

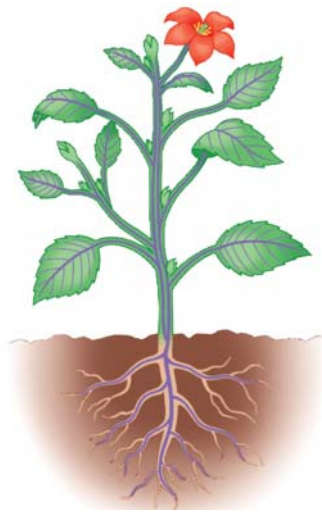
Name _____ Period _____

Chapter 35: Plant Structure, Growth, and Development

In this unit on plants, the challenge for students will be to learn the new vocabulary. As we work through this unit, you will find an emphasis on labeling and explaining plant diagrams and specific directions for which terms you should know.

Concept 35.1 The plant body has a hierarchy of organs, tissues, and cells

1. This concept is organized into three sections—plant organs, tissues, and cells. Begin by defining a *tissue* and an *organ*.
2. The three plant organs are _____, _____, and _____.
3. On Figure 35.2, label the *shoot system*, *root system*, *apical bud*, *axillary bud*, and *root system*.



4. Define *root* and then explain the difference between a *taproot* and *lateral roots*.

Root

Taproot and lateral roots

5. This photograph shows the *root hairs* of a radish. What is the function of *root hairs*?



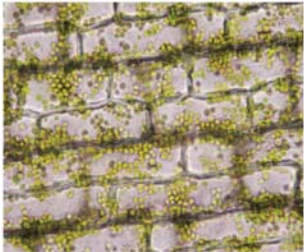
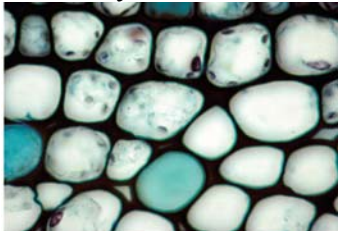
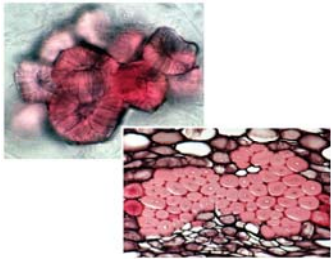
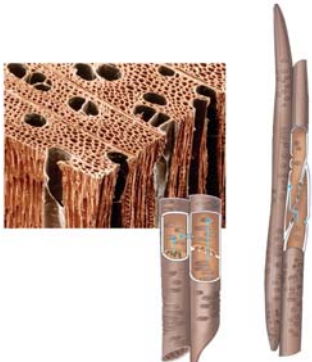
6. What is the advantage of *apical dominance* to a plant?
7. The main function of a leaf is _____.
8. What are five additional functions that modified leaves can perform?
9. Plants have three types of tissues. Place the name of each tissue type and its function in the table below.

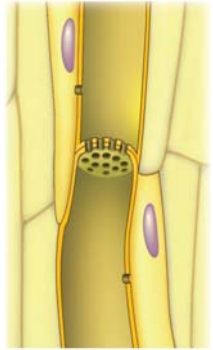
Tissue type	Function

10. What is the function of the *cuticle*?
11. *Xylem* conducts _____.
12. *Xylem* transport tends to be in one direction, but *phloem* transport is more complicated. Explain the pattern of sugar flow in phloem tissue.

13. The two major tissues of the *ground tissue system* are *pith* and *cortex*. Where are they found in the plant?

14. Plants have five major types of cells. Below you will find a picture of each cell type. Give the major function of each cell type. Specific questions may follow your general description of the cell type.

<p><i>Parenchyma cells</i></p> 	<p>Function</p>
<p><i>Collenchyma cells</i></p> 	
<p><i>Sclerenchyma cells</i></p> 	
<p><i>Xylem cells</i></p> 	<p>Label vessel elements, tracheids, and pits.</p>

<p><i>Phloem cells</i></p> 	<p>Label companion cell, sieve tube element, and sieve plate.</p>
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15. Compare and contrast the following structures:

Tracheids and vessel elements

Sieve tube elements and companion cells

16. At the end of this first extensive concept, do not lose sight of the big picture. Complete the following summary charts.

