is _____ | No frecklesstudent is _____ |
| 14. Frecklesstudent is _____ | 30. Frecklesstudent is _____ |
| No frecklesstudent is _____ | No frecklesstudent is _____ |
| 15. Frecklesstudent is _____ | 31. Frecklesstudent is _____ |
| No frecklesstudent is _____ | No frecklesstudent is _____ |
| 16. Frecklesstudent is _____ | |
| No frecklesstudent is _____ | |

TREE IDENTIFICATION TERMS

BRANCHING

ALTERNATE BRANCHING:

A branching pattern where side branches, leaves, and leaf scars do not grow directly across from each other.



OPPOSITE BRANCHING:

A branching pattern where side branches, leaves, and leaf scars grow directly across from each other.



CONIFERS

BUNDLES: Groups of needles held together at the base by a small papery wrap called a fascicle.



CONIFEROUS: A tree that bears cones and has needles. Also called evergreens.

EVERGREEN: A tree that bears cones and has needles. Also called coniferous.

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

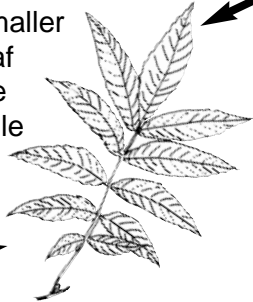


DECIDUOUS

BROAD-LEAFED: A tree that sheds all of its leaves annually. They have leaves as opposed to needles. These trees are also called deciduous.

DECIDUOUS: A tree that sheds all of its leaves annually. These trees are also called broad-leafed.

COMPOUND LEAF: A type of leaf that has one stem and many smaller leaflets. A leaf begins where the leaf petiole attaches to the twig.



LEAFLETS: Smaller parts of leaves that often resemble leaves themselves. They join together along the petiole. The leaf petiole attaches to the twig.

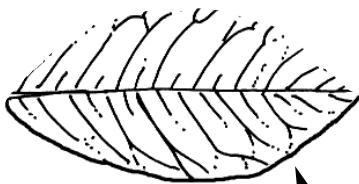
PETIOLE: The stalk that supports a leaf and attaches the leaf to the twig. They can be round, flat, or square.



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

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

LEAF MARGINS



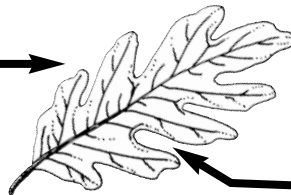
ENTIRE: A type of leaf edge that is smooth and has no wavy or rough edges.

TOOTHED: A type of leaf edge that has small points or bumps along it (teeth). Single-toothed means that all the teeth are about the same size. Double-toothed means that on each tooth there is a smaller tooth.



LOBED: A type of leaf edge that has large rounded parts.

SINUSES: The spaces in between lobes on a leaf.



