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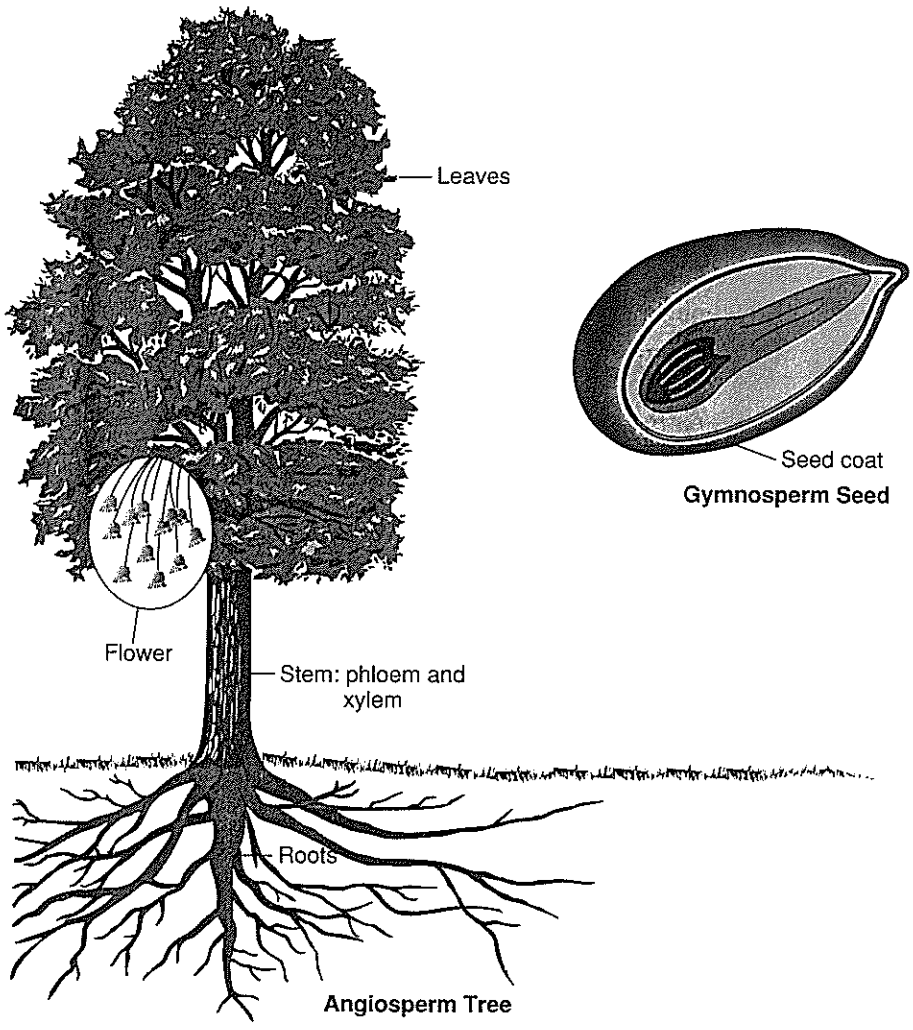
Plants Designed for Life on Land

Life on land offers many benefits to plants, including abundant sunlight and gaseous carbon dioxide and oxygen. But life outside of water also presents significant problems to plants. The seed plants have overcome many of these problems through the evolution of adaptations that allow them to survive the difficulties of life on land.

The figure below shows some of the adaptations of seed plants. On the lines that follow, briefly describe the role of each of these adaptations.



1. Leaves: _____

2. Stem: _____

3. Phloem: _____

4. Xylem: _____

5. Roots: _____

6. Seed coat: _____

For each of the following environmental situations, describe one adaptation that would enable a seed plant to survive.