The three plant organs are

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The three basic plant tissues are

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The five basic plant cells are

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Concept 35.2 Meristems generate cells for new plant organs

17. What is the difference between *indeterminate growth* and *determinate growth*?

18. Although plants generally show indeterminate growth, what are three examples of plant parts that show determinate growth?
19. Based on the length of their life cycle, plants are categorized into three groups. Explain what each category means below, and provide an example.

Annuals

Biennials

Perennials

20. Plants are capable of indeterminate growth because they have perpetually embryonic tissues called _____ .
21. Explain the following relationships.

Apical meristems and primary growth

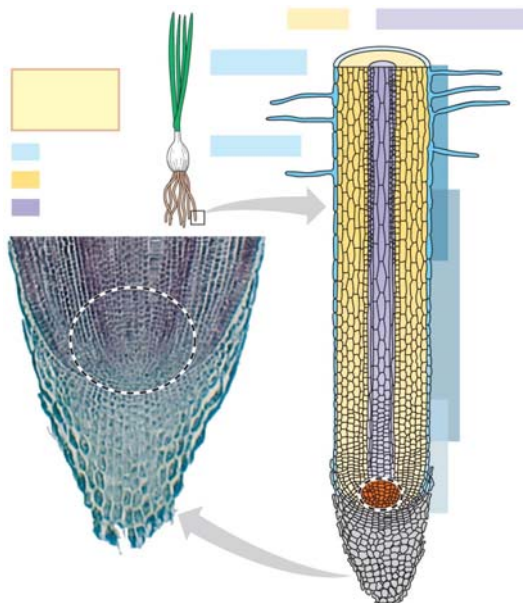
Lateral meristems and secondary growth

Primary growth and secondary growth

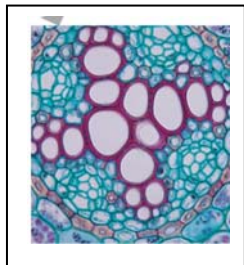
Concept 35.3 Primary growth lengthens roots and shoots

22. The figure below shows an image that is like a slide many students study in a mitosis lab and is labeled for this lesson as the “Primary growth of a root.” Label the nine structures shown in the figure: *cortex, vascular cylinder, epidermis, apical meristem, root cap, root hair, zone of differentiation, zone of elongation, and zone of cell division.*

23. Explain what events occur in *the zone of cell division, zone of elongation, and zone of differentiation.*



24. In most roots, the xylem and phloem is a solid cylinder of vascular tissue located in the center of the root and called the *stele*. The figure below shows the *stele* of a dicot root. Label the *xylem*, *phloem*, *endodermis*, and *pericycle*. Also define the two new terms as indicated.



Endodermis

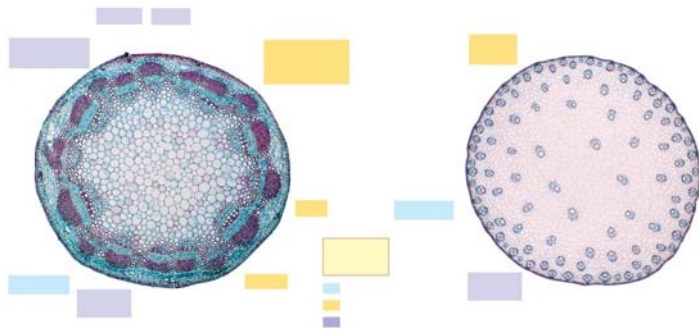
Pericycle

25. Why must new roots formed by the pericycle originate in the center of the root?

26. From Figure 35.16, label *shoot apical meristem*, *leaf primordia*, *young leaf*, *developing vascular strand*, and *axillary bud meristems*.