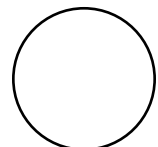
PETIOLE AND NEEDLE SHAPE CROSS-SECTIONS



FLAT

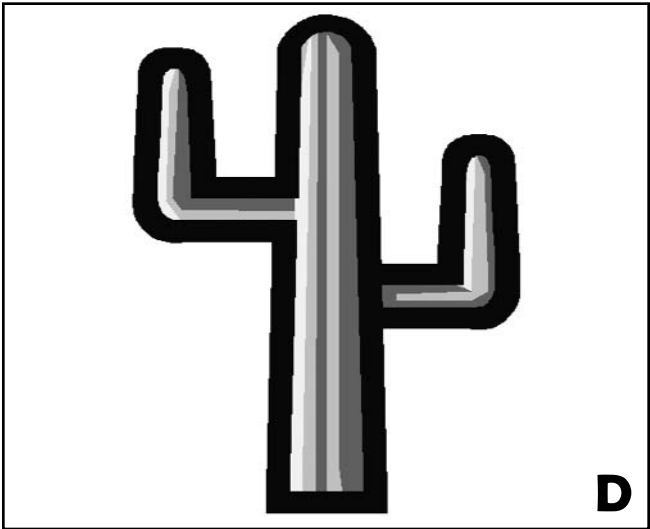
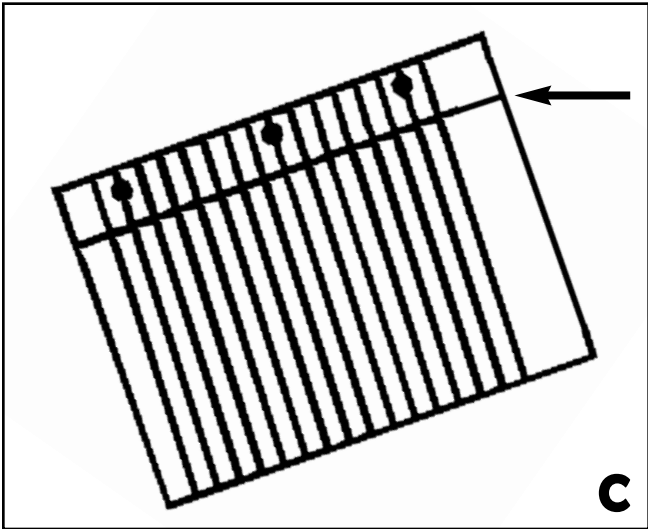
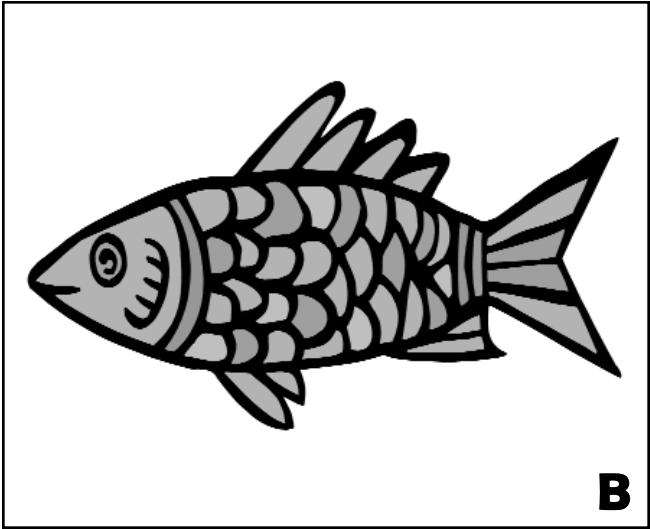
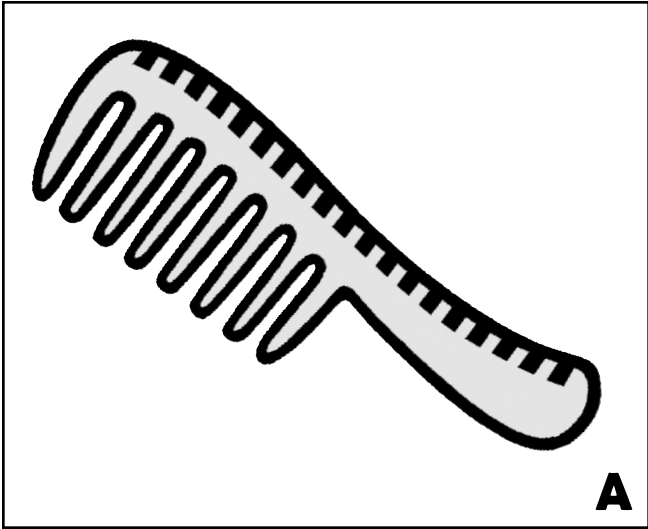


