

Name _____ Period _____

Chapter 29 Plant Diversity I: How Plants Colonized Land

Concept 29.1 Land plants evolved from green algae

1. Plants colonized land about 500 million years ago. Which group of algae is believed to be the ancestors of land plants?
2. 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 answer that is also correct. Whatever your response was, modify your answer above to include the other term. Read this section and you will review a number of traits of plants that they 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*. What is it, and why is it important?
3. Study Figure 29.5, which shows the four key traits that appear in nearly all land plants but not in the charophytes. You are about to encounter a large new vocabulary. We will use it through the next few chapters, so it is essential to master. Let's begin by just defining the terms.

alternation of generation

sporophyte

gametophyte

fertilization

zygote

spore

sporangia

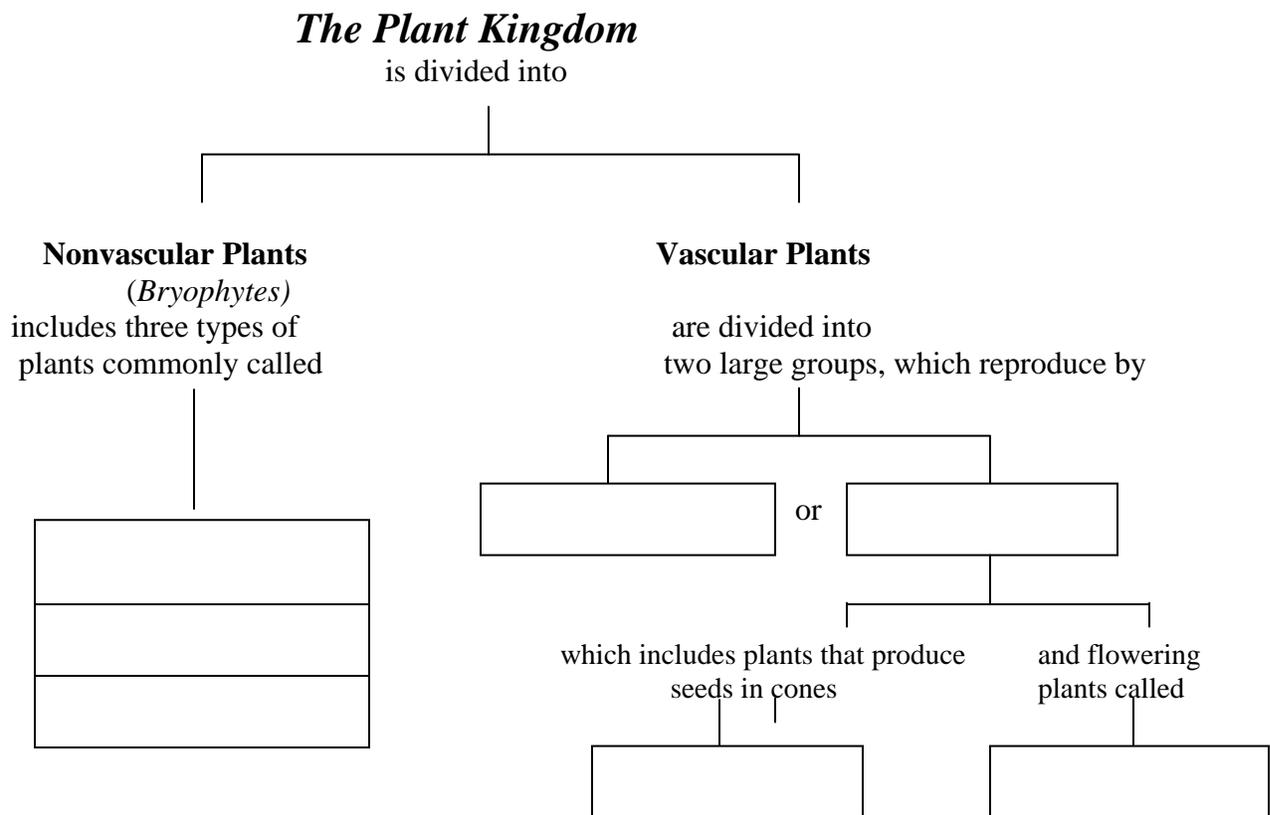
archegonia

antheridia

apical meristem

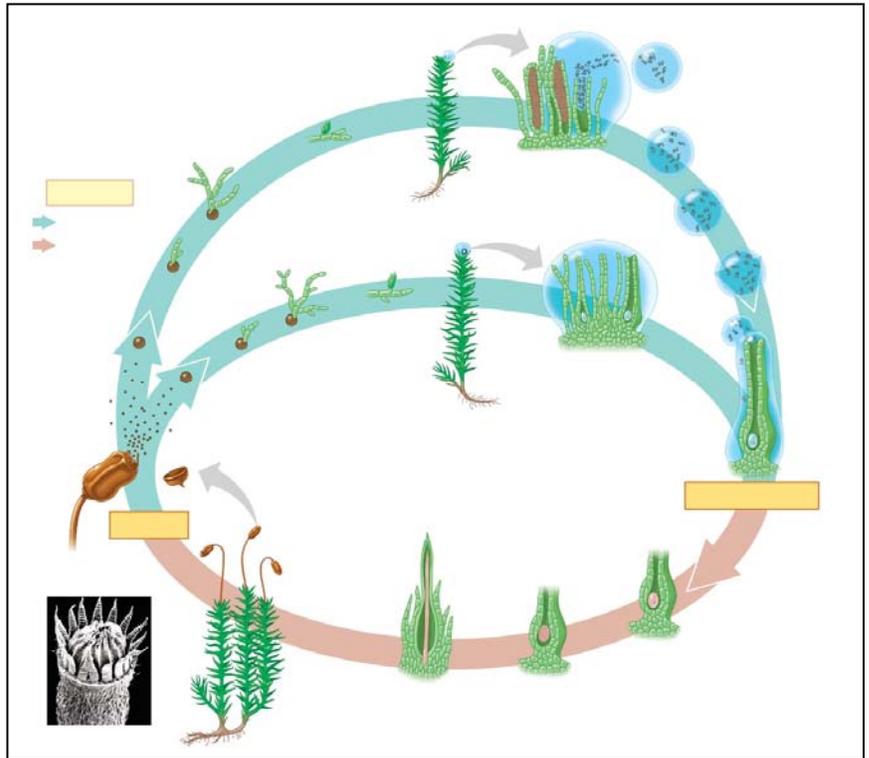
We will apply these terms in the next concept.

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. As you recorded in question 3, an important feature of plants is *alternation of generations*. It is time now to learn how this process works, and a study of the moss life cycle is a good place to begin. Label the following features: *male gametophyte*, *antheridia*, *female gametophyte*, *archegonia*, *egg*, *zygote*, and *sporophyte*. Indicate 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. However, 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 a moss, label the *sporophytes* and *gametophytes*. Which generation is *haploid*? Which is *diploid*?

