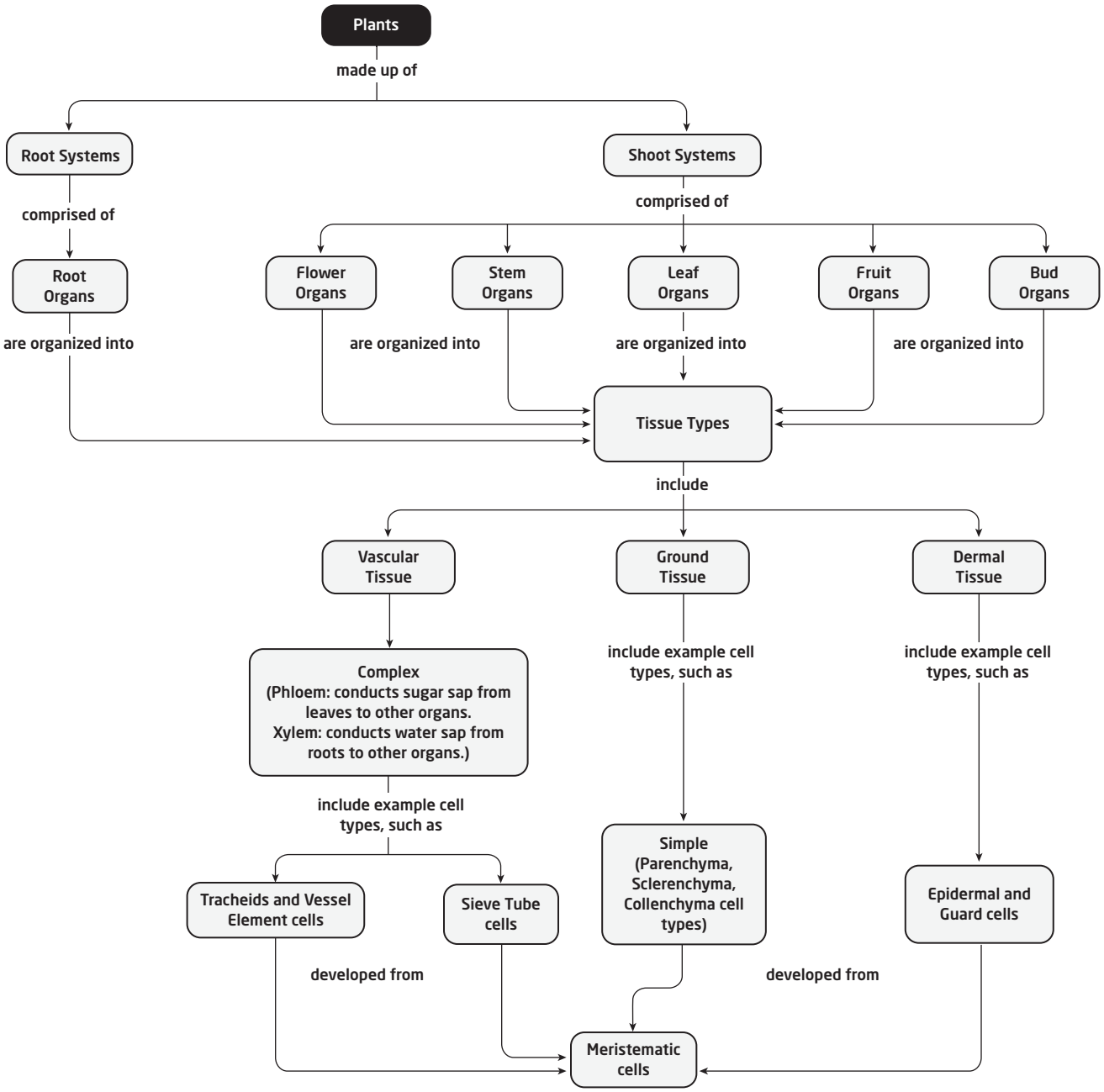
Chapter Review Answers (Student textbook pages 80 to 81)

Please also see **BLM 2-9 Chapter 2 Review (Alternative Review).**

Make Your Own Summary



Reviewing Key Terms

1. epidermis
2. cell differentiation
3. meristematic
4. organs
5. gall
6. system
7. root; shoot

Knowledge and Understanding

8. New tissues and organs are produced from differentiation of meristematic cells.
9. Auxin is a plant hormone that inhibits growth of lateral buds. It promotes growth upwards, from the terminal bud.
10. A tissue is a collection of similar cells that carry out the same function. An organ is a collection of different types of tissues or cells that work together to carry out a certain function.