SQUARE

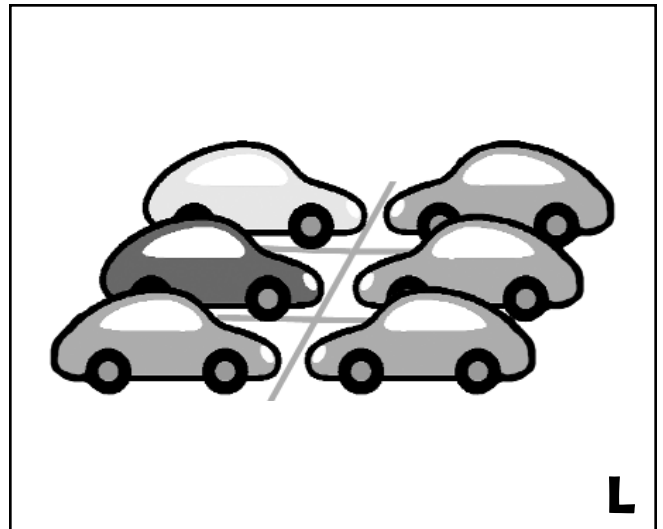
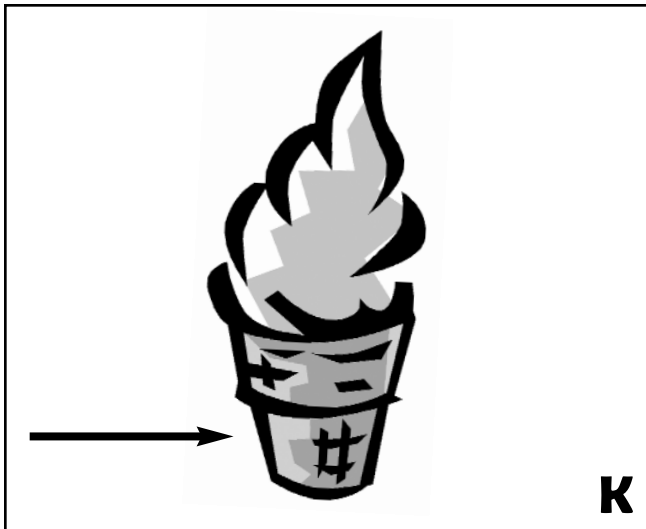
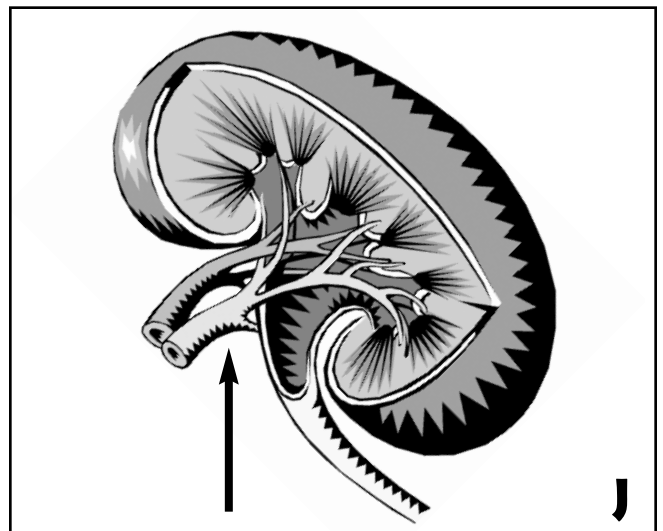
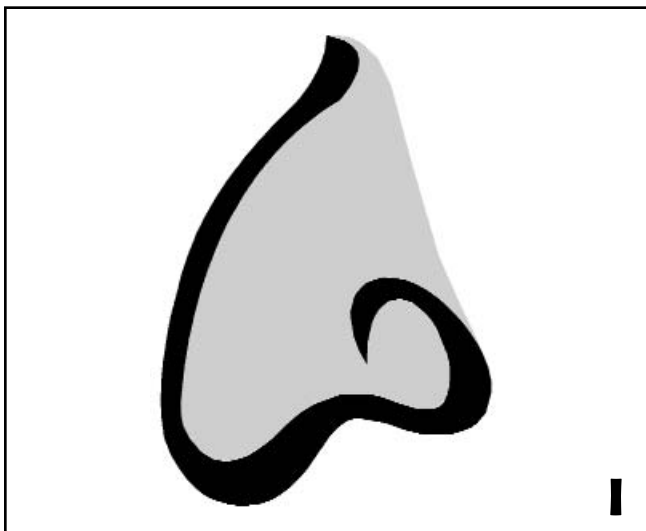
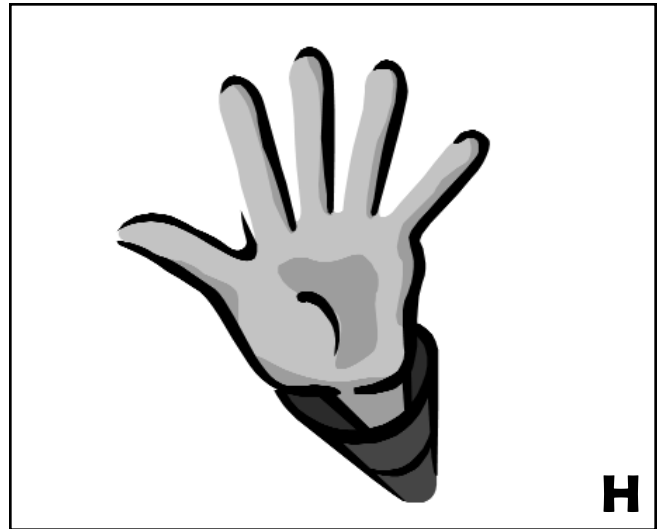
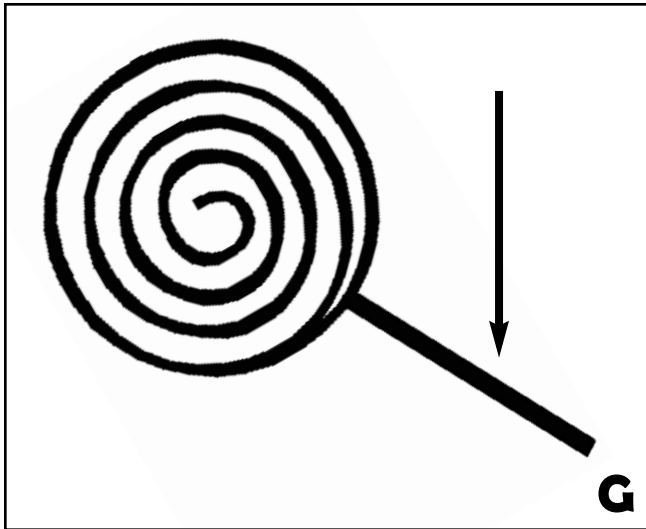


