

CHAPTER 21

Mosses and Ferns
Section 21-2

SKILL ACTIVITY
Making comparisons

Distinguishing Between Mosses and Ferns

Biologists often learn about two or more biological systems by comparing them. In this activity you will compare mosses and ferns. Figures 1 and 2 show the life cycles of a moss and a fern.

Figure 1 Life Cycle of a Moss

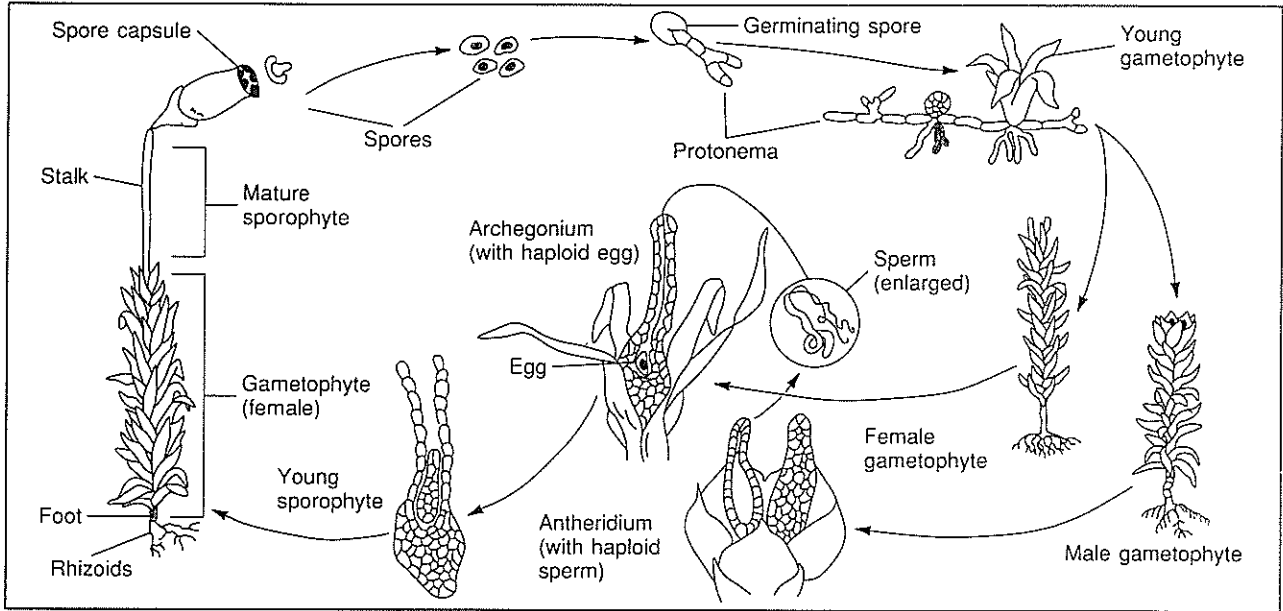
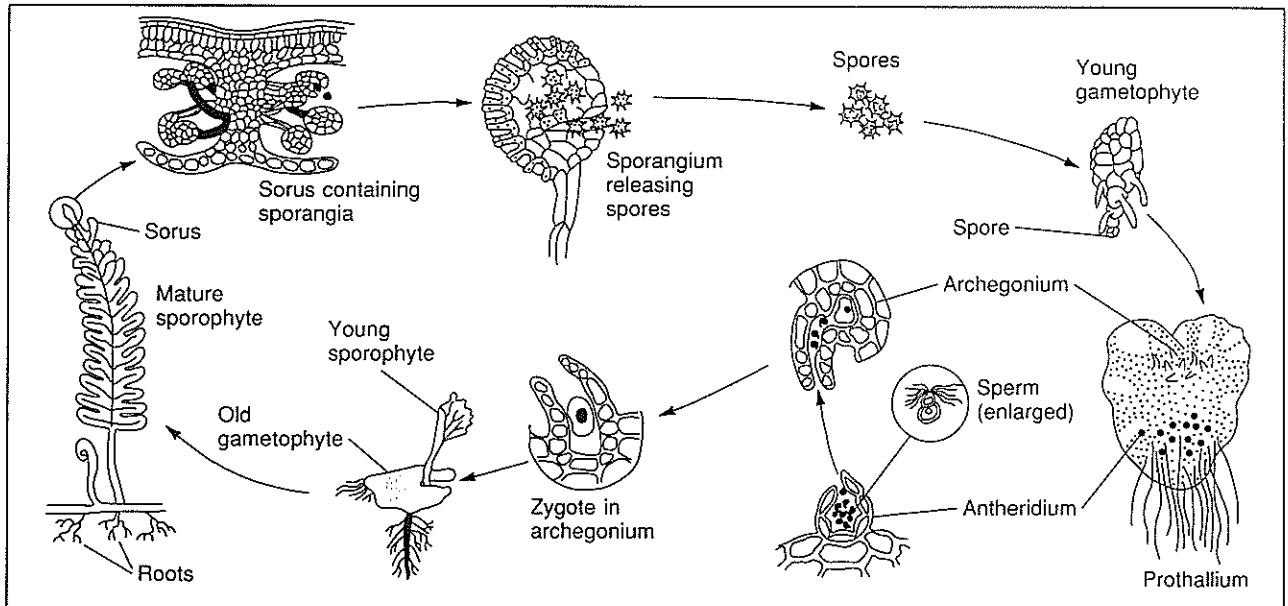


