# Chapter 24 Kingdom Plantae

# GENERAL Biology students are only responsible for the notes in BLACK font type on this study guide.

# HONORS students are responsible for ALL the class notes (including yellow highlighted notes on this study guide).

1. Overview
   1. What is a plant? (from “warm up” slides)
      1. Plants are members of the Kingdom \_\_\_\_\_.
      2. All plants are \_\_\_\_\_ and are composed of \_\_\_\_\_ cells.
      3. All plants have cell walls composed of \_\_\_\_\_.
      4. All plants carry out \_\_\_\_\_ (Autotrophs) using the green pigment, \_\_\_\_\_.
      5. Life Cycle exhibits \_\_\_\_\_.
      6. Plant Embryo is \_\_\_\_\_.
   2. \_\_\_\_\_: Study of Plants
   3. Life could not exist on earth without plants
      1. Plants are the \_\_\_\_\_ in every food chain.
      2. Plants carry out \_\_\_\_\_ producing \_\_\_\_\_ from \_\_\_ and \_\_\_\_.
      3. The plant uses this glucose as a source of energy, but much of this glucose is passed up the \_\_\_\_\_.
         1. Herbivores eat the \_\_\_\_\_ and carnivores eat the \_\_\_\_\_.
         2. As a result, an amount of the glucose produced by the plant is passed to the next step in the food chain.
      4. Not only do plants provide the base for food chains, they provide \_\_\_\_\_ for animals as well as shelter and nesting sites.
   4. \_\_\_\_\_ of Generations
      1. All plants exhibit Alternation of Generations
         1. They have two different forms which they exist
            1. S\_\_\_\_\_ (\_\_\_\_\_; diploid (2n))
            2. G\_\_\_\_\_ (gamete-producing) (\_\_\_\_\_-n)

Diploid (2n) sporophyte stage produces haploid spores by \_\_\_\_\_.

Haploid spores undergo \_\_\_\_\_ to produce gametophyte stage.

1. Gametophyte makes gametes (egg and sperm) by \_\_\_\_\_.
2. Fertilization: zygote (2n) produces a new \_\_\_\_\_ (n)

**Sporophyte plant produces spores by meiosis**

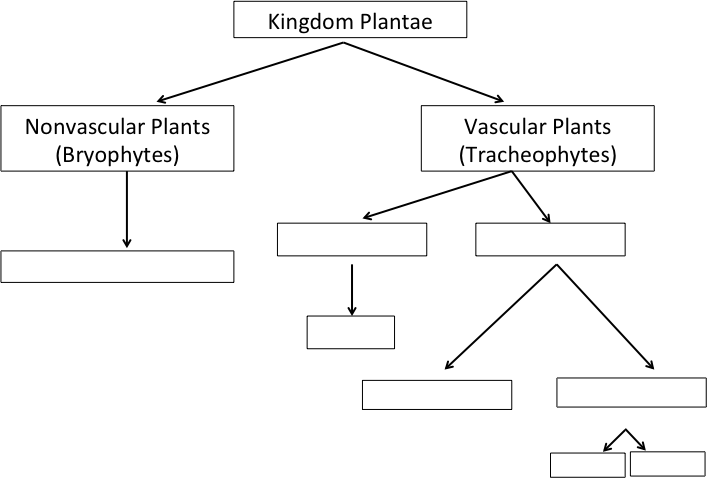
**Fertilization of gametes**

**The zygote develops into the sporophyte plant.**

1. Plant Diversity
   1. Genesis 1:11-13
   2. “Ancestral” Green (photosynthetic) Algae are thought to have led to the evolution of four major groups of living land plants
      1. \_\_\_\_\_ and Liverworts
      2. F\_\_\_\_\_
      3. G\_\_\_\_\_ (cone bearing plants)
      4. A\_\_\_\_\_ (flower bearing plants)
2. Classification of Plants
   1. All plants are either \_\_\_\_\_ plants or \_\_\_\_\_ plants.
      1. Vascular plants have vascular tissue and nonvascular plants do not have vascular tissue.
         1. Vascular tissue is tissue that conducts \_\_\_\_\_ and \_\_\_\_\_ throughout the plant.
         2. \_\_\_\_\_: carries food down the plant from the leaves.
         3. \_\_\_\_\_: carries water up the plant from the roots.
      2. Vascular Plants are Classified as \_\_\_\_\_.
      3. Nonvascular Plants are Classified as \_\_\_\_\_.
   2. Tracheophytes (Vascular Plants) are further subdivided into "Seed Plants" and "Seedless Plants".
      * + 1. The \_\_\_\_\_ Plants do not produce seeds. Example: \_\_\_\_\_.
          2. Seed Plants do produce seeds.
          3. The Seed Plants are divided into: \_\_\_\_\_ and \_\_\_\_\_.