ROUND

TREE ID VOCABULARY CARDS



TREE ID VOCABULARY CARDS



TREE ID DATA SHEET

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
	Coniferous	Deciduous	Opposite	Alternate				
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

TREE IDENTIFICATION KEY

BEGIN HERE:

Tree has needles useuse **CONIFEROUS TREE KEY**
 Tree has broad leavesuse **DECIDUOUS TREE KEY**

CONIFEROUS TREE 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

DECIDUOUS TREE KEY

- 1. Opposite branching (2)
- 1. Alternate branching (4)
 - 2. Compound leaves (3)
 - 2. Simple leaves: Maple species (see a-c below)
 - a. Leaf margins smooth, 5 lobes**Sugar Maple (*Acer saccharum*)**
 - b. Leaf margins double-toothed, 3 to 5 lobes.....**Red Maple (*Acer rubrum*)**
 - c. Leaf margins 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. 9 to 11 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 pseudonacacia*)**
 - 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, sinues extend halfway to mid-vein, leaves hairless, dull green**Red Oak (*Quercus rubra*)**
 - e. Pointed lobes, deep sinues extend 3/4 of the way to mid-vein, leaves hairless, bright green and shiny**Northern Pin Oak (*Quercus ellipsoidalis*)**
 - f. Pointed lobes, deep sinues, young leaves hairy underneath, dark green and shiny, leathery**Black Oak (*Quercus velutina*)**

TREE IDENTIFICATION KEY

DECIDUOUS TREE KEY

9. Bark not papery (10)

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

- a. Leaves single-toothed, white peeling bark**White Birch (*Betula papyrifera*)**
- b. Leaves double-toothed, dull green leaves, yellow or bronzed bark**Yellow Birch (*Betula alleghaniensis*)**
- c. Leaves 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. Leaves finely toothed**Balsam Poplar (*Populus balsamifera*)**