Figure 2 Life Cycle of a Fern



1. The moss contains vegetative structures that are similar to structures in the fern. Compare the vegetative structures of the moss and the fern that are shown in Figures 1 and 2.

2. Compare the spore-containing structures of both plants.

3. Which stage in the life cycles of the moss and the fern would you be most likely to see in the woods? Explain your answer.

4. Compare the events that occur just after the spores are released in mosses and ferns.

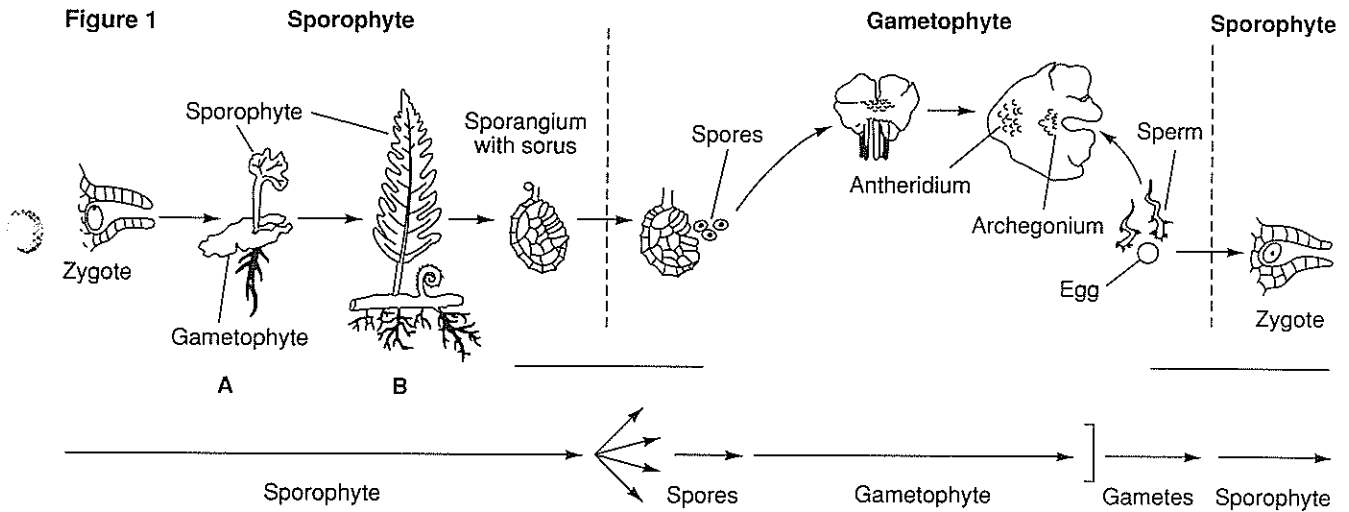
5. Compare the ways in which the sperm and the egg join in mosses and ferns.

