

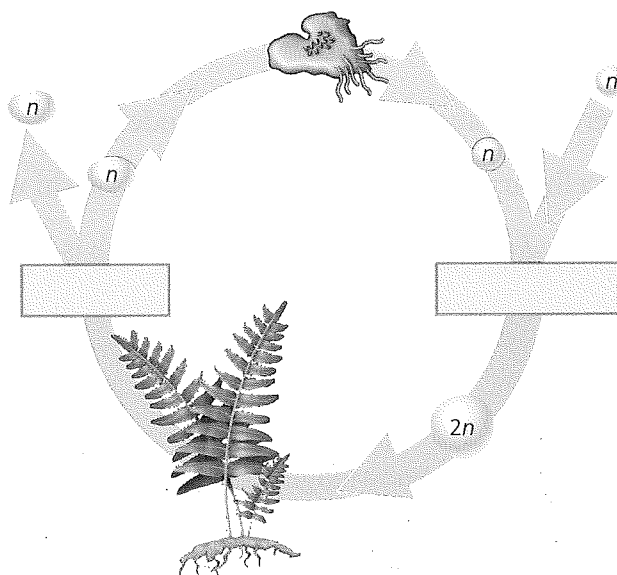
Name _____ Period _____

Chapter 29: Plant Diversity I: How Plants Colonized Land

The movement of plants onto land required many adaptations, which are discussed in this chapter. The first land plants were more closely tied to water than later groups, so focus on the features that are new in successive groups. Life cycles is the second important topic in this chapter, and although the terminology is less important, it helps to describe alternation of generations in plants. We will lead you through the most important parts of this chapter, focusing on adaptations for terrestrial life and plant life cycles.

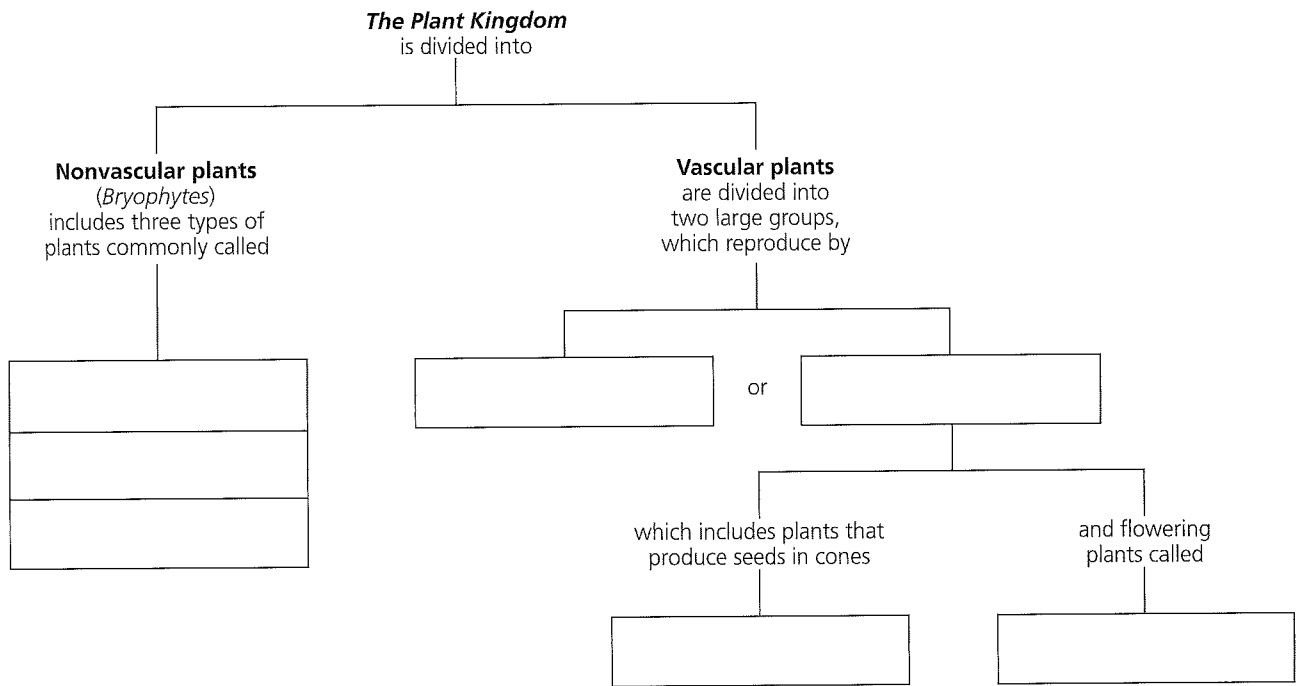
Concept 29.1 Land plants evolved from green algae