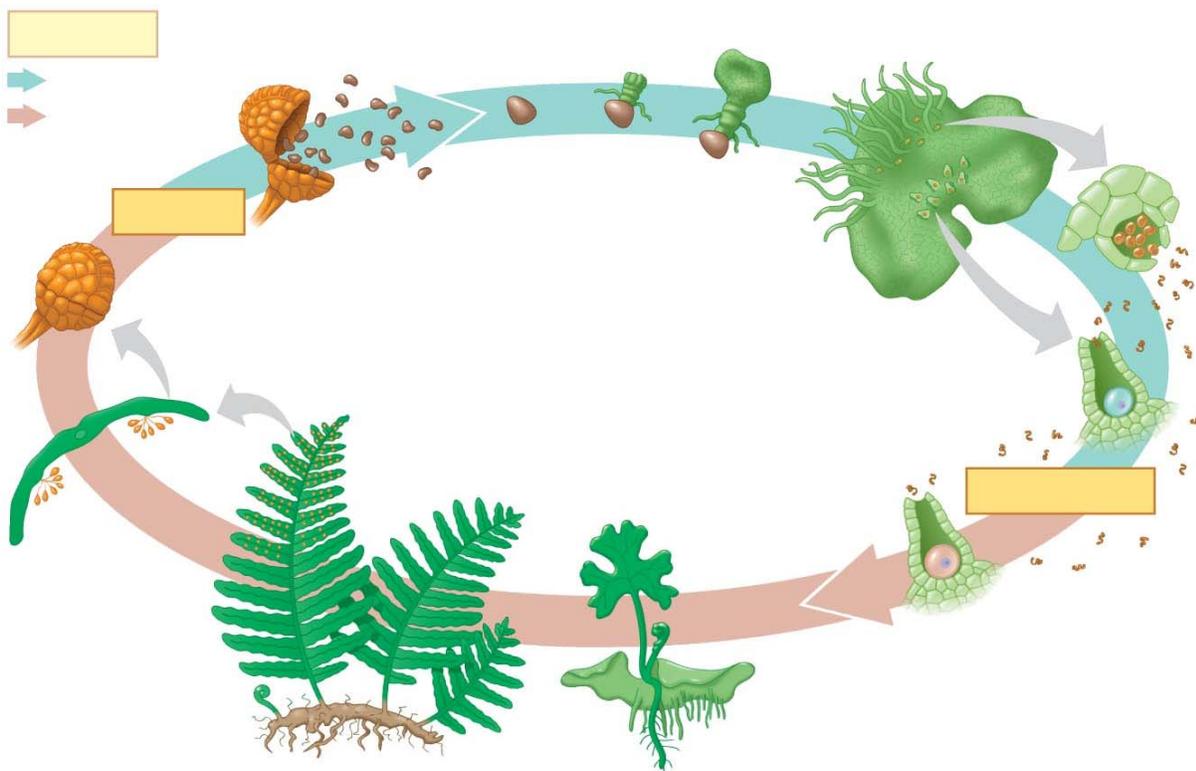


14. How do mosses absorb water? How is it distributed?
15. Which moss generation is *dominant*? It is larger, longer-living, independent, and photosynthetic. It is the generation that you will always see.

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 tissues to grow very tall. How does this give vascular plants a competitive edge?
20. What are functions of *roots*?
21. Go back to page 604 in your text to answer this: What are *mycorrhizae*? Without true roots, how do bryophytes absorb nutrients from the soil?
22. What is the function of *leaves*?
23. 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 29.15. Have you ever seen any of the plants pictured here?
24. 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: *sporangium*, *meiosis*, *spore*, *gametophyte*, *antheridium*, *archegonium*, *sperm*, *egg*, *fertilization*, *zygote*.



25. Which generation is dominant in ferns? Is it haploid or diploid?
26. 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	

Testing Your Knowledge: Self-Quiz Answers

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

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____

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Chapter 30: Plant Diversity II: The Evolution of Seed Plants

In this second chapter on the evolution of plants, it is important to know enough terminology to understand the major evolutionary trends. As you work through this chapter, keep working to see the big picture and try not to get lost by too many new terms. Be patient.

Concept 30.1 Seeds and pollen grains are key adaptations for life on land

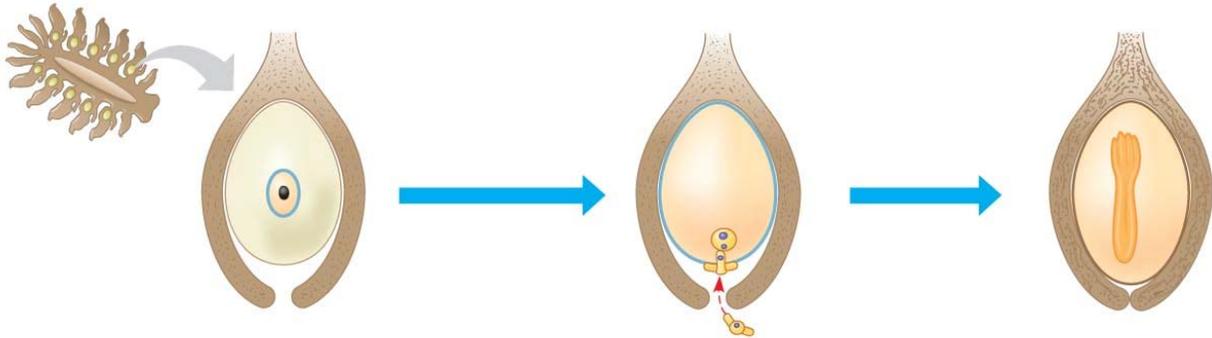
