

Unit B: Tree Growth and Development

Lesson 1: Examining the Structures of a Tree

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Identify the major parts of a tree.
2. Explain the functions of the various parts of a tree.

Recommended Teaching Time: 1.5 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has also been developed with use of this lesson plan
- http://forestry.about.com/od/treephysiology/ss/part_of_tree.htm
- http://www.forestry.ky.gov/NR/rdonlyres/04752270-B0E6-4A2F-8142-76329A2FD5DB/0/parts_of_tree_factsheet.pdf

List of Equipment, Tools, Supplies, and Facilities

Writing surface
PowerPoint Projector
PowerPoint slides
Transparency Masters
Worksheet for students
Tree samples

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide #2):

- Cambium
- Cork cambium
- Crown
- Fibrous root system
- Heartwood
- Inner bark
- Outer bark
- Phloem
- Roots
- Sapwood
- Tap root system
- Tree
- Trunk
- Xylem

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask students to name the important roles that trees play in human everyday life. Make listing of student answers on the board. Then ask students how the trees are able to perform all of these functions. Discuss how it involves many steps and process to accomplish these roles. Lead discussion to objectives of lesson in how each of the parts of the tree has a certain role to play.

Summary of Content and Teaching Strategies

****Objectives 1 and 2 are combined in this lesson to make it more logical in order when teaching.**

Objective 1: Identify the major parts of a tree.

Objective 2: Explain the functions of the various parts of a tree.
(PowerPoint Slide #3)

I. A **tree** is a woody plant having one well-defined stem and a formed crown. There are three major parts to a tree. They are the roots, the trunk, and the crown.

(PowerPoint Slide #4)

A. The **roots** are the part of the tree typically found below the soil surface. The root system serves to anchor and support the tree. Roots take water and nutrients from the soil for plant growth.

(PowerPoint Slide #5)

Roots also act as a storehouse for manufactured food for the plant. There are two basic types of tree roots. They are tap and fibrous.

1. A **tap root system** has one large root with a number of small roots.

2. A **fibrous root system** has many roots that spread and branch in the soil.

(PowerPoint Slide #6 shows an example of roots)

(PowerPoint Slide #7)

B. The **trunk** of the tree serves to conduct nutrients and water from the roots to the manufacturing portion of the tree, represented by the crown.

(PowerPoint Slide #8)

The trunk also produces the bulk of the useful wood in a tree. The trunk is comprised of a series of rings. Under normal conditions, one ring is produced each year.

(PowerPoint Slide #9)

Each section of the ring has a specific purpose in the life of the tree.

1. In large trees, the center portion of the trunk is darker-colored and is known as **heartwood**. Here the cells have ceased to function.

(PowerPoint Slide #10)

In other words, the wood in this portion of the tree is dead. The heartwood provides strength to the tree and keeps it upright.

(PowerPoint Slide #11)

2. Outward from the heartwood is the lighter colored wood known as **sapwood**, or **xylem**. This is the living portion of the tree. It is the means by which raw nutrients and water are carried from the roots to the crown. The sapwood also serves as the storage area for some of the food made in the leaves.

(PowerPoint Slide #12)

3. Outside the sapwood is the **cambium**. This active layer of cells is responsible for the growth of the tree. Each year the cambium forms a new annual ring. This is how trees grow in diameter.

(PowerPoint Slide #13)

4. Immediately outward from the cambium are the living cells called the **inner bark** or the **phloem**. The tissue carries food made in the leaves down to the branches, trunk, and roots. The phloem is protected by dead, nonfunctioning **outer bark**.

(PowerPoint Slide #14)

5. The bark, which protects the trunk of the tree, is formed by the **cork cambium**, a thin layer of cells between the phloem and the bark itself.

(PowerPoint Slide #15 shows a cross section of the trunk)

(PowerPoint Slide #16)

- C. The **crown** or the top part of the tree that includes branches, twigs, buds, and leaves. A major role of the crown is to hold leaves to collect sunlight so photosynthesis can occur. It is also in this section of the tree that seeds, fruits, nuts, and berries are produced. The crown can also serve as a nesting site for wildlife such as squirrels and birds.

