Study Guide | Botany: Unit II | Name:

mr. e | Leaves

Format: 25 multiple choice/T or F; 2 'label the diagram' sections (plant cell, dicot leaf x-section); 3 shorter essays (see end)

Vocabulary

Leaf margin
Sessile
Chloroplast
cell membrane
cytoplasm
nucleus
vacuole
cell wall
nucleolus
nuclear envelope
mitochondrion
smooth ER.
lower epidermis
spongy mesophyll layer
cuticle
guard cells
xylem
phloem
stoma(ta)
palisade mesophyll layer
upper epidermis
air spaces
central vein
simple leaf
compound leaf
alternate/opposite/whorled
venation patterns
phototropism
catalyst
chlorophyll
xanthophyll
carotene
anthocyanin
turgor P
arid/temperate/tundra

Concepts to know:

1. Basic leaf margin types.
2. Location of chloroplasts in a dicot leaf.
3. Leaf arrangement t arrangement types
    a. Alternate
    b. Opposite
    c. Whorled
4. General direction of flow of materials through vascular tissues (xylem/phloem)
5. Basic tissue types (meristematic, vascular, structural [ground, epidermal])
6. What is the chief principle of leaf arrangement?
7. Factors that affect transpiration
8. Affect of the Stoma on transpiration
9. Modified leaves & their functions
    a. Water-storing
    b. Tendrils
    c. Bracts
    d. Thorns/spines
    e. carnivorous

10. Levels of organization (cell→ tissue→organ…) be able to define each level using the former

11. Role of hormones in phototropism of the leaf.

12. Basic parts & *functions* of dicot leaf parts (see diagram below)

13. Why do plant cells typically have larger vacuoles than animal cells?

14. What is a catalyst? Which part of the leaf did we identify as catalytic? Why?

15. How much (%) sunlight is actually converted by plants to sugars in photosynthesis?

16. Photosynthetic byproducts: Know which sugar is made, which is transported, and which is stored.

17. Relate relative cuticle thickness with environment.

18. Know what basic plant cell parts look like (be able to verbally describe them to a friend)

19. Identify a leaf's margin based on a picture of a leaf.

Diagram Labeling I: plant cell anatomy (word bank provided)

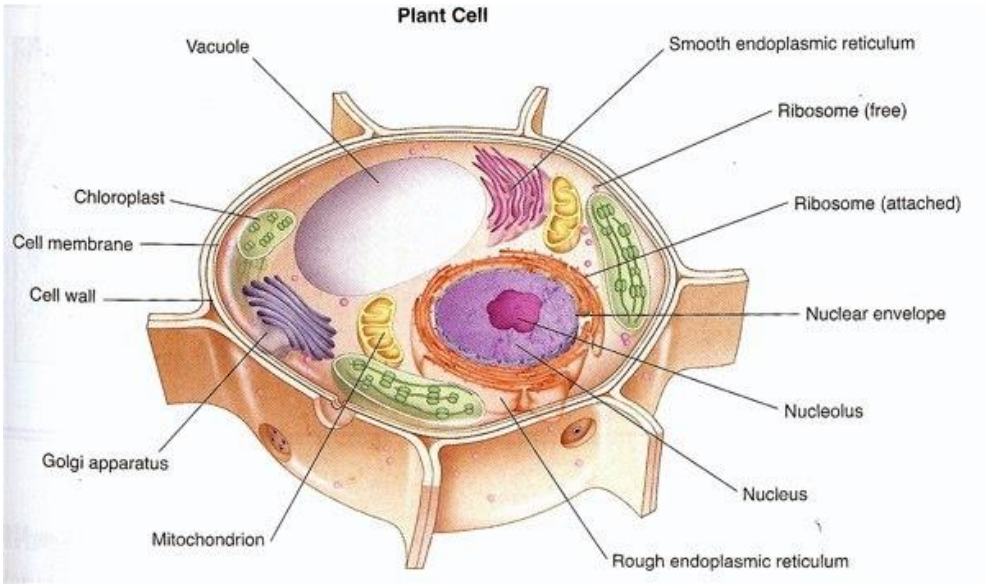
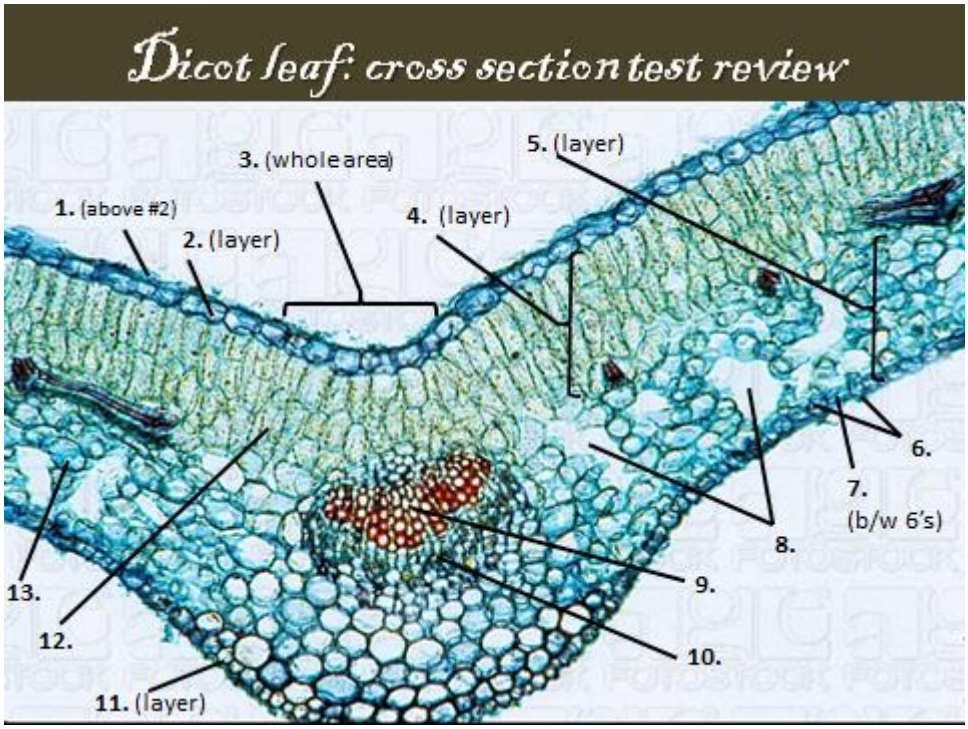


Diagram Labeling II: Dicot leaf cross-section (same as practicum before--only hand-drawn…)



Essay Questions: There are nine essay presented. Choose the *three* you feel most comfortable with, circle their letters, and answer them as thoroughly as you can on the attached blank page. This section is worth 30 points; hence, depending on which three you select, any points above 30 will be considered extra credit—however, you must choose three…no less! (30 points; max EC = +4)

a. Define the phenomena of *phototropism* and describe how a plant might perform this task. (9 points)

b. Describe in as much detail as possible the *plant transport system* by following the process form root to stem (xylem), to leaf, to stem (phloem) and citing the substances carried by the transport system at these various stages. (12 points)

c. We discussed how God carefully placed the leaf's *stoma* and *chloroplasts*. Where did God place these vital structures and why do you suppose he did this so? Share a few reasons why He might have chosen to create leaves just in such a manner. (9 points)

d. Share the *definition* and *location