7. Rain falls only during one short season each year; water is deep below the soil surface. _____

8. Tall buildings block out sunlight; sunlight is available 6 meters to 10 meters above ground level. _____

9. The days are humid; the nights are extremely dry. _____

10. The days are extremely dry; the nights are humid. _____

11. Annual strong winds pose physical danger to plants. _____

12. Leaves are heavily browsed by a migratory mammal that lives in the area only during winter. _____

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Flower Pollination and Seed Dispersal

A. Pollination is essential to the reproduction of flowering plants. It involves the transfer of pollen from one flower to another. Since plants cannot move, they must rely on agents to transfer the pollen for them. Different flowers have different agents, or pollinators. The pollinator depends on the characteristics of the flower. Some plants are pollinated by the wind. Most angiosperms, however, are pollinated by insects, birds, and mammals. Many of these organisms eat pollen and nectar produced by flowers. As they travel from one flower to the next looking for food, some of the pollen from one flower is accidentally transferred to another flower.

The following chart describes some common agents of pollination. Use this information to decide which agents would pollinate each of the flowers described in the list.

Agent	Special Characteristics
Honeybees 	Excellent vision but cannot see the color red; can see blue, yellow, and ultraviolet best
Night-flying moths 	Cannot see color; excellent sense of smell
Flies 	Attracted to scents that resemble dead or decaying animals
Hummingbirds 	Good sight; attracted to orange and red; poor sense of smell
Bats 	Active at night; attracted to sour, musty odors

1. The banana plant has a hanging flower that opens only at night and gives off a musty odor.

_____

2. Willow trees have simple flowers with little fragrance that produce tiny pollen grains. _____

_____

3. Skunk cabbage releases an odor like that of decayed meat. _____

4. Flower A is bright orange with little fragrance. _____

5. Flower B has small white flowers that open at night and produce a sweet scent. _____

_____

6. Flower C is bright yellow with nectar located close to its surface. _____

7. Flower D is bright red with nectar located in long tubes. _____

8. Which type of pollination is most random? Explain your answer. _____

_____

_____

9. Do wind-pollinated or animal-pollinated flowers produce more pollen? Explain your answer.

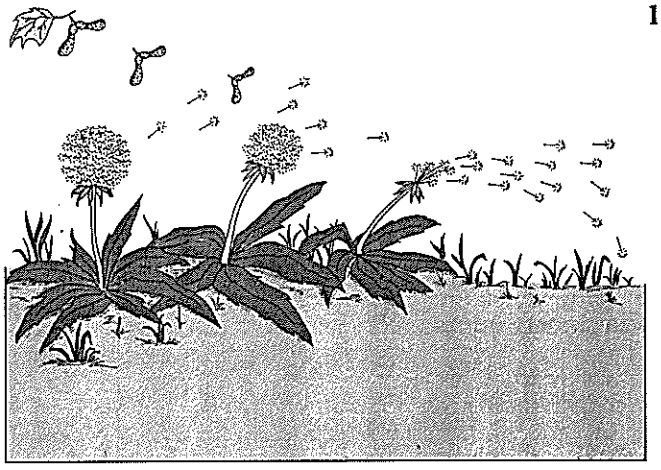
_____

_____

_____

B. Just as flowers have different methods of pollination, angiosperm fruits have different adaptations to help scatter seeds away from the parent plant. The process of distributing seeds is called seed dispersal.

The illustrations that follow represent four methods of seed dispersal. On the lines next to each illustration, briefly describe each method.