****Use TM: B1-1 and TM: B1-2 or PowerPoint #17 to aid in the discussion on this topic. After you feel like the students have a good understanding of these objectives use PowerPoint Slide #18 as a review. Point to a tree part and have a student tell you what part you are talking about. Then call on another student to tell you the function of that part. Do this until you have covered all parts and functions. You could also have students complete WS: B1-1 as a review of the different parts of a tree.**

Review/Summary: Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. The question on PowerPoint Slide #19 can also be used.

Application: Students will be able to identify parts and their functions on trees in their area.

Evaluation: Use the following sample test to evaluate the students' comprehension of the material covered in this lesson.

Answers to Sample Test:

Part One: Matching

1. a
2. e
3. f
4. d
5. g
6. b
7. c

Part Two: Completion

1. one
2. tap
3. photosynthesis
4. fibrous

Part Three: Short Answer

Roots, trunk, and crown.

Sample Test

Name _____

Test

Unit B Lesson 1: Examining the Structures of a Tree

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | | |
|-----------------|--------------|------------|
| a. Phloem | d. Heartwood | g. Cambium |
| b. Roots | e. Crown | |
| c. Cork cambium | f. Xylem | |

- _____ 1. The tissue carries food made in the leaves down to the branches, trunk, and roots.
- _____ 2. The top part of the tree that includes branches, twigs, buds, and leaves.
- _____ 3. It is the means by which raw nutrients and water are carried from the roots to the crown.
- _____ 4. Provides strength to the tree and keeps it upright.
- _____ 5. Active layer of cells is responsible for the growth of the tree
- _____ 6. Serves to anchor and support the tree and to take water and nutrients from the soil for plant growth.
- _____ 7. A thin layer of cells between the phloem and the bark itself.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

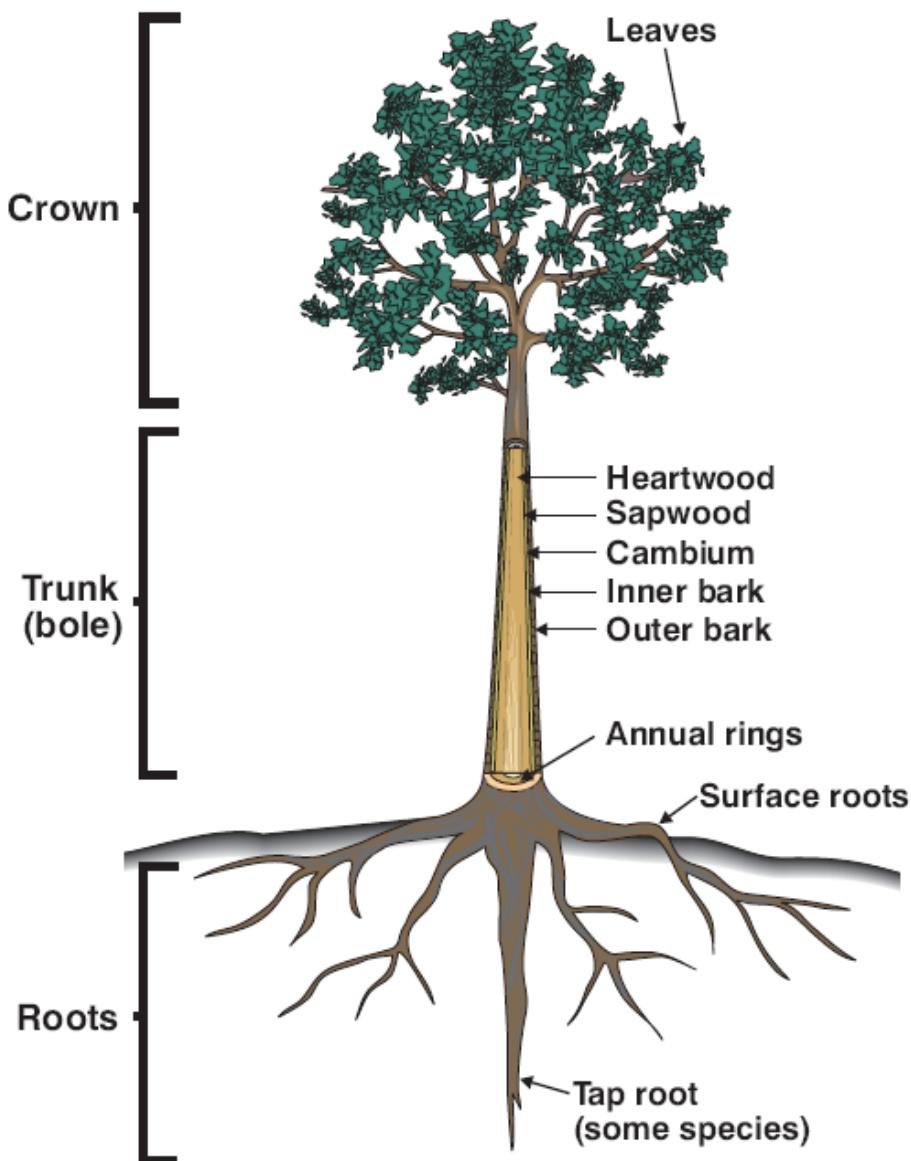
1. Under normal conditions, _____ ring(s) is produced each year in the trunk of a tree.
2. A _____ root system has one large root with a number of small roots.
3. A major role of the crown is to hold leaves to collect sunlight so _____ can occur.
4. A _____ root system has many roots that spread and branch in the soil.

