

**CBL BIOLOGY: LIFE SCIENCE OPTION**  
**BSCS Green Version 10th edition**  
**Biology An Ecological Approach**  
**Lesson Plan Quarter 3, Week 9, Day 1**



## Outcomes for Today

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Standards Focus: 1abfh

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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This chapter is a major shift in focus, but not in the recently studied conceptual ideas of living things. We have now moved from the world of animals to the study of plants. Ask students to think about the differences between plants and animals. What makes a plant a plant and not an animal? This might be a good time to create a large classroom Venn diagram indicating (with words, phrases and pictures) the similarities and differences between plants and animals. You could refer to this chart throughout the lessons over the next five days.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**transpiration      petiole      succulent      guard cells      photosynthesis**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

This would be a good time to review the characteristics of all living things. Here are six characteristics of living things: growth, cells, movement, respiration, complex chemical reactions, and reproduction.

#### 4. Read directions for investigation/activity.

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#### 5. Read text. Ch 18, The Flowering Plant: Form and Function, Text Introduction, Section 18.1-18.3, pp. 512-516

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
a typical leaf	petiole blade guard cells	514  515

### RESPOND

#### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

The main function of a leaf is to produce food.

Photosynthesis occurs primarily in the leaves.

The structure of a leaf is pretty complicated when you go inside and look at all the cells.

There are little holes or openings in each leaf which allow oxygen and carbon dioxide to move into and out of the leaf.

Transpiration is the process in which water evaporates through plants.

Leaves also regulate the loss of water from plants.

Wilted plants have less turgor pressure.

Some leaves have other functions, like spines for protection on a cactus. These spines are actually modified leaves.

#### 7. Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

### EXPLORE

#### 8. Explore today's investigation with inquiry activities.

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#### 9. Explore today's simulation with inquiry activities.

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## 10. Collect data and post.

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### One possible activity:

#### How Are Leaves Alike and Different?

**Materials Required:** A variety of fallen leaves collected from home or school, ruler, colored paper, poster paint, brush

**Activity Time:** 1-2 class periods

**Concepts Covered:** Variation and structure

#### Introduction

Leaves may vary because of inheritance, or because of the environment in which they live. For example, the leaves of a particular species may be large if its environment richly supplies the things needed by the plant.

**Objective:** To compare different types of leaves.

#### Procedure

Take students (if possible) on a short walk around the school. Instruct them to collect different kinds of leaves. Note: If possible, it is preferred that they pick up fallen leaves, rather than stripping plants! Returning to the classroom, instruct them to place the leaves on their desks and compare them.

Ask them:

- What can you say about the shapes of the leaves?
- How do they differ in size?

Next, have students place the leaves in groups according to properties, such as color, size, kind (maple, oak, etc.), number of points, and arrangement of veins.

How many groups did they get?

Ask why they think leaves vary in size, shape, color, number of points, and other characteristics?

Further Activities:

1) **Press Plants.** Invite students to collect parts of plants, such as leaves and flowers. Caution: Stress collecting fallen plant parts only. Do not allow students to pick from living things. Also, make sure students do not collect any parts from poisonous plants such as poison ivy. Have students press the plant parts between newspapers. Place some books or something heavy on the newspapers. After several days, remove the weights and newspapers. Discuss how drying helps to preserve the plants.

2) **Make splatter pictures of leaves.** Have students collect different types of leaves and bring them to class. Tell students to place the leaves on colored paper. Then show students how the dip brushes in poster paint and splatter paint over the leaves to make

a pictured outline. Have students compare the different types of leaves and what methods they had to use to make good splatter pictures. For example, ask how the thickness of the paint affected the quality of the picture.

### Discussion

Follow up with a review discussion on leaf variation.

Other possible activities for a  class  group or  individual

- Bookmark  Open Mind Portrait  g6 Graphic Organizer  
 g7 Main Idea Graphic Organizer  c1-12 Cubing  Postcard  Prop  
 Poster  Ad  Map  Retelling  Reader's Theatre  Cartoon  Rap

### Key Questions

What is the main function of leaves?

Make a diagram or illustration of a typical leaf and the various parts (layers, etc.).

Why does carbon dioxide move into a leaf during the day?

What is turgor pressure? What happens to the plant if this pressure drops?

What is the function of guard cells?

Why do plants in a dry environment have small leaves?

Name a specific adaptation of specialized leaves.

What is an insectivorous plant?

Remember to ask  literal  structural  idea  craft  author  literature  life  
 evaluate and  inference questions every day.

