

# Mosses, Liverworts, and Hornworts

## Reading Preview

### Key Concept

- What characteristics do the three groups of nonvascular plants share?

### Key Terms

- rhizoid • bog • peat

## Target Reading Skill

**Identifying Main Ideas** As you read this section, write the main idea—the biggest or most important idea—in a graphic organizer like the one below. Then write three supporting details that give examples of the main idea.

### Main Idea

Nonvascular plants include . . .

Detail

Detail

Detail

## Lab Zone Discover Activity

### Will Mosses Absorb Water?

1. Place 20 mL of sand into a plastic graduated cylinder. Place 20 mL of peat moss into a second plastic graduated cylinder.
2. Predict what would happen if you were to pour 10 mL of water slowly into each of the two graduated cylinders and then wait five minutes.
3. To test your prediction, use a third graduated cylinder to add 10 mL of water slowly to the sand. Then add 10 mL of water to the moss. After five minutes, record your observations.

### Think It Over

**Predicting** How did your prediction compare with your results? What did you learn about moss from this investigation?



You pause from your hike to look at the forest around you. As far as you can see, you are surrounded by a living carpet of mosses. They are growing everywhere—up tree trunks, on rocks along the banks of the stream, and on the forest floor. Mosses make up one group of nonvascular plants. **The three major groups of nonvascular plants are mosses, liverworts, and hornworts. These low-growing plants live in moist environments where they can absorb water and other nutrients directly from their environment.** The watery surroundings also enable sperm cells to swim to egg cells during reproduction.



# Mosses

Have you ever seen mosses growing in the cracks of a sidewalk or in a shady spot? With more than 10,000 species, mosses are by far the most diverse group of nonvascular plants.

**The Structure of a Moss** If you were to look closely at a moss, you would see a plant that looks something like the one in Figure 11. The familiar green, fuzzy moss is the gametophyte generation of the plant. Structures that look like tiny leaves grow off a small, stemlike structure. Thin, rootlike structures called **rhizoids** anchor the moss and absorb water and nutrients. The sporophyte generation grows out of the gametophyte. The sporophyte grows a long, slender stalk with a capsule at the end. The capsule contains spores.

**The Importance of Mosses** Many people use peat moss in agriculture and gardening. The peat moss that gardeners use contains sphagnum (SFAG num) moss. Sphagnum moss grows in a type of wetland called a **bog**. The still water in a bog is so acidic that decomposers cannot live in the water. Thus when the plants die, they do not decay. Instead, the dead plants accumulate at the bottom of the bog. Over time, the mosses become compressed into layers and form a blackish-brown material called **peat**. Large deposits of peat exist in North America, Europe, and Asia. In Europe and Asia, people use peat as a fuel to heat homes and to cook food.



How does peat form?



FIGURE 11

### A Moss Plant

A moss gametophyte is low-growing and has structures that look like roots, stems, and leaves. The stalklike sporophyte generation remains attached to the gametophyte.

### Interpreting Diagrams

What structures anchor the gametophyte?

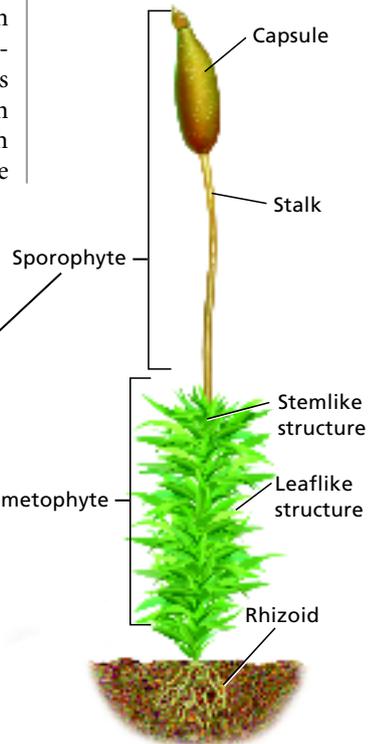




FIGURE 12

### Liverworts and Hornworts

Liverworts (left) have sporophytes that are too small to see. The leaf-like and treelike structures are part of the plants' gametophytes. Hornworts (right) have gametophytes that lie flat on the ground. The hornlike sporophytes are about one centimeter long.

## Liverworts and Hornworts

Figure 12 shows examples of two other groups of nonvascular plants—liverworts and hornworts. There are more than 8,000 species of liverworts. This group of plants is named for the shape of the plant's body, which looks somewhat like a human liver. *Wort* is an old English word for "plant." Liverworts are often found growing as a thick crust on moist rocks or soil along the sides of a stream.

There are fewer than 100 species of hornworts. If you look closely at a hornwort, you can see slender, curved structures that look like horns growing out of the gametophytes. These hornlike structures, which give these plants their names, are the sporophytes. Unlike mosses or liverworts, hornworts are seldom found on rocks or tree trunks. Instead, hornworts usually live in moist soil, often mixed in with grass plants.



For: Links on nonvascular plants  
Visit: [www.SciLinks.org](http://www.SciLinks.org)  
Web Code: scn-0143



What does a hornwort sporophyte look like?

## Section 3 Assessment

**Target Reading Skill Identifying Main Ideas** Use your graphic organizer about nonvascular plants to help you answer the questions below.

### Reviewing Key Concepts

- a. Describing** Describe two characteristics that nonvascular plants share.
- b. Relating Cause and Effect** Explain how the two characteristics of nonvascular plants are related.
- c. Comparing and Contrasting** In what ways are mosses, liverworts, and hornworts similar? In what ways do they differ?

Lab  
zone

### At-Home Activity

**Moss Hunt** With a family member, go on a moss hunt in your neighborhood. Look for mosses in sidewalk cracks, on trees, or on other objects. For each location in which you find mosses, observe and record the sunlight and moisture conditions. Explain why mosses grow in the environments they do.

# Masses of Mosses

## Problem

How is a moss plant adapted to carry out its life activities?

## Skills Focus

observing, measuring

## Materials

- clump of moss
- hand lens
- metric ruler
- toothpicks
- plastic dropper
- water

## Procedure



1. Your teacher will give you a clump of moss. Examine the clump from all sides. Draw a diagram of what you see. Measure the size of the overall clump and the main parts of the clump. Record your observations.
2. Using toothpicks, gently separate five individual moss plants from the clump. Be sure to pull them totally apart so that you can observe each plant separately. If the moss plants start to dry out as you are working, moisten them with a few drops of water.
3. Measure the length of the leaflike, stemlike, and rootlike structures on each plant. If brown stalks and capsules are present, measure them. Find the average length of each structure.
4. Make a drawing of a single moss plant. Label the parts, give their sizes, and record the color of each part. When you are finished observing the moss, return it to your teacher. Wash your hands thoroughly.



5. Obtain class averages for the sizes of the structures you measured in Step 3. Also, if the moss that you observed had brown stalks and capsules, share your observations about those structures.

## Analyze and Conclude

1. **Observing** Describe the overall appearance of the moss clump, including its color, size, and texture.
2. **Measuring** What was the typical size of the leaflike portion of the moss plants, the typical height of the stemlike portion, and the typical length of the rootlike portion?
3. **Inferring** In which part(s) of the moss does photosynthesis occur? How do you know?
4. **Communicating** Write a paragraph explaining what you learned about mosses from this investigation. Include explanations of why mosses cannot grow tall and why they live in moist environments.

## More to Explore

Select a moss plant with stalks and capsules. Use toothpicks to release some of the spores, which can be as small as dust particles. Examine the spores under a microscope. Create a labeled drawing of what you see.