- Plants colonized land about 500 million years ago. Which group of algae is believed to be the ancestor of land plants?
- Perhaps you answered *green algae* to question 1, which would be correct, or *charophytes*, which are a lineage of green algae and a more precise correct answer. Whatever your response was, modify your answer to include the other term. Read this section and you will review a number of traits that plants share with various groups of algae. We are most interested in those adaptations that are unique to plants and enabled life on land. One trait that is shared with the *charophytes* is sporopollenin. Although the term is not critical, its function is. What is it, and why is it important?
- Using Figure 29.3 in your text, refer to the first section on alternation of generations. Label the following: *gametophyte*, *gamete*, *fertilization*, *zygote*, *mitosis*, *sporophyte*, *meiosis*, *spore*, n , and $2n$. After labeling, answer the following questions.



- a. Sexual life cycles always feature two key events. What are they? (Hint: Figure 13.6 on page 256)
 - b. If the gametophyte has 82 chromosomes, how many chromosomes are in the sporophyte?

 - c. In animals, the direct result of meiosis is a gamete. In plants, what is directly produced by meiosis? _____
 - d. Alternation of generations is a feature of the plant clade. Name the two generations that alternate. Which is haploid and which is diploid?
4. Now let's organize the plant groups. Complete the concept map that follows to show how plants are classified.



Concept 29.2 Mosses and other nonvascular plants have life cycles dominated by gametophytes

5. An important feature of plants is *alternation of generations*. Let's look further at the process with a specific group of plants, the mosses. Use Figure 29.6 in the text to locate the following: *male gametophyte*, *antheridia*, *female gametophyte*, *archegonia*, *egg*, *zygote*, and *sporophyte*. Note the haploid and diploid part of the life cycle.

6. What is made in the *antheridium*? _____ in the *archegonium*? _____
7. What is made by the *gametophyte* generation? _____
8. What is made by the *sporophyte* generation? _____
9. Where does meiosis occur?
10. In animals, the gametes are formed by meiosis. In plants, what cells are formed by meiosis?
11. How are spores dispersed?
12. How does the sperm reach the egg?
13. On this picture of moss, label the sporophyte and the gametophyte. Which generation is *haploid*? _____ Which is *diploid*? _____



