# 23.1 Specialized Cells in Plants

### Key Questions

- ***What are the three principal organs of seed plants?***
- ***What are the primary functions of the main tissue systems of seed plants?***
- ***How do meristems differ from other plant tissues?***

### Vocabulary

epidermis • lignin • vessel element • sieve tube element • companion cell • parenchyma • collenchyma • sclerenchyma • meristem • apical meristem

### Taking Notes

**Concept Map** As you read, make a concept map to organize the information in this lesson.

**THINK ABOUT IT** Have you ever wondered if plants were really alive? Compared to animals, plants don't seem to do much. If you look deep inside a living plant, this first impression of inactivity disappears. Instead, you will find a busy and complex organism. Plants move materials, grow, repair themselves, and constantly respond to the environment. They may act at a pace that seems slow to us, but their cells and tissues work together in remarkably effective ways.

## Seed Plant Structure

***What are the three principal organs of seed plants?***

The cells of a seed plant are organized into different tissues, organs, and systems. **The three principal organs of seed plants are roots, stems, and leaves.** The organs are linked together by systems that run the length of the plant. These systems produce, store, and transport nutrients, and provide physical support and protection.

**Roots** Roots anchor plants in the ground, holding soil in place and preventing erosion. Root systems often work with soil bacteria and fungi in mutualistic relationships that help the roots absorb water and dissolved nutrients. Roots transport these materials to the rest of the plant, store food, and hold plants upright against forces such as wind and rain.

**Stems** Plant stems provide a support system for the plant body, a transport system that carries nutrients, and a defensive system that protects the plant against predators and disease. Stems also produce leaves and reproductive organs such as flowers. Whatever the size of a stem, its support system must be strong enough to hold up leaves and branches. The stem's transport system contains tissues that lift water from the roots up to the leaves and carry the products of photosynthesis from the leaves back down to the roots.

**Leaves** Leaves are the plant's main photosynthetic organs. The broad, flat surfaces of many leaves increase the amount of sunlight plants absorb. Leaves also expose a great deal of tissue to the dryness of the air and, therefore, have adaptations that protect against water loss. Adjustable pores in leaves help conserve water while letting oxygen and carbon dioxide enter and exit the leaf.

**In Your Notebook** *Relate the three main plant organs back to the basic needs of plants described in Lesson 22.1.*

**MYSTERY CLUE**

**The tangled fig "branches" are not actually stems. What are they?**