Angiosperm (flowering plants)

M\_\_\_\_\_

D\_\_\_\_\_

Gymnosperm (Cone-bearing plants)

* 1. Nonvascular Plants
     + 1. Bryophytes are \_\_\_\_\_, meaning they have \_\_ vascular tissue (xylem and phloem)

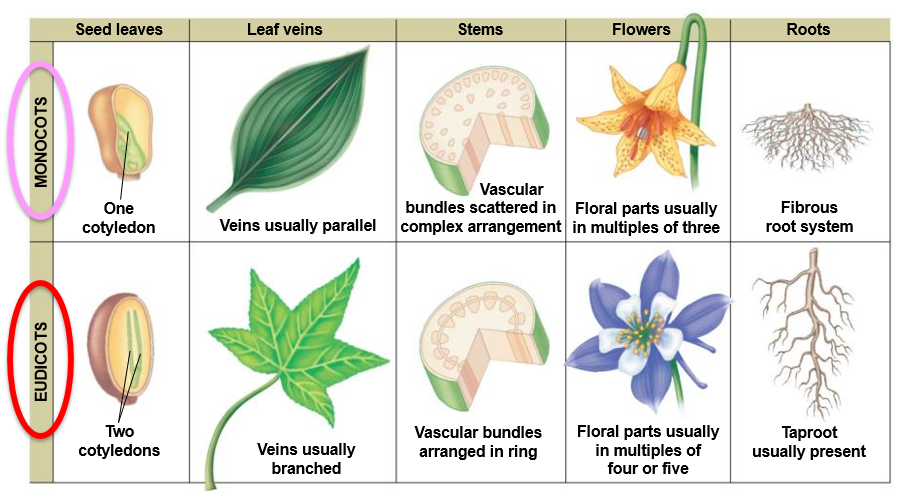
1. These plants can draw up water by \_\_\_\_\_ on a few centimeters above the ground.
2. This prevents them from growing very big.
3. Bryophytes have life cycles dominated by \_\_\_\_\_.
   * 1. Bryophytes include \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
     2. Bryophytes produce \_\_\_\_\_ gametes and must have water to \_\_\_\_\_.
4. During part of their life cycle, the produce \_\_\_\_\_ that must \_\_\_\_\_ through water to reach the egg.
5. They must live in places where there is rainfall or dew for at least part of the year.
   * 1. Bryophytes have \_\_\_ true roots, stems, or leaves
   1. Although bryophytes do not have true roots, they do possess \_\_\_\_\_.
6. Rhizoids are root-like structures that \_\_\_\_\_\_ the plant to the ground.
7. Water moves from cell to cell through the \_\_\_\_\_ and into the rest of the plant.
8. Rhizoids are capable of absorbing \_\_\_\_\_ and \_\_\_\_\_ from the soil.
   1. Bryophytes are small and grow close to the ground because they have no way to transport water large distances.
   2. This \_\_\_\_\_ the growth of the plant.
      1. Bryophytes show Alteration of Generations
9. In bryophytes, the \_\_\_\_\_ is the dominant, recognizable stage of the life cycle and is the stage that carries out most of the plant’s photosynthesis.
10. As members of the plant kingdom, they do possess \_\_\_\_\_ and carry out \_\_\_\_\_.
    1. Vascular Plants (Tracheophytes)
       * 1. Vascular tissue is specialized to conduct \_\_\_\_\_ and \_\_\_\_\_ throughout the plant.
         2. Two types of Vascular Tissue: X\_\_\_\_\_ and P\_\_\_\_\_.
         3. Vascular tissue enables plants to grow upward, away from the surface of the ground
    2. Seedless Vascular (tracheophytes) plants – \_\_\_\_\_
11. Ferns have \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
12. The \_\_\_\_\_ generation is dominant
13. Ferns have \_\_\_\_\_ tissue (xylem and phloem).
14. Just like the nonvascular plants, the Ferns have motile, \_\_\_\_\_.
15. Water must be present for the \_\_\_\_\_.
    1. Seeded Vascular (Tracheophytes) Plant Properties
16. Have \_\_\_\_\_ or \_\_\_\_\_.
17. The transfer of sperm by \_\_\_\_\_.
18. The protection of \_\_\_\_\_ within \_\_\_\_\_.
    * + 1. Like bryophytes and ferns, all seed plants show alternation of generations, alternating between the \_\_\_\_\_ stages.
        2. Unlike the bryophytes and ferns, the seed plants do not require \_\_\_\_\_ for the fertilization of the gametes.
        3. This allows the seed plants to occupy many more types of \_\_\_\_\_ than the bryophytes and ferns.