6. Explain why ferns can grow larger and taller than mosses.

Alternation of Generations in Tracheophytes

The tracheophytes have complex life cycles. Like mosses and liverworts, they undergo alternation of generations. A complete life cycle of a tracheophyte consists of two stages—the sporophyte stage and the gametophyte stage. Each stage is one generation in the sequence of alternation. The sporophyte generation looks completely different from the gametophyte generation. The number of chromosomes in the sporophyte generation is also different. In order for tracheophytes to survive from generation to generation, they must go through both stages.

Figure 1 shows the alternation of generations in a typical fern. Use the figure to answer the questions.



1. Which structure, A or B, is most visible to people? Explain your answer.

2. Which structure, A or B, produces haploid cells that can develop into new plants? What are these cells called?

3. Write the term haploid above each stage in the fern's life cycle that has half the number of chromosomes. Label the dashed line that indicates meiosis.

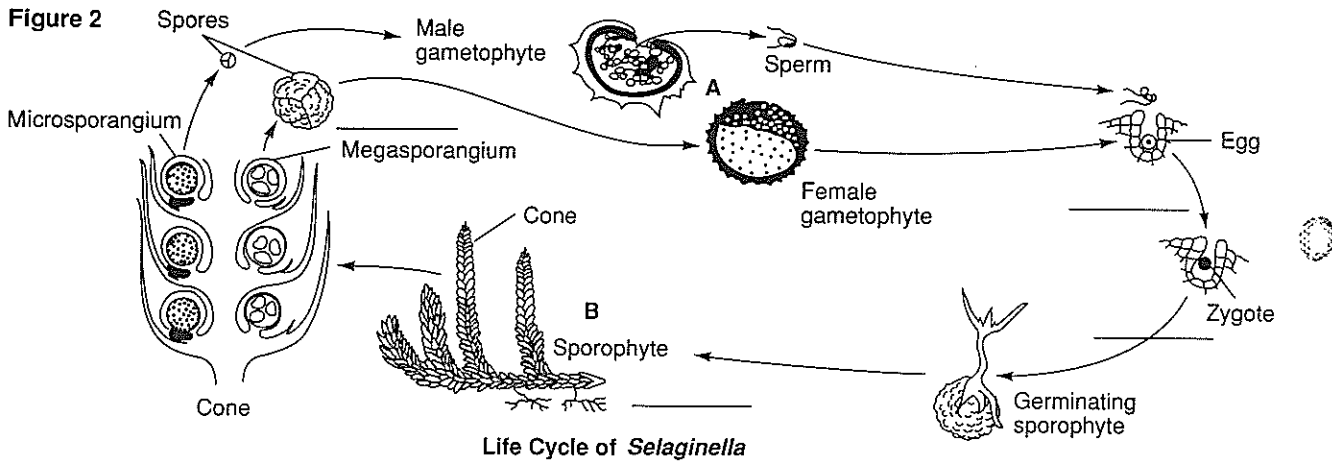
4. Which structure(s)—A, B, or both—contains chlorophyll?

5. Through what process does the haploid gametophyte give rise to a diploid sporophyte?

6. Write the term diploid above each stage in a fern's life cycle that has the full number of chromosomes. Label the dashed line that indicates fertilization.

7. In which structure does meiosis occur? Why is meiosis necessary?

All tracheophytes have alternation of generations, but the process is not the same in all types. Club moss reproduction differs in some ways from fern reproduction. Look at Figure 2. It shows alternation of generations in a group of club mosses called *Selaginella*. Use the figure to answer the questions that follow.



