

The Plant Body

1. Describe and compare the three basic organs of vascular plants. Explain how these basic organs are interdependent.
2. List the basic functions of roots. Describe and compare the structures and functions of fibrous roots, taproots, root hairs, and adventitious roots.
3. Describe the basic structure of plant stems.
4. Explain the phenomenon of apical dominance.
5. Describe the structures and functions of four types of modified shoots.
6. Describe and distinguish between the leaves of monocots and those of eudicots.
7. Describe the three tissue systems that make up plant organs.
8. Describe and distinguish between the three basic cell types of plant tissues. For each tissue, describe one characteristic structural feature and explain its functional significance.
9. Explain the functional relationship between a sieve-tube member and its companion cell.

The Process of Plant Growth and Development

10. Distinguish between determinate and indeterminate growth. Give an example of each type of growth.
11. Distinguish among annual, biennial, and perennial plants.
12. Explain this statement: "In contrast to most animals, which have a stage of embryonic growth, plants have regions of embryonic growth."
13. Distinguish between the primary and secondary plant body.
14. Describe in detail the primary growth of the tissues of roots and shoots.
15. Describe in detail the secondary growth of the tissues of roots and shoots.
16. Name the cells that make up the tissue known as wood. Name the tissues that comprise the bark.

Mechanisms of Plant Growth and Development

17. Explain why *Arabidopsis* is an excellent model for the study of plant development.
18. Explain what each of these *Arabidopsis* mutants has taught us about plant development:
 - a. *fass* mutant
 - b. *gnom* mutant
 - c. *KNOTTED-1* mutant
 - d. *GLABRA-2* mutant
19. Define and distinguish between *morphogenesis*, *differentiation*, and *growth*.
20. Explain why (a) the plane and symmetry of cell division, (b) the orientation of cell expansion, and (c) cortical microtubules are important determinants of plant growth and development.
21. Explain how pattern formation may be determined in plants.
22. Give an example to demonstrate how a cell's location influences its developmental fate.
23. Explain how a vegetative shoot tip changes into a floral meristem.
24. Describe how three classes of organ identity genes interact to produce the spatial pattern of floral organs in *Arabidopsis*.