

CHAPTER 12 Introduction to Plants

SECTION

2

Seedless Plants



California Science Standards

7.2.a, 7.5.a

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What are the differences between seedless vascular plants and nonvascular plants?
- How do seedless vascular plants reproduce?
- How do nonvascular plants reproduce?

STUDY TIP

Organize As you read this section, make a chart that compares vascular plants and nonvascular plants.

Critical Thinking

1. Apply Concepts Why wouldn't you expect to see nonvascular plants in the desert?

READING CHECK

2. List What are two functions of the rhizoid?

TAKE A LOOK

3. Identify Are the male and female gametophytes separate plants or part of the same plant?

What Are Seedless Plants?

When you think of plants, you probably think of plants like flowers that make seeds, but many plants don't.

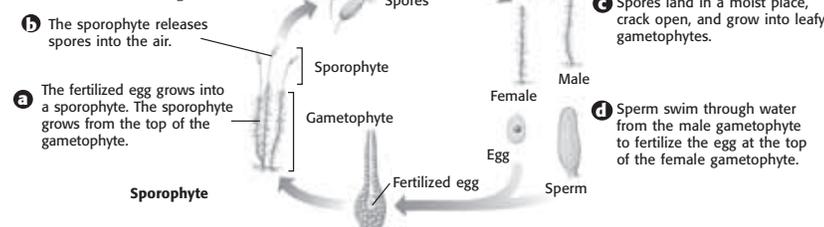
Remember that plants are divided into two main groups: nonvascular plants and vascular plants. All nonvascular plants are seedless, and some vascular plants are seedless, as well.

What Are the Features of Nonvascular Plants?

Mosses, liverworts, and hornworts are types of nonvascular plants, which do not have vascular tissue. Instead, each cell gets water and nutrients directly from the environment or a nearby cell. Therefore, nonvascular plants usually live in damp places. They do not have true stems, roots, or leaves. However, they do have features that help them to get water and stay in place. A **rhizoid** is a rootlike structure that holds nonvascular plants in place. Rhizoids also help them get water and nutrients. ✓

Nonvascular plants
• have no vascular tissue
• have no true roots, stems, leaves, or seeds
• are usually small
• live in damp places

Moss Life Cycle



SECTION 2 Seedless Plants *continued*

REPRODUCTION IN NONVASCULAR PLANTS

Like all plants, nonvascular plants have a two-stage life cycle. They have a sporophyte generation, which produces spores, and a gametophyte generation, which produces eggs and sperm. Nonvascular plants can also reproduce asexually, that is, without eggs and sperm.

IMPORTANCE OF NONVASCULAR PLANTS

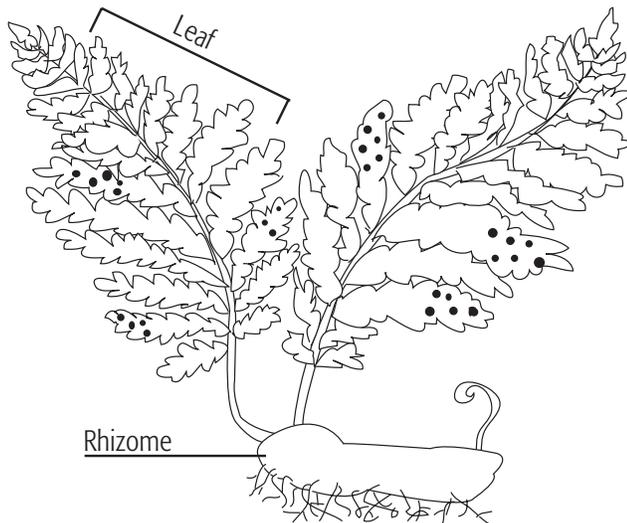
Nonvascular plants are usually the first plants to live in a new environment, such as newly exposed rock. When these plants die, they break down and help form a thin layer of soil. Then, plants that need soil in order to grow can move into these areas.

Some nonvascular plants are important as food or nesting material for animals. A nonvascular plant called peat moss is important to humans. When it turns to peat, it can be burned as a fuel.

What Are the Features of Seedless Vascular Plants?

Vascular plants have specialized tissues that deliver water and nutrients to all their cells. Therefore, seedless vascular plants are often larger than nonvascular plants. They do not have to live in places that are damp. ✓

Many seedless vascular plants, such as ferns, have a structure called a rhizome. The **rhizome** is an underground stem that produces new leaves and roots.



Critical Thinking

4. Apply Concepts What do you think is the reason that nonvascular plants can be the first plants to grow in a new environment?