### Key Paragraph

Usually the main function of a leaf is to produce food through photosynthesis. How is its structure adapted for that function? The leaf of a flowering plant consists of an enlarged flat portion, the blade, connected to the plant stem by a petiole. The blade may be in one piece or divided into separate leaflets (a compound leaf). The large surface area of the blade permits maximum exposure to light.

## EXTEND

**11.** Prompt every student to write a short product tied to today's reading.

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### Leaf Me Alone

Have students write a little tale from the perspective of the leaves that were picked by the students on their activity walk. The leaves would tell their story of birth and then the "end of the line" finale when they were picked.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.

**CBL BIOLOGY: LIFE SCIENCE OPTION**  
**BSCS Green Version 10th edition**  
**Biology An Ecological Approach**  
**Lesson Plan Week 9, Day 2**



## Outcomes for Today

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Standards Focus: 1abfh

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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In order to generate some interest for this lesson, obtain some photographs of large trees such as the giant Sequoia or the California Coast Redwood. Pose the question, "How does water travel all the way to the top of this magnificent organism anyway?" Another aspect to consider is the tremendous weight of large trees. To demonstrate this, bring in a fresh cut log that has not been dried or seasoned. Have students hold the log. Ask them how such large trees can support this tremendous weight load. Why doesn't the tree collapse under its own weight? Finally, discuss with students the age of a large tree such as the Coast Redwood or the ancient Bristlecone Pine. Many of these trees were mere seedlings when the Vikings first set sail across the North Atlantic long before the United States was even a dream!

#### 1. Background knowledge necessary for today's reading.

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Introduce five important, useful words from today's reading.

**herbaceous**

**bud**

**bulb**

**phloem xylem**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

## READ

### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Leaves are specialized structures of the plant designed to capture light energy to promote photosynthesis.

Leaves have specialized layers of cells.

Special cells called guard cells regulate water loss from leaves as well as gas exchange.

Not all leaves are flat as they are specialized for harsh conditions such as the habitat for cactus (hot and dry).

Cactus spines are actually modified leaves.

### 4. Read directions for investigation/activity.

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### 5. Read text. Ch 18, The Flowering Plant: Form and Function, Text Section 18.4-18.5, pp. 516-520

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
living twig	bud lenticels scar	517

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Stems support the leaves and conduct liquids up and down the plant.

Woody stems keep their original shape even when the plants die.

All stems have buds.

A bud is a miniature shoot with leaves and all the other parts in a very compact form ready to emerge.

You can look at a branch and tell how old it is by counting bud scars.

Phloem carries food from the leaves as dissolved sap.

Xylem is the supportive tissue of the stem and it carries water up from the roots.

**7.** Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## **EXPLORE**

**8.** Explore today's investigation with inquiry activities.

---

**9.** Explore today's simulation with inquiry activities.

---

**10.** Collect data and post.

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### **One possible activity: Circulation in a Celery Stalk**

**Description:** Students will learn about the various parts of a plant by looking at a live plant and sketching their observations. Following their research, students will create an illustration identifying each part and its function. Through reading and writing extensions, students will read facts for comprehension and literature for interest. Each student will organize his or her ideas in order to write a short composition addressing a single topic: plants in their life.

#### **Objectives:**

1. Students will be able to identify and label the following parts of a plant: root, stem, leaf, bud, and flower.
2. Students will be able to explain the function of each part of a plant.

#### **Materials:**

- celery sticks
- glass with water
- food coloring
- live plant(s)
- various books on plants and plant life (fiction and non-fiction)

#### **Vocabulary review:**

1. Stem - Part of a plant that supports other parts, such as leaves, flowers, buds; part of a plant that carries water and nutrients from the ground to other plant parts.
2. Root - Underground part of a plant which serves to anchor the plant in place; also delivers water and nutrients from the ground to the stem.
3. Leaf - Lateral outgrowth from the stem; primary function is food manufacturing.
4. Bud - An incompletely opened flower or small group of leaves.
5. Flower - Part of a plant that is usually colorful and protrudes from the stem; serves in reproduction.

**Procedure:**

(Before beginning the lesson, make sure you bring in at least one live plant for the classroom.) Ask, "Do you have plants at home? What has a plant done for you today? How do plants help us?" Acknowledge students' answers and continue. Introduce the plant you have brought in. Ask students if they can name any or all of the parts of the plant. Using student input, write *only the part* (not the function) on the board. Ask, "Do you know what each part does?" Write student responses on the board.