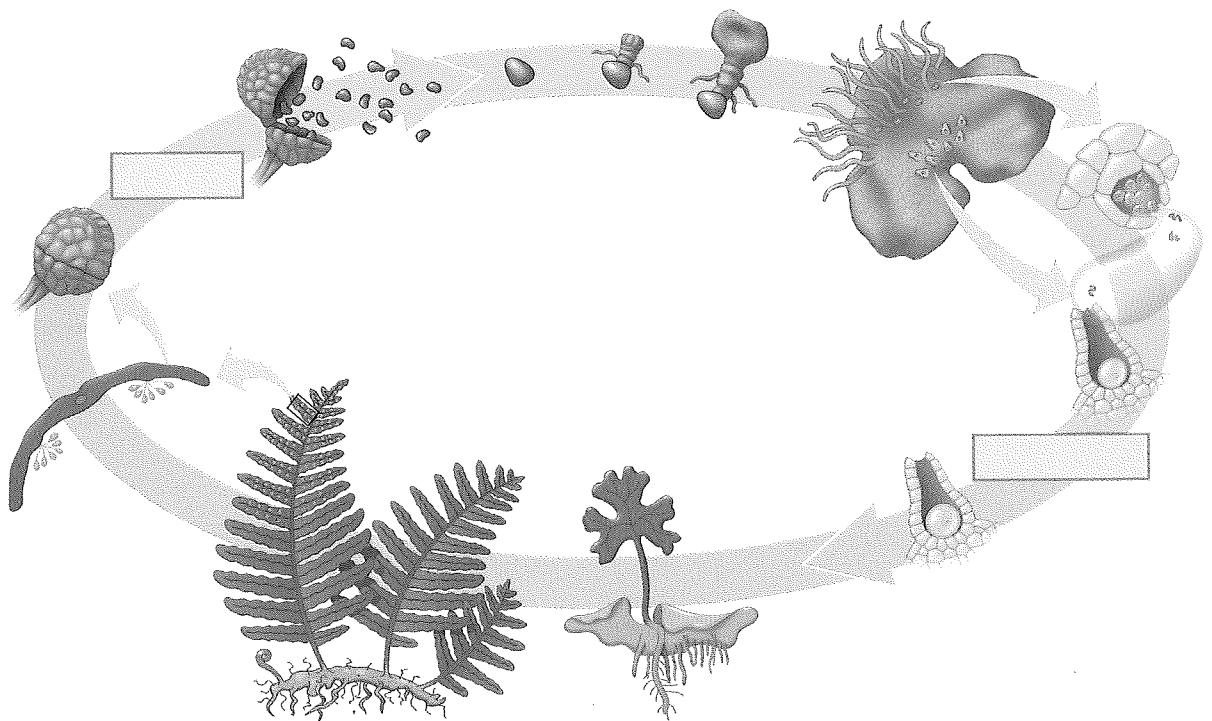
Polytrichum commune,
hairy-cap moss

14. How do mosses absorb water? How is it distributed?
15. Which moss generation is *dominant*? _____ It is larger, longer-living, independent, and photosynthetic. It is the generation that you will always see.

Concept 29.3 *Ferns and other seedless vascular plants were the first plants to grow tall*

16. Like the Bryophyta, ferns are most common in damp environments. What feature of their reproduction requires them to live in a moist habitat?

17. What are the two types of *vascular tissue*? What does each transport?
18. *Ferns* are vascular plants. Why can vascular plants grow to be very tall, but nonvascular plants are all tiny?
19. Lignified vascular tissue allows vascular plants to grow very tall because it adds strength. How does this give vascular plants a competitive edge?
20. What are the functions of *roots*?
21. What is the function of *leaves*?
22. To summarize, only plants with vascular tissue can have true roots, stems, and leaves. Ferns and their relatives are seedless vascular plants. You will see examples of club mosses, horsetails, and more in Figure 29.13 of your text. Have you ever seen any of the plants pictured here?
23. Let's conclude this chapter with a look at the life cycle of a fern. Use this to solidify your understanding of alternation of generations. Label the following elements on the diagram below: *sporangium*, *meiosis*, *spore*, *gametophyte*, *antheridium*, *archegonium*, *sperm*, *egg*, *fertilization*, and *zygote*.



24. Which generation is dominant in ferns? Is it haploid or diploid?
25. Throughout this chapter, we have looked at problems of a terrestrial life faced by plants. Use the following chart to summarize the solutions that are seen to some of these problems.

Problem	Solutions
1. Obtain water	
2. Transport water	
3. Transport products of photosynthesis	
4. Prevent desiccation of embryo	
5. Prevent desiccation of plant body	
6. Support against gravity	
7. Protect embryo	
8. Transport sperm	
9. Increase surface area for photosynthesis	

Test Your Understanding Answers (Some questions purposely omitted.)

Now you should be ready to test your knowledge. Place your answers here:

3. _____ 5a. _____ 5b. _____ 5c. _____ 5d. _____ 6 _____