13. Leaves 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*)**

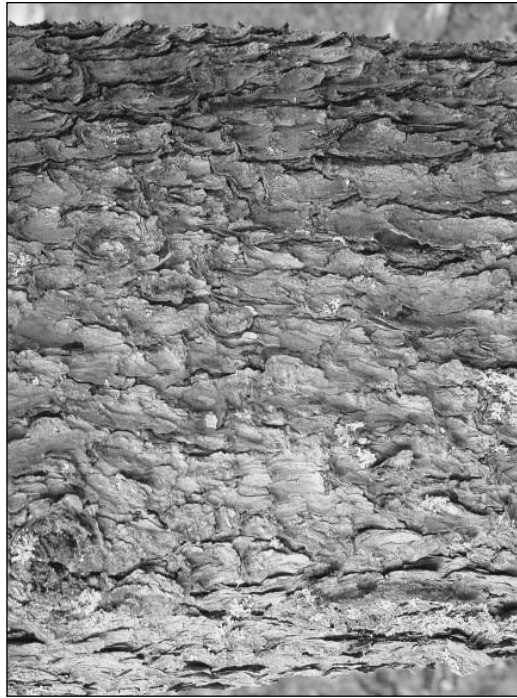
16. Sharp pointed teeth, leaves 2 to 4 inches long and hairy.....**Hackberry (*Celtis occidentalis*)**

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

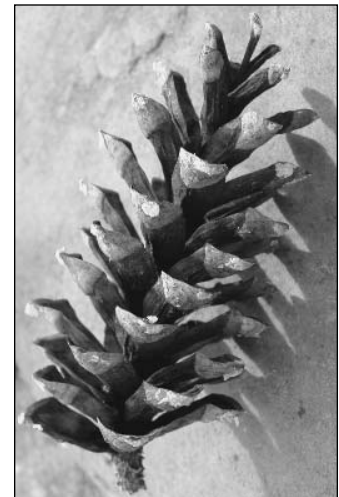
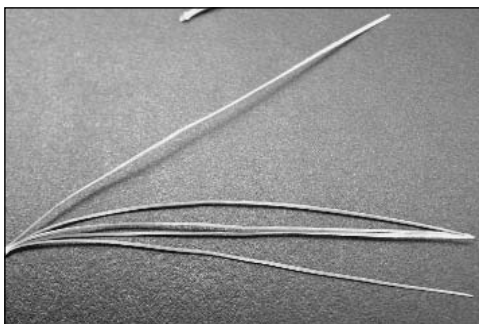
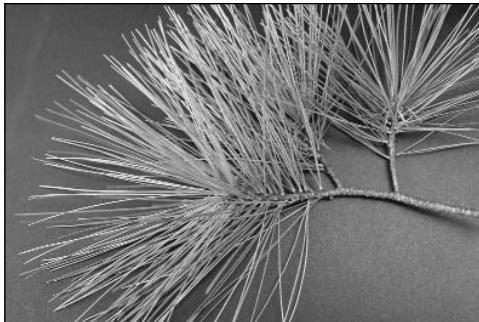
17. Leaf dull and rough (18)

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)**

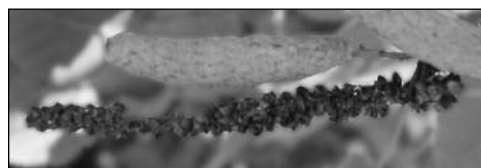
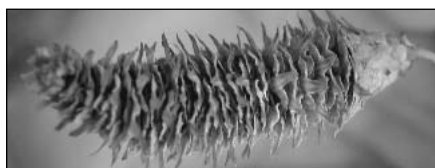
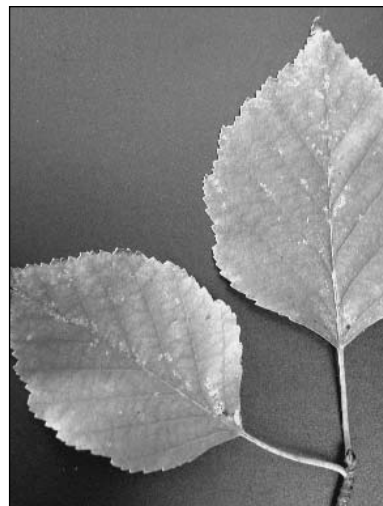
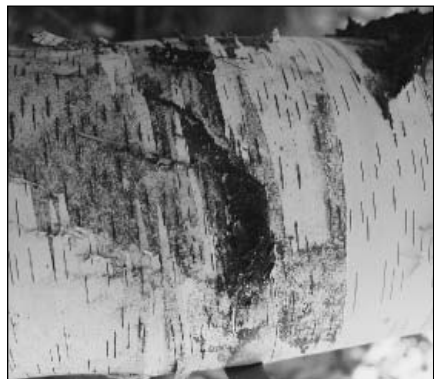


A



B

C



D