To further emphasize the function of the stem, conduct a "celery experiment." (At home the night before, soak some celery stalks in colored water for varying lengths of time. Do not show these to the students yet!) Bring out a glass filled with colored water and a celery stalk. Ask students, "If this piece of celery represents the stem of a plant, what will happen when it is placed in this glass of colored water?" Students should be able to hypothesize what the celery might look like according to the function of the stem. Write students' hypotheses on the board. Let students know that you will be coming back to this activity later in the lesson.

- **Teacher Note:** Use a stalk of celery that is about 6-8" high, with the leafy part still attached at the top. Cut the bottom of the stalk on a slight angle. Place the stalk in a glass of colored water (10 drops of blue or red food coloring mixed with 1 to 2 cups of water works best). When the celery stalk sits in the colored water for about 15 minutes, the colored water is absorbed by the celery and is soaked upwards to the leafy part through the "veins" in the celery stalk. Some pieces absorb the colored water faster; this is why I recommend doing this at home the night before so that there is a good example to show the students. The longer the stalk sits in the colored water, the darker the celery stalk becomes from the food coloring. This clearly demonstrates to the students that the stem acts as the carrier of water and nutrients from the ground to the other parts of the plant. The colored water is actually carried up into the leafy part of the celery, and the leafy part changes color (according to the color of food dye used). If you do not have a stalk with the leafy part, this experiment still works. The stem itself begins to change color, but the students get more excited when they see the leaves change color. This experiment can also be done using a white carnation, but chances are that the celery is more readily accessible and economically convenient for most teachers.

Have students record the observations on the celery (or carnations) in their notebooks. In closing, remind students of their hypotheses regarding the celery experiment. Show students the celery from today and last night. Ask students to share their observations. Were their hypotheses correct? As an extension, have students write a story in their journals about how plants are a part of their lives.



Other possible activities for a class group or individual

- Bookmark Open Mind Portrait g6 Graphic Organizer  
g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop  
Poster Ad Map Retelling Reader's Theatre Cartoon Rap

### Key Questions

What is the biological definition of a bud?

Explain the structure of a bulb with an illustration and give examples.

Make a three-dimensional illustration of a tree trunk and indicate the following structures: xylem, phloem, cambium, pith, and bark

What is the difference between a herbaceous and woody plant? Give several examples.

Remember to ask literal structural idea craft author literature life  
evaluate and inference questions every day.

### Key Paragraph

The plant stem connects the leaves and the roots and supports the leaves and reproductive organs in the light and air. Stems also carry water and nutrients from the roots to the leaves and sugars from the leaves to nonphotosynthetic parts of the plant. Air diffuses into stems through lenticels, small openings on the stem's surface, thus supplying oxygen to the cells for cellular respiration. Stems may be either herbaceous or woody. Herbaceous stems are rather soft and rely on turgor pressure for support. Woody stems, on the other hand, have cells with thick, stiff walls that provide support.

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading

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#### A bud is a bud?

Discuss with students how language develops by taking on new meanings. Such is the case with the term "bud."

Prompt students to write to this question:

How has the simple botanical (pertaining to plants) term taken on new meaning? Can you think of other terms commonly used in the language of people under thirty that has taken on new meanings? List these terms.

### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world.

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**Lesson Plan for Week 9, Day 3**



## Outcomes for Today

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Standards Focus: 1abfh

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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This lesson is about the movement of water from the ground through the roots, stems, leaves, and out of the leaves. The theme you may want to use here is one of a cycle. This is often referred to as the transpiration (water evaporation through plants) cycle. Set the stage by asking students this question: "How can water move up through plants? Do plants "suck" water like we do through a straw? Demonstrate capillary action of water by placing a clear straw in a glass of water. Ask students to explain with an "educated guess" why this happens. Carry out this demonstration with several straws of different size diameters. What are the variations and why? Allow a potted plant to become dry and wilt. Demonstrate the difference after you water the plant. Many such activities are simple observation.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**meter      cohesion-tension      stem      leaf      root**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

## READ

### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Plants have different specialized parts. Each part is specialized for performing specific functions necessary for the survival of the entire plant.

Leaves are the center of photosynthesis and food production.

Stems provide support for the plant while also providing a structure and network of liquid transportation systems (xylem and phloem) to transport fluids throughout the plant.

Within the leaf structure, specialized cells work together to provide the necessary functions for survival.

### 4. Read directions for investigation/activity.

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### 5. Read text. Ch 18, The Flowering Plant: Form and Function, Text Section 18.6 & Investigation 18.2, pp. 520-522 and 534-536

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
tree	roots, stems, leaves	522

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

It must be difficult for trees to suck water so high up the trunks to the leaves.

Water molecules attract more water molecules.