        4. In the seed plant, the \_\_\_\_\_ generation is the dominant, recognizable stage of the life cycle and is the stage that carries out most of the plant’s \_\_\_\_\_.
        5. Cones and flowers are \_\_\_\_\_ structures.
        6. The gametophytes grow and mature within these \_\_\_\_\_.
    1. Seed Plants
       1. Classified in two groups: Angiosperm and Gymnosperm
19. Cones are the seed-bearing structures of \_\_\_\_\_.
20. Flowers are the seed-bearing structures of the \_\_\_\_\_.
21. The Gametophyte generations of seed plants live \_\_\_\_\_ Cones and Flowers.
    * 1. P\_\_\_\_\_
22. The entire male gametophyte is contained within the \_\_\_\_\_.
23. Pollen grains contain \_\_\_\_\_.
24. Rather than the sperm swimming through water, the pollen (sperm) is carried to the female gametophyte by \_\_\_\_\_, \_\_\_\_\_, or small animals.
25. \_\_\_\_\_ is the transfer of pollen from the male reproductive structures to the female reproductive structures.
    * 1. Seeds
    1. A seed consists of an \_\_\_\_\_ and a \_\_\_\_\_ that is enclosed inside of a protective outer covering.
    2. The plant embryo is \_\_\_\_\_ and is in the early developmental stage of the \_\_\_\_\_ plant.
    3. The seed contains a \_\_\_\_\_ that nourishes the embryo.
    4. This food supply \_\_\_\_\_ the embryo until the seed has sprouted and has grown enough to become fully photosynthetic.
    5. The outer \_\_\_\_\_ surrounds and protects the embryo and keeps the contents of the seed from drying out.
    6. The \_\_\_\_\_ remains in a dormant stage within the seed for weeks, months, or even years.
    7. The seed can survive long periods of bitter cold, extreme heat or drought. When growing conditions become favorable, the seed germinates and begins to grow.
26. G\_\_\_\_\_
27. Bear their seeds directly on the surfaces of \_\_\_\_\_.
28. Includes the conifer such as \_\_\_\_\_ and \_\_\_\_\_.
29. The term “Gymnosperm” means “Naked Seed”.
30. The Cone is the seed-bearing structure and all seeds are \_\_\_\_\_.
31. Cycads, ginkgoes, spruce, pine, cypress, fir, cedar, redwood.
32. A\_\_\_\_\_
33. General Properties
34. Also called \_\_\_\_\_ plants.
35. Bear their seeds within a \_\_\_\_\_ that protects the seed.
36. Angiosperms include grasses, flowering trees, and shrubs.
37. According to evolutionists, angiosperms appeared in the fossil record “only” 135 million years ago, making them the most “recent” of all plants.
38. \_\_\_\_\_ plants are thought to be the dominating form of plant life on earth.
39. They have a method of reproduction and development that involves \_\_\_\_\_.
40. Flowers and Fruit
41. Unique to angiosperms is the development of the \_\_\_\_\_ as the \_\_\_\_\_.
42. Flowers are an advantage to plants because they \_\_\_\_\_ insects and other small animals to the flower.
43. These insects and animals then transport \_\_\_\_\_ from one flower to another.
44. This means of pollination is much more efficient than the \_\_\_\_\_.

