

## SOLUTIONS TO THE STUDY GUIDE FOR MODULE #14

1. a. Botany – The study of plants
  - b. Perennial plants – Plants that grow year after year
  - c. Annual plants – Plants that live for only one year
  - d. Biennial plants – Plants that live for two years
  - e. Vegetative organs – The parts of a plant (such as stems, roots, and leaves) that are not involved in reproduction
  - f. Reproductive plant organs – The parts of a plant (such as flowers, fruits, and seeds) involved in reproduction
  - g. Undifferentiated cells – Cells that have not specialized in any particular function
  - h. Xylem – Nonliving vascular tissue that carries water and dissolved minerals from the roots of a plant to its leaves
  - i. Phloem – Living vascular tissue that carries sugar and organic substances throughout a plant
  - j. Leaf mosaic – The arrangement of leaves on the stem of a plant
  - k. Leaf margin – The characteristics of the leaf edge
  - l. Deciduous plant – A plant that loses its leaves for winter
  - m. Girdling – The process of cutting away a ring of inner and outer bark all the way around a tree trunk
  - n. Alternation of generations – A life cycle in which there is both a multicellular diploid form and a multicellular haploid form
  - o. Dominant generation – In alternation of generations, the generation that occupies the largest portion of the life cycle
  - p. Pollen – A fine dust that contains the sperm of seed-producing plants
  - q. Cotyledon – A “seed leaf” which develops as a part of the seed - it provides nutrients to the developing seedling and eventually becomes the first leaf of the plant.
2. Meristematic tissue will be anywhere that mitosis is going on. The cells that perform mitosis are a part of the meristematic tissue.
  3. The petiole attaches the leaf blade to the stem.

4. a. Whorled      b. Alternate      c. Opposite

5.

Letter	Shape	Margin	Venation
a.	Deltoid	Entire	Parallel
b.	Elliptical	Serrate	Pinnate
c.	Lobed	Entire	Pinnate
d.	Cleft	Dentate	Palmate
e.	Orbicular	Undulate	Pinnate (This is a tough one. You might think it's parallel, but there is actually a vein in the middle, from which the other veins sprout. )
f.	Chordate	Entire	Pinnate

6. a. photosynthesis b. photosynthesis c. protection d. transports water and minerals e. transports food and organic substances f. support

7. The guard cells control the opening and closing of the stomata.

8. The spongy mesophyll is typically on the underside of the leaf, and it is usually a lighter shade of green due to the fact that the photosynthesis cells are not as tightly packed there.

9. Carotenoids and anthocyanins.

10. No, a tree without an abscission layer cannot be deciduous. Remember, the abscission layer cuts off the flow of nutrients to the leaves, which causes them to stop doing photosynthesis, causing them to die. With no abscission layer, that will not happen and the tree will not lose its leaves in the winter.

11. The abscission layer is right between the stem and the petiole.

12. The four regions of a root are: the root cap, the meristematic region, the elongation region, and the maturation region. The undifferentiated cells are in the meristematic region.

13. a. This is from a dicot. The fibrovascular bundles do not have a face-like appearance; instead, they are characteristic of dicots.

b. This is from a monocot. The face-like characteristic of the fibrovascular bundles tells you this.

14. Woody stems have no limit to their growth because the cork cambium can always produce more bark. Thus, when the bark cracks, the inner parts of the stem are not exposed to the surroundings.

15. The vascular cambium produces new vascular tissue.

16. It is woody. The cork cambium appears only in woody stems. It makes new cork tissue for the outer bark.

17. Xylem make up most of the wood in a woody stem, while phloem are found in the inner bark.

18. The dominant generation in mosses is the gametophyte generation, and it is haploid.

19. If it has archegonia and antheridia, it produces gametes. Thus, it is in the gametophyte generation, which is not the dominant generation for ferns.
20. Since plants from phylum Bryophyta have no vascular tissue, there is no efficient way to transport nutrients throughout the plant. The plant must therefore stay small so that the nutrients need not travel far.
21. The plant must have a fibrous root system. If a root system does not go deeper than the height of a plant, it must spread out so that its total length is greater than that of the plant.
22. The female reproductive organ is the seed cone, and the male is the pollen cone.
23. The number of cotyledons produced in the seed is the fundamental difference between monocots and dicots. Monocots have one cotyledon in their seeds, dicots have two.
24. In monocots, the venation is parallel, while it is netted (pinnate or palmate) in dicots. The fibrovascular bundles are packaged differently in monocots and dicots. Typically, monocots have fibrous root systems whereas dicots have taproot systems. Finally, monocots usually produce flowers in groups of three or six while dicots produce flowers in groups of four or five. The student need list only one of these.
25. It belongs in phylum Coniferophyta, which contains the cone-making plants. It is vascular. Only the bryophytes are nonvascular.
26. It belongs in phylum Anthophyta.