Water moves from the soil into the plants through the roots.

Water moves out of the plant through the leaves.

Water moving up and through and evaporating out of plants is a process called transpiration.

**7.** Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## EXPLORE

**8.** Explore today's investigation with inquiry activities.

---

**9.** Explore today's simulation with inquiry activities.

---

**10.** Collect data and post.

---

### One possible activity:

#### Leaves, Stems, and Roots

Refer to **Transparency 41** in the transparency book. Have students use this overhead illustration to create their own drawing and label the important parts.

Also refer to Investigation 18.2 on page 534. If you have microscopes, follow the directions.

#### Activity

Look at the various structures found in roots, stems, and leaves.

#### Discussion

Answer questions under Part A, Part B, and Part C on pages 534 and 535.

If microscopes are not available, go to this website:

<http://www.nature.com/nsu/040419/040419-5.html>

and have students ponder the questions raised.

Other possible activities for a  class  group or  individual

- Bookmark  Open Mind Portrait  g6 Graphic Organizer  
 g7 Main Idea Graphic Organizer  c1-12 Cubing  Postcard  Prop  
 Poster  Ad  Map  Retelling  Reader's Theatre  Cartoon  Rap

## Key Questions

Trace the path of a water molecule from the ground through a plant and out indicating all of the specific structures involved on this journey.

What is a root hair?

How do guard cells control water loss from a plant?

What is a wildlife tree? Why might it be important to protect them?

Remember to ask literal structural idea craft author literature life evaluate and inference questions every day.

## Key Paragraph

Water must travel more than 100 meters to reach the top of the tallest trees. Many experiments have shown that water from roots rises through root xylem to stem xylem to the xylem in the veins of the leaves. This movement is against the force of gravity. Imagine you are standing with a long soda straw on top of a building three stories tall. The straw reaches into a bottle of root beer on the ground. No matter how hard you try, you cannot suck the root beer up from the bottle, not even with a vacuum pump. How do water and materials dissolved in water move to the top of a tree?

## EXTEND

**11.** Prompt every student to write a short product tied to today's reading.

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### What is a "tree hugger"?

Make sure students read the "Biology Today" section on page 521. Then obtain a copy of the children's book *The Lorax* by Dr. Seuss. Prompt them to write to this prompt: What does it mean to be a tree hugger?

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.

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**BSCS Green Version 10th edition**  
**Biology An Ecological Approach**  
**Lesson Plan for Week 9, Day 4**



## Outcomes for Today

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Standards Focus: 1abfh

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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This lesson is all about plant roots. Think of the many metaphors involving the word root or roots. Here are just a few examples:

My roots run deep.

What are your roots?

Get to the root of the problem.

These and many more (from student suggestions) can help form a picture or an image. The roots of plants are absolutely essential for the plant's survival. Try using metaphors to generate interest and build the anticipatory set for this section.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**taproot**

**fibrous root**

**root hairs**

**micronutrient**

**root cap**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

## READ

### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Roots form the third essential component of the flowering plant.

The first two components are (1) the leaves which are designed for food production and (2) the stems designed to support the plant and provide for the distribution of fluids

All plants are generalized into these three basic parts: roots and root systems, stems, and leaves.

### 4. Read directions for investigation/activity.

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### 5. Read text. Ch 18, The Flowering Plant: Form and Function, Text Section 18.7-18.8, pp.520-526

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
tip of a growing root	root cap, root hairs, vascular cylinder	523

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Roots do more than just holding plants to the ground.

There are two primary types of root systems. They are:

Fibrous root systems with many branches reaching in all directions.

Taproot systems with one primary root going straight down.

Each root is covered with millions of root hairs that are very small.

Root systems have a very large surface area and most of this is in the tiny root hairs.

Nutrients and water move into the plant through the root systems.

Many roots are edible and serve as food sources (carrots, etc.).

**7.** Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## EXPLORE

**8.** Explore today's investigation with inquiry activities.

---

**9.** Explore today's simulation with inquiry activities.

---

**10.** Collect data and post.

---

### One possible activity:

#### Sprouts

Alfalfa or bean sprouts are a great source for students to observe recently sprouted plants.

#### Procedure

Purchase the sprouts from the grocery store and store in a cool environment.

#### Activity

If you have access to a dissecting microscope or at least hand lenses, review with students the proper procedures for usage. Have students carefully observe an individual sprout and note the following structures:

The seed

The cotyledons

The root with root hairs

Have them sketch the sprouts and label the various parts.

#### Discussion

As a follow up, have students create a salad and eat it.

Ask the following questions:

What is longer, the stem or the root?