8. Which structure, A or B, is the one most often seen by people? Explain your answer.

9. Which structure(s)—A, B, or both—contains chlorophyll?

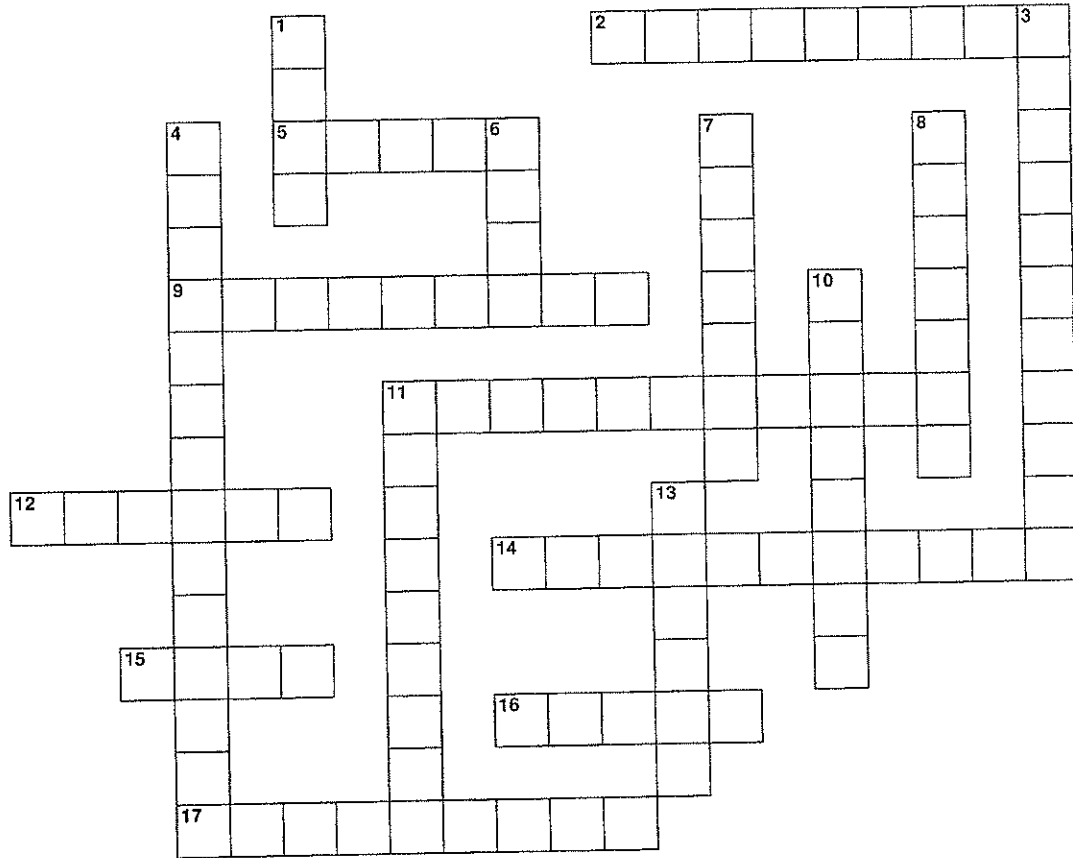
10. In what way(s) is alternation of generations different in *Selaginella* from alternation of generations in ferns?

11. Write the term haploid on the lines under each stage in the life cycle of *Selaginella* that has half the number of chromosomes.
12. Write the term diploid on the lines under each stage in the life cycle of *Selaginella* that has the full number of chromosomes.
13. In order for fertilization to occur in both the ferns and in *Selaginella*, the gametes have to be in what medium? Why?

14. The alternation of generations in tracheophytes is an extremely complex life cycle. Why do you think such a complicated method of reproduction developed in these plants?

Mosses and Ferns

Using the clues below, fill in the spaces of the puzzle with the correct words.

**Across**

2. Phylum that contains mosses, liverworts, and hornworts
5. Structures in tracheophytes that are similar to rhizoids in bryophytes
9. Cells found in xylem tissue that carry water
11. Structure that holds antheridia and archegonia in ferns
12. Large leaves of a fern
14. Structure found in some plants that produces flagellated sperm cells
15. Bundle of vascular tissues found in a leaf
16. Vascular tissue that transports water from the roots to all parts of a plant
17. Structure that produces spores in ferns

Down

1. Well-developed tracheophyte with rhizomes and fronds
3. Structure found in some plants which produces egg cells
4. Process carried out exclusively by autotrophs
6. Clusters of sporangia
7. Waxy material that covers the leaves of tracheophytes
8. Creeping or underground stem of a fern
10. Thin rootlike structures that anchor bryophytes in the ground
13. Vascular tissue that transports nutrients and photosynthetic products throughout a plant
11. Develops from the germinating spore of a moss.