The \_\_\_\_\_ is also a structure found only in angiosperms.

The fruit is a wall of tissue surrounding the seed.

The fruit \_\_\_\_\_ the seed, but also aids in \_\_\_\_\_ by attracting animals to the fruit.

1. Angiosperm Diversity
2. The phylum containing angiosperms is divided into two classes: \_\_\_\_\_ and \_\_\_\_\_
3. Monocots and dicots are named for the number of \_\_\_\_\_ their seeds contain.
4. Monocots: have \_\_\_\_\_ cotyledon
5. Dicots: have \_\_\_\_\_ cotyledons
6. A \_\_\_\_\_ is the first leaf or the first pair of leaves produced by the embryo of a seed plant.

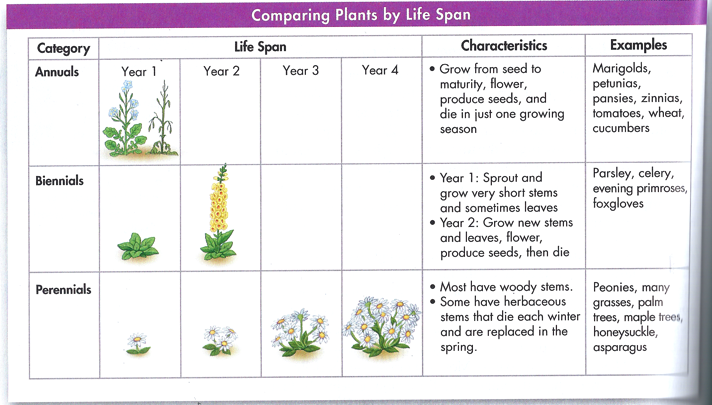


1. M\_\_\_\_\_ – corn, grass, coconut, orchid, banana, onion, wheat
2. D\_\_\_\_\_ – beans, coffee, tomato, daisy, mint, rose, pea, apple, maple
3. Most \_\_\_\_\_ trees are dicots.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Kingdom Plantae | | | |
| Characteristics | Mosses | Ferns | Gymnosperms | Angiosperms |
| Vascular Tissue Present? | No | Yes | Yes | Yes |
| True roots, stems, leaves? | No | Yes | Yes | Yes |
| Dominant Generation? | Gametophyte | Sporophyte | Sporophyte | Sporophyte |
| Water required for Fertilization |  |  |  |  |
| Seeds? |  |  |  |  |
| Flowers? |  |  |  |  |
| Motile or non-motile gametes? |  |  |  |  |
| Flowers or Cones? |  |  |  |  |

1. Basic Plant Tissue Types
2. Each plant organ (roots, stems, leaves) contains all three types.

|  |  |  |
| --- | --- | --- |
| Tissue | Components | Function |
| ? | Epidermis | * Protective outer covering * Prevent loss of water |
| ? | Parenchyma  Collenchyma  Sclerenchyma | * Bulk of plant body * Metabolism (Photosynthesis, Cell Respiration, etc.) * Storage of Sugars * Physical Support |
| ? | Xylem  Phloem | * Transport water and nutrients * Supports the plant body |

1. \_\_\_\_\_
2. Carries \_\_\_\_\_ and \_\_\_\_\_ from the roots to the rest of the plant.
3. Composed of \_\_\_\_\_ Cells (Cell Walls remain).
4. Cell Walls are lignified, which provide \_\_\_\_\_ for the plant (helps it grow tall).
5. In Trees it is the \_\_\_\_\_.
6. \_\_\_\_\_:
7. Carries the \_\_\_\_\_ made in the leaves during photosynthesis, to other plant structures.
8. \_\_\_\_\_ Tissue, but arranged in tubes.
9. Xylem and Phloem form a continuous network from the tip of the \_\_\_\_\_, through the \_\_\_\_\_, all the way to the \_\_\_\_\_, and vice versa.
10. \_\_\_\_\_ Tissue
11. Lies between dermal and vascular tissue.
12. Divided into: \_\_\_\_\_ and \_\_\_\_\_.
13. Leaf Ground Tissue is called \_\_\_\_\_.
14. Includes \_\_\_\_\_ (photosynthesis in the leaves, and storage in the roots).
15. \_\_\_\_\_ (shoot support in areas of active growth).
16. \_\_\_\_\_ (shoot support in areas where growth has ceased).
17. Plant Growth [chart below is for HONORS only]
18. Most plants have indeterminate growth, continuing to grow throughout a plant’s life.
19. Plants are categorized based on the length of their life cycle:
20. \_\_\_\_\_ complete their life cycle in one year.
21. \_\_\_\_\_ complete their life cycle in two years.
22. \_\_\_\_\_ live for many years.
23. Occurs in specialized tissues called \_\_\_\_\_, consisting of undifferentiated cells that divide when conditions permit.
24. \_\_\_\_\_ Meristems are found at the tips of roots and in the buds of shoots.
25. Primary Growth
26. occurs at apical \_\_\_\_\_.
27. allows roots to push downward through the soil.
28. allows shoots to grow upward, increasing exposure to \_\_\_\_\_ and CO2.