Why do you suppose sprouts are so healthful to eat?

How can these little plants grow with no soil?

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap



## Key Questions

Create an illustration of a fibrous root system.

Create an illustration of a tap root system.

What are the three basic functions of roots?

What are root hairs and what is their primary function.

What are nutrients?

What are micronutrients?

Remember to ask literal structural idea craft author literature  
life evaluate and inference questions every day.

## Key Paragraph

Roots anchor plants and help absorb water and nutrients. They also conduct materials and serve as storage organs. The vascular tissues of many roots form a cylinder that is surrounded by a cortex, which may form part of the bark around an older, woody root. Sometimes food, in the form of starch and sugars is stored in the cortex. Carrots, sugar beets, radishes, and turnips are examples of storage roots.

## EXTEND

**11.** Prompt every student to write a short product tied to today's reading.

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### Metaphors Be With You!

Review the common root metaphors described in the background section of this lesson. Instruct students to write at least three common metaphors (or make up their own) with the word root or roots as a key part. Ask them to write their interpretation as well.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.

**CBL BIOLOGY: LIFE SCIENCE OPTION**  
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**Lesson Plan for Week 9, Day 5**



## Outcomes for Today

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Standards Focus: 1abfh

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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To develop the anticipatory set and to build interest in this lesson, obtain several pieces of wood or lumber in which the growth rings are clearly visible. (Sometimes a simple stain helps.) Distribute these among the students and ask them to determine the number of years' growth represented in their particular wood sample. If you are able to obtain a complete cross section of a small tree or branch such as the one in Figure 18.20, this would be even better for purposes of study and discussion. Save these samples for a follow up activity later in this lesson

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**embryo      cotyledon      meristem      cambium      ray cell**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

## READ

### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

A plant is a complex organism with specific parts, each with functions and structures, which have adapted for survival.

Within the leaf structure, the combination of carbon dioxide and water in photosynthesis produces food.

This food is in the form of sugars and other substances and is necessary for plant growth and maintenance.

The stems provide support as well as multiple conduits for dissolved materials to be distributed throughout the plant.

The root system serves as an anchor in the soil and also as that part of the plant that pulls water and nutrients into the organism.

### 4. Read directions for investigation/activity.

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### 5. Read text. Ch 18, The Flowering Plant: Form and Function, Text Section 18.9-18.11, pp. 526-529

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
cross section of a woody plant	cambium, ray cells, xylem, phloem	529

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

**Students might mention:**

An embryo is a tiny plant within the seed.

The tiny root is the first part of the new plant to emerge from the seed during the germination process

Cotyledons are the leaf-like structures that first appear when a seed sprouts, but they are not true leaves. They fall off after other leaves appear and begin growing.

Plants grow by the process of cell division and elongation.

Primary growth increases the length of the plant while secondary growth increases the strength of the plant by increasing the diameter of the stem.

Tree rings develop because the difference in growth during summer and winter produces a pattern of less dense and denser wood.

**7.** Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## EXPLORE

**8.** Explore today's investigation with inquiry activities.

---

**9.** Explore today's simulation with inquiry activities.

---

**10.** Collect data and post.

---

**One possible activity:****Dendrochronology****Description of activity**

For an introduction to this subject go to this site:

[http://www.mnsu.edu/emuseum/archaeology/dating/dat\\_dendro.html](http://www.mnsu.edu/emuseum/archaeology/dating/dat_dendro.html)

**Procedure**

Redistribute the wood and tree samples used at the beginning of this lesson. Explain to students that they are scientists looking to discover patterns in their wood samples.

**Activity**

Direct students to study and answer the following questions:

- How old is your section of wood?
- Describe some patterns that you observe. For example there may be several years in a row of good growth.

- Can you find a very similar sample of wood in the class collection? How do you know it is from the same tree?

### Discussion

Follow up with a discussion on the value of dendrochronology?

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

### Key Questions

What is the first structure to emerge from a germinating seed? Why is this so?

What are cotyledons?

Compare and contrast primary and secondary growth in plants.

What two important structures found in flowering plants are formed by the cambium?

What are tree rings and how are they formed?

Remember to ask literal structural idea craft author literature life  
evaluate and inference questions every day.

## EXTEND

**11.** Prompt every student to write a short product tied to today's reading.

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### The Witness Tree

Select a rather large tree on or near your school grounds. Visit the tree with your students and generate interest on the history of the tree. Later, prompt students to write a paragraph from the perspective of the tree on the many changes it has witnessed over the years. Instruct students to include a hopeful plea for the future.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.