Part Three: Short Answer

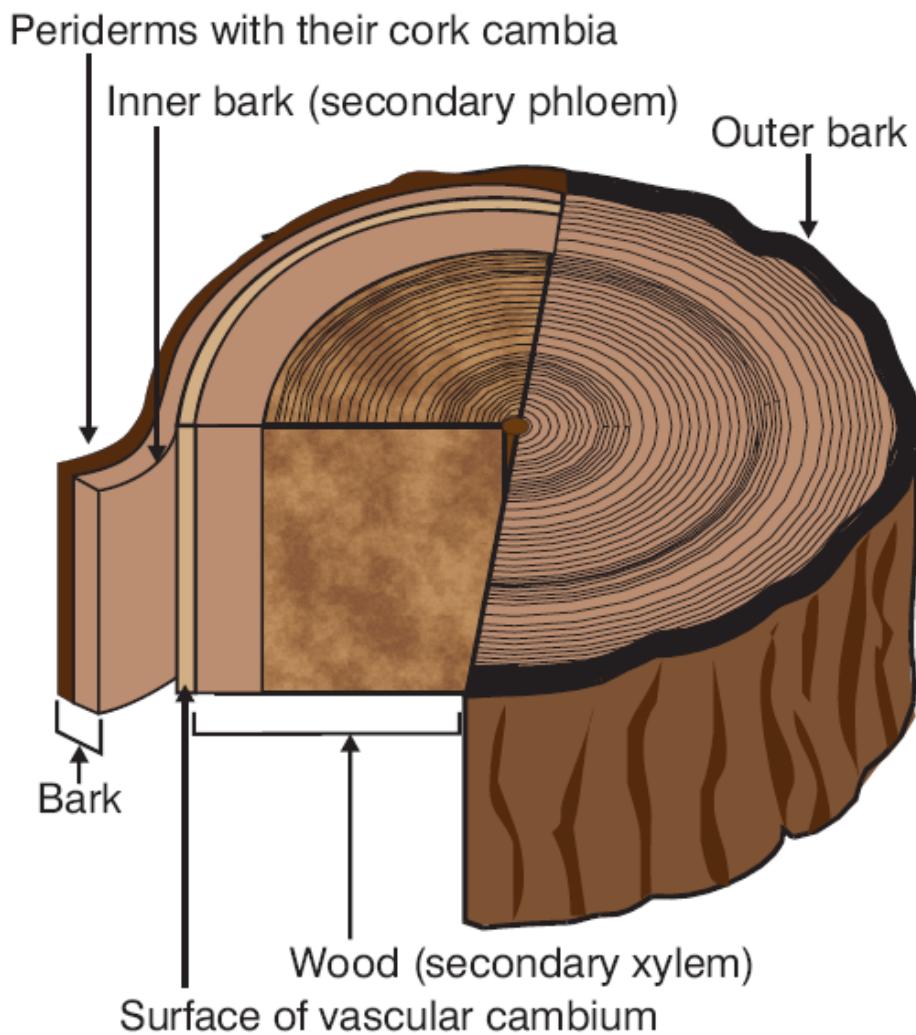
Instructions. Provide information to answer the following question.

Name the three major parts of a tree.

PARTS OF A TREE



WOOD STEM SECTION



WS: B 1-1

PARTS OF A TREE