11. a. tissue; transports water and nutrients

b. organ; provides large surface area for photosynthesis

c. organ; takes up water and nutrients from soil

d. tissue; protection

e. part of a cell; increases surface area of roots for increased uptake of water and nutrients

12. Diagrams should indicate that guard cells control the opening and closing of stomata.

13. A: cuticle; B: upper epidermis; C: palisade tissue; D: mesophyll tissue; E: vascular bundle; F: guard cells

14. a. Carbon dioxide, water, and light energy are needed for photosynthesis.

b. Plants trap sunlight by thylakoids in chloroplasts. Carbon dioxide comes from the surrounding air and the water comes from the soil.

15. The increase in mineral concentration in the xylem causes an increase in water uptake by osmosis.

16. Venn diagrams should indicate that the two types of root systems are taproots and fibrous roots. Taproots extend far into the ground, have one main root that is larger than the others, and gets water from far underground. Fibrous roots extend horizontally near the surface of the soil, are all about the same size, and absorb water near the surface of the ground.

Thinking and Investigating

17. a. Line A best represents plant 2, line B best represents plant 3, and line C best represents plant 1.

b. Environmental conditions affect the rate of water loss in plants. In more humid environments (plastic bag), there is a lower rate of water loss than in dry, windy environments (in front of a fan).

18. I would expect to find the least amount of rainfall in the province that has the daisies with the fewest stomata (province D) and the greatest amount of rainfall in the province that has the daisies with the highest number of stomata (province A). When water is scarce, it is better to have fewer stomata because plants experience water loss from these pores.

19. The plant will wilt because it does not have a large enough root system, which is responsible for the uptake of water and nutrients needed for the plant.

20. Leaf epidermis is much less permeable to water and nutrients than root epidermis. Leaf epidermis is covered in a cuticle, which helps to minimize water and nutrient loss. In contrast, the main function of the root system is to take up water and nutrients for the plant. Therefore, root epidermis must be very permeable to water to allow this uptake.

21. Example: The fibrous "strings" in celery are probably made up of xylem and phloem. An investigation such as the one described on page 78 would help determine the function of the strings.

Communication

22. Student diagrams should show a plant organism with individual cells, tissues, organs, and systems labelled, possibly using blowouts to show magnified parts of the plant.

23. Student diagrams should resemble Figure 2.23 on page 73 and Figure 2.24 on page 74.

24. Student columns should include the explanation that there is less transpiration in the evening and, therefore, less water loss through evaporation. This, therefore, reduced the amount of water that must be pulled up form the root system.

25. A high rate of transpiration would move nutrients the plant quickly, ensuring a constant supply. The high rate would also allow a high rate of gas exchange, ensuring an optimum transfer of carbon dioxide and oxygen. However, a high rate of transpiration necessitates a steady supply of water – otherwise the plant would quickly dry out.

Application

26. a. Cells specialized for photosynthesis have a high concentration of chloroplasts; other cells do not.

b. The chlorophyll in chloroplasts give plants their green colour; green parts of a plant are likely to participate in photosynthesis.

27. Watering plants too much can kill them because the water can replace the available oxygen that is needed by the root system for cellular respiration.

28. Fruits ripen more quickly in a paper bag than on a counter because the ethylene gas emitted by the fruit is trapped in the bag, hastening the ripening process. If the fruit is not in a bag, the gas dissipates quickly into the surrounding air.

29. Damp grain is more likely to sprout or rot.

30. The diagram on the right, showing watering around the base of the bush, represents the best use of the water. The water that is used by plants is supplied through the root system. Therefore, applying the water more closely to the roots is the best use of the water.