1. _____

_____

_____

_____

_____

_____

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2. _____

3. _____

4. _____

5. Why is seed dispersal important to plants? _____

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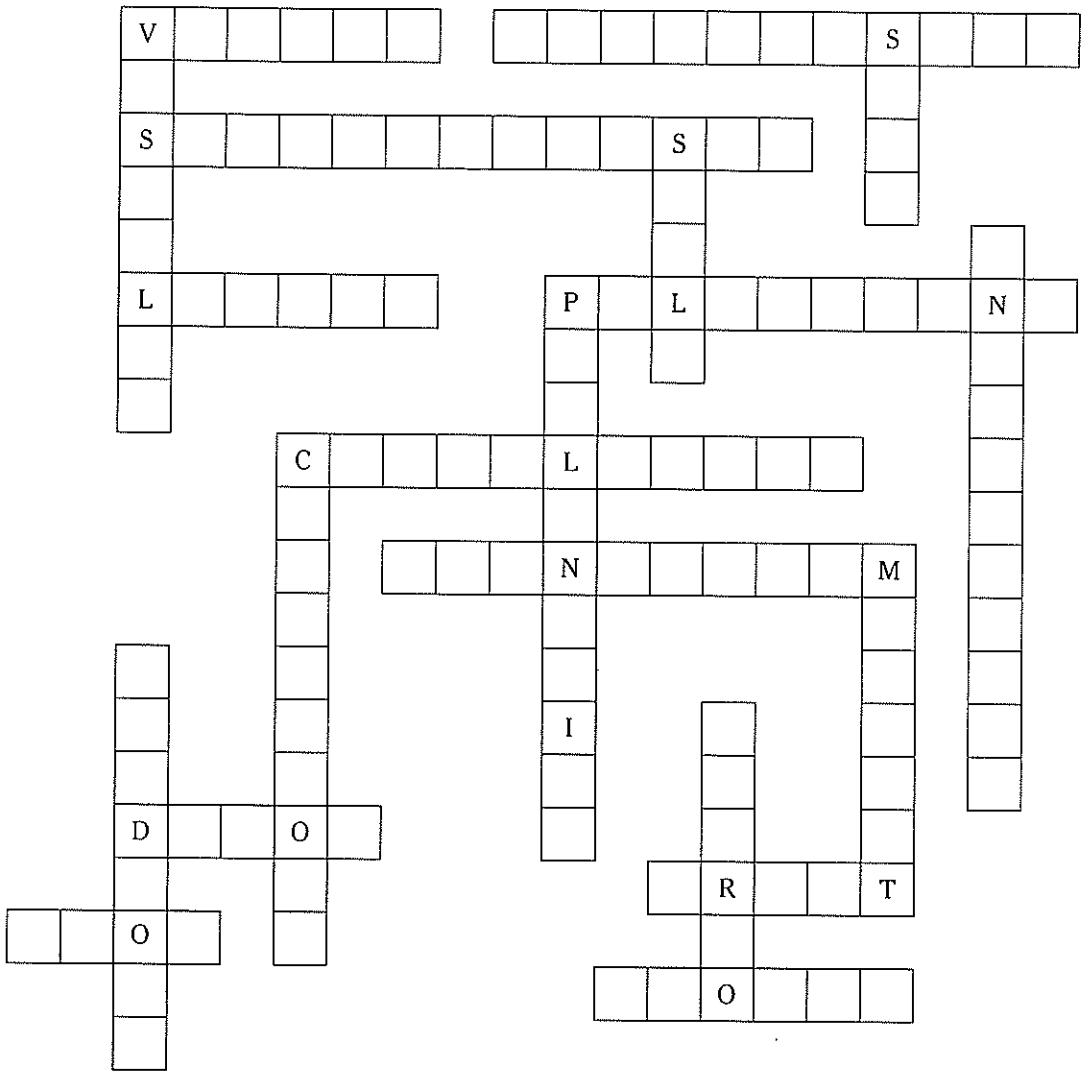
Cross-a-Clue

Write the answers to the numbered clues on the lines provided. These answers will give you the words to fill in on the crossword diagram below. The crossword contains letter clues to help you place the word or words correctly.



1. Process by which two organisms evolve structures and behaviors in relation to one another _____

2. Tiny plant protected by a seed coat _____

3. Carrying of pollen to a female gametophyte _____

4. Seed plant with two seed leaves _____

5. Type of pollination that results from the actions of animals _____

6. Reproductive structure of angiosperms _____

7. Plant structure that holds the leaves of the plant up to the sun _____

8. Naked-seed plant _____

9. Bundles that contain xylem and phloem tissues _____

10. Plant structure that absorbs water and dissolved nutrients from the soil

_____

11. Flowering plants _____

12. Process of distributing seeds away from parent plants _____

13. Produces male gametophytes in conifers _____

14. Leaves of an embryo _____

15. Specialized male or female reproductive structures found in gymnosperms

_____

16. Organs in which most plants make food _____

17. Protective wall that surrounds the seeds of an angiosperm _____

18. Protective covering that surrounds the embryo _____

19. Name of the subphylum that includes seed plants _____

20. Seed plant with one seed leaf _____