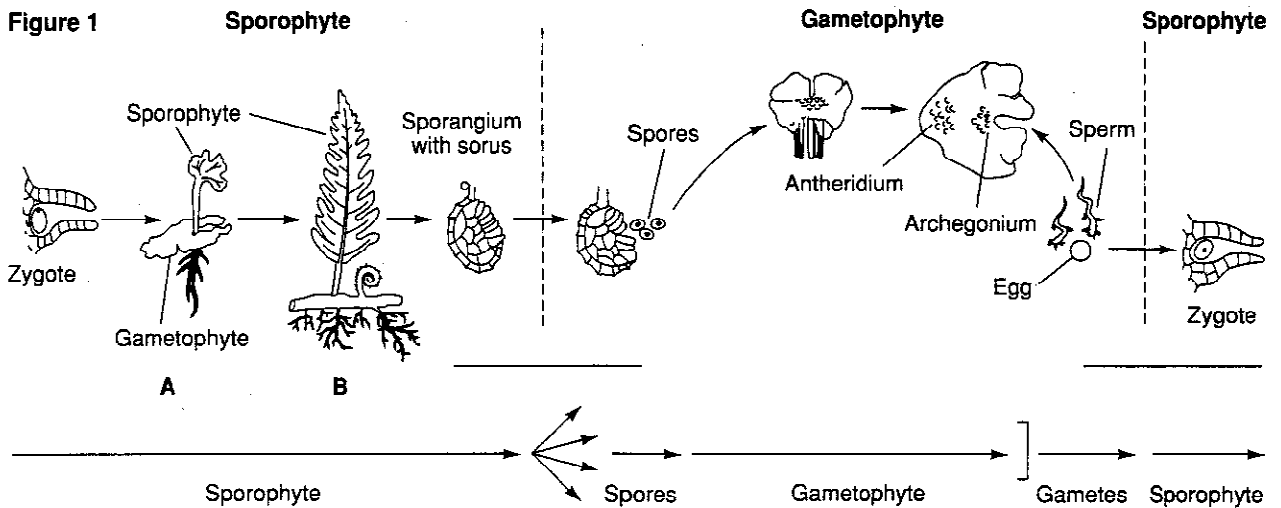


Alternation of Generations in Tracheophytes

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.

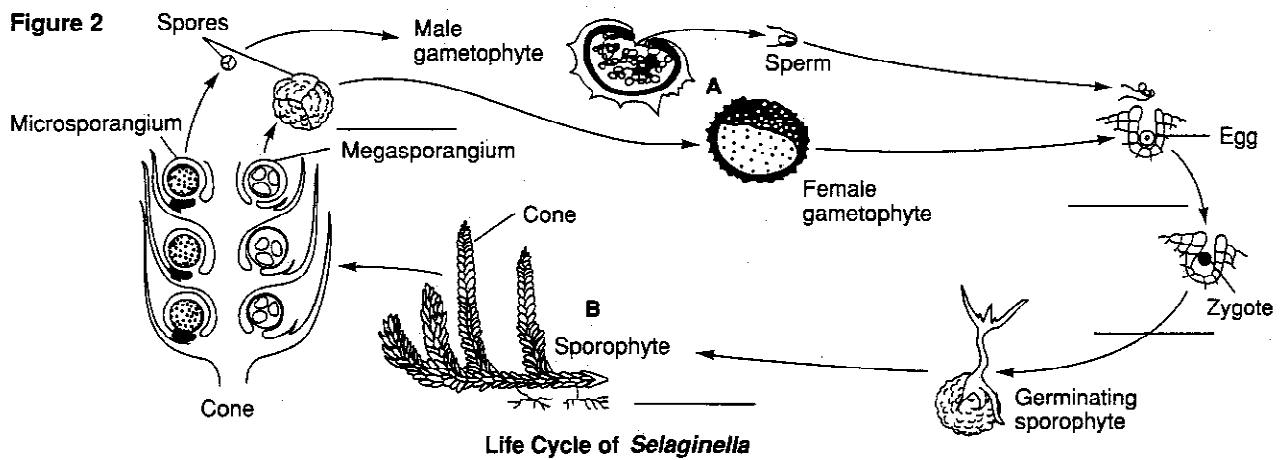
4. Which structure(s)—A, B, or both—contains chlorophyll?

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?