READING CHECK

5. Explain How do the cells of a seedless vascular plant get water?

SECTION 2 Seedless Plants *continued*

REPRODUCTION IN SEEDLESS VASCULAR PLANTS

Seedless vascular plants and nonvascular plants have very similar life cycles. First, the sperm from a male gametophyte joins with the egg from a female gametophyte. The sporophyte that grows from the egg and sperm produces spores. Then, these spores grow into new gametophytes.

Seedless vascular plants can also reproduce asexually. This can happen when new plants branch off from older plants. It can happen also when pieces of one plant fall off and begin to grow as new plants. ✓

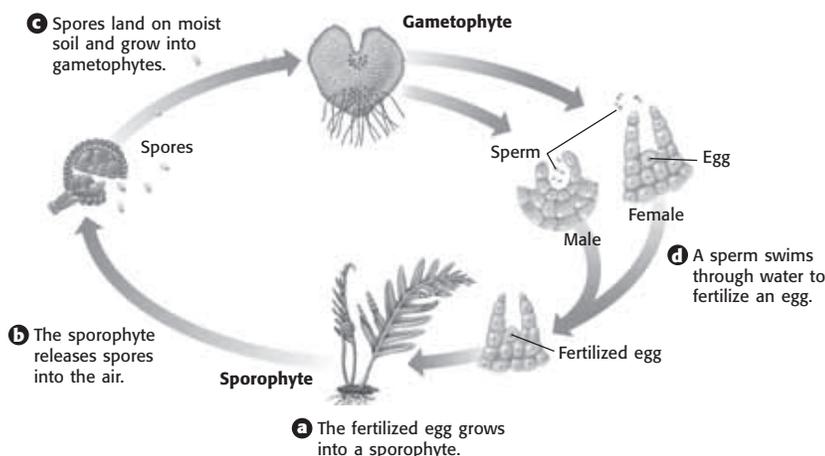
READING CHECK

6. Describe What are two ways in which seedless nonvascular plants reproduce asexually?

TAKE A LOOK

7. Apply Concepts Does this figure show sexual or asexual reproduction? Explain your answer.

Fern Life Cycle



IMPORTANCE OF SEEDLESS VASCULAR PLANTS

Seedless vascular plants that lived about 300 million years ago are important to people today. After these ancient ferns, horsetails, and club mosses died, they formed coal and oil. Coal and oil are fossil fuels that people remove from Earth’s crust to use for energy. They are called *fossil fuels* because they formed from plants (or animals) that lived long ago. ✓

Seedless vascular plants help to make and preserve soil. Seedless vascular plants help form new soil when they die and break down. Their roots can make the soil deeper, which allows other plants to grow. Their roots also help prevent soil from washing away.

Many seedless vascular plants are used by humans. Ferns and some club mosses are popular houseplants. Horsetails are used in some shampoos and skincare products.

READING CHECK

8. Explain Where does coal come from?

Section 2 Review

7.2.a, 7.5.a



SECTION VOCABULARY

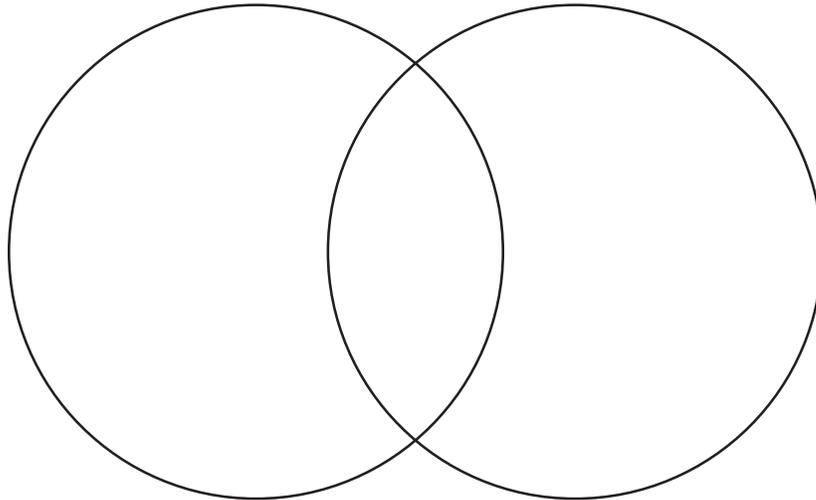
rhizoid a rootlike structure in nonvascular plants that holds the plants in place and helps plants get water and nutrients

rhizome a horizontal, underground stem that produces new leaves, shoots, and roots

1. Compare What are two differences between a rhizoid and a rhizome?

2. Explain In which generation does sexual reproduction occur? Explain your answer.

3. Compare Use a Venn Diagram to compare vascular and nonvascular plants.



4. Apply Concepts Nonvascular plants are usually very small. How does their structure limit their size?

5. List Name six kinds of seedless plants.