1. List five characteristics common to all seed plants.
2. In seed plants, the evolutionary trend of gametophyte reduction continues. List four advantages the plant gains by the miniaturization of the gametophyte.
3. *Heterospory* indicates that the plant produces two kinds of spores: *megaspores* and *microspores*. Explain what each type of spore forms as it develops.

megaspore

microspore
4. Inside each _____, a female _____ develops from a megaspore and produces one or more _____.
5. A microspore develops into a _____ that consists of a male _____ enclosed within the pollen wall.

6. What is the purpose of *pollination*?
7. What are two advantages of pollen over free-swimming sperm?
8. What are three advantages of seeds over spores?

9. Using Figure 30.3 as a guide, label all parts of this figure. Then, below each of the three drawings, explain what is occurring.



Concept 30.2 Gymnosperms bear “naked” seeds, typically on cones

10. Figure 30.5 shows the four phyla of gymnosperms. The phylum *Coniferophyta* will most likely be the one with which you are most familiar. What are five examples of the *Coniferophyta*?

11. Understanding the life cycle of the pine should bring together the essential characteristics of gymnosperms. Following Figure 30.6, label and give eight brief explanations of the important features of the pine life cycle.



Study Hint: Continue to look for the big picture. Microspores will eventually produce pollen that will contain sperm nuclei. Megaspores will eventually produce archegonia that will contain eggs. The sperm and egg will unite to form a diploid embryo. The basics are the same as with any sexually reproducing organism.