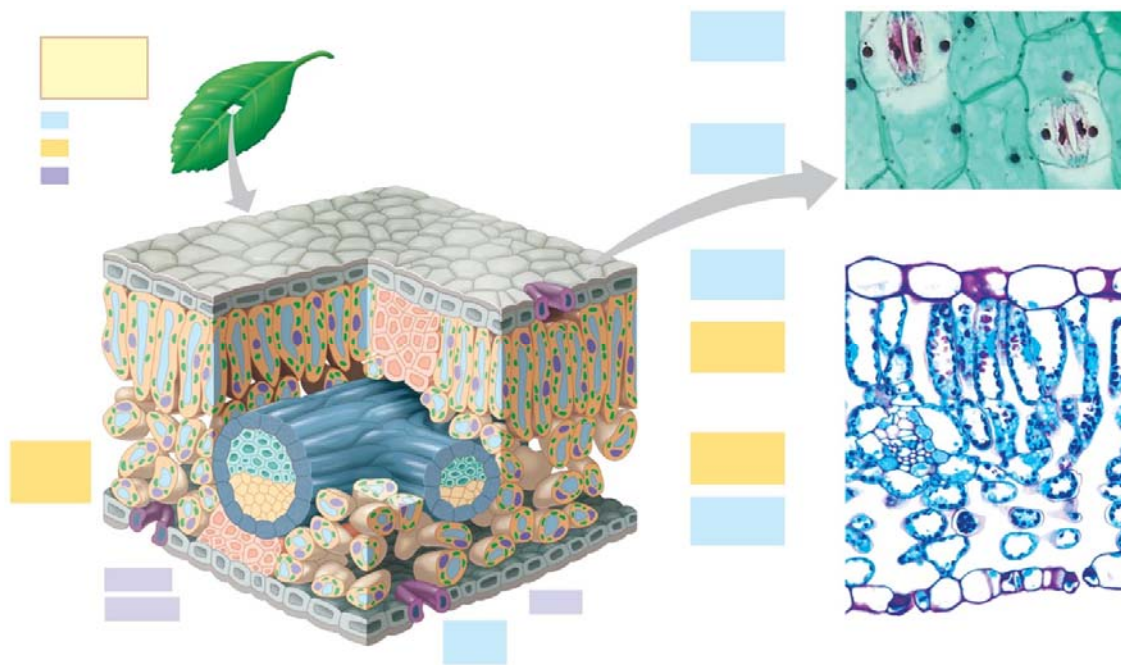


27. What structure in this figure is responsible for primary growth?
28. It is possible to tell a young *eudicot* from a *monocot* by the structure of the stem. In the following figure, label the *eudicot*, *monocot*, *epidermis*, and *vascular bundles*.



29. How is the arrangement of vascular bundles different in monocot and dicot stems?

30. To understand the process of photosynthesis, students are expected to know leaf structure in greater detail. Using Figure 35.18, label each structure just as shown in the text.



31. What gas critical to photosynthesis enters the leaf through stoma? _____
32. What is lost through the stoma that leads to transpiration? _____
33. Is this a C_3 , C_4 , or CAM leaf? _____

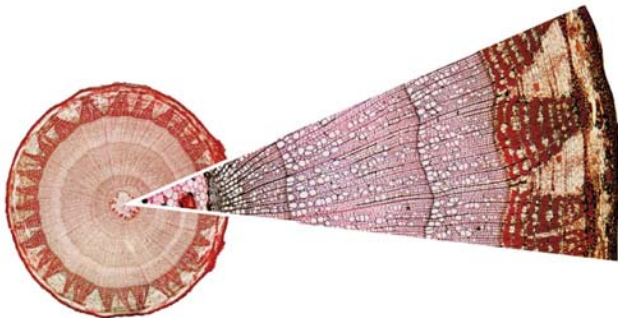
Concept 35.4 Secondary growth adds girth to stems and roots in woody plants

34. Primary growth arises from apical meristems and results in _____ of roots, stems, and leaves. Secondary growth arises from _____ and _____ cambium and results in increased _____ of roots and stems.
35. Explain what is produced by these structures.

Vascular cambium

Cork cambium

36. Read the text that accompanies Figure 35.19 and then answer these questions.
- What results in primary growth of the stem?
 - What cells are formed to the inside and the outside of the vascular cambium?
 - What is the difference in the formation of primary xylem and phloem versus secondary xylem and phloem?
37. What vascular tissue forms the *bark*, and what is the function of the *bark*?
38. What tissues are included in the bark of a tree?
39. On this figure, add these labels: *cork cambium*, *cork*, *periderm*, *bark*, *growth ring*, *secondary xylem*, *secondary phloem*, and *vascular cambium*.



40. Look back at the stem in Figure 35.19 and find the horizontal slits in the bark, known as *lenticels*. You may have noticed lenticels on the young twigs of trees or shrubs. What is the function of *lenticels*?

Concept 35.5 is omitted. These topics have not been included on recent AP Biology exams.

Testing Your Knowledge: Self-Quiz Answers

Now you should be ready to test your knowledge. Place your answers here:

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____