Concept 30.3 The reproductive adaptations of angiosperms include flowers and fruits

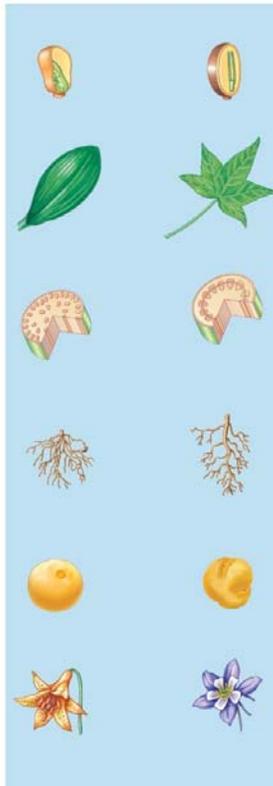
12. Concerning seeds, what is the difference between gymnosperms and angiosperms?
13. What is the specialized function of the *flower*?

14. Label the ten structures on the flower diagram. Briefly give the function of each labeled part.



15. A fruit consists of a mature _____.
16. List the two functions of fruits.
17. What is the difference between cross-pollination and self-pollination? What is the evolutionary advantage of cross-pollination?
18. What two events occur during *double fertilization*?
19. In the space below, draw the essential features of the life cycle of an angiosperm. Use Figure 30.10 as a guide, but simplify the labeling to reflect only the most important terms. After sketching and labeling, use your own phrasing to explain the process in seven concise steps.

20. After double fertilization, the ovule matures into the _____. The zygote develops into the sporophyte _____. The embryo is nourished by a tissue called the _____.
21. The two largest groups of angiosperms are *monocots* and *eudicots*. Flowering plants can often be placed in one of these two categories by easy-to-observe characteristics. Label the following portion of Figure 30.13 showing key differences between the two groups.



Concept 30.4 Human welfare depends greatly on seed plants

22. Explain the importance of seed plants to humans in the following areas:

food

wood

medicines

23. Why should threats to plant diversity be taken seriously?

Testing Your Knowledge: Self-Quiz Answers

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1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

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Chapter 31: Fungi

Concept 31.1 Fungi are heterotrophs that feed by absorption

1. Both animals and fungi are multicellular heterotrophs, but they differ in how they obtain their nutrients. Explain how fungi bring in nutrients.
2. Both plants and fungi have cell walls. What material is found in the cell wall of fungi?
3. The body of a fungus consists of *hyphae*, which make up the *mycelium*. What are these?
4. In the last chapter, we looked at the importance of *mycorrhizae* to plant nutrition. Explain the action of *mycorrhizae*.

Concept 31.2 Fungi produce spores through sexual or asexual life cycles

5. A new fungal organism grows from what structure?
6. *Spores* are the reproductive cells of fungi; they can be formed sexually or asexually. When two haploid mating strains are near each other, how do they signal or communicate?

Concept 31.4 Fungi have radiated into a diverse set of lineages

This concept discusses many different fungi and has some wonderful photographs and figures. Although you might not be asked much about fungi on an AP Biology exam, let's look at a few of them.

Zygomycetes

7. Here is a figure showing the life cycle of a fungus you have all seen—*Rhizopus stolonifer*, or common bread mold. Label it to explain a typical fungus life cycle.



8. Don't miss the story of *Pilobus*! Where do you find it, and how does it send its spores and next generation on to an appropriate new home?

Ascomycetes

9. What is the name of the structure where the sexual spores are produced?

10. What is the common name of this group?
11. Give at least three examples of *ascomycetes*.
12. Did your class do the *Sordaria* meiosis lab, AP Lab 3? _____ *Sordaria* is an ascomycete. You may also remember *Neurospora*, which Beadle and Tatum used in their research.

Basidiomycetes

13. What is the name of the structure where the sexual spores are produced?
14. What is the common name of this group?
15. Give at least three examples of *basidiomycetes*.
16. What are "fairy rings"? Have you ever seen one? Explain how they grow.

Concept 31.5 Fungi play key roles in nutrient cycling, ecological interactions, and human welfare

17. Fungi are heterotrophs and have three modes of nutrition. Explain each mode of nutrition, and describe a fungus that exhibits it.

Explanation of Mode of Nutrition	Fungus Example
<i>Decomposer</i>	
<i>Parasitism</i>	

<i>Mutualism</i>	
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18. Tell the life stories of three of your favorite *pathogenic* fungi.

19. Describe three ways in which humans benefit from activities of fungi.

Testing Your Knowledge: Self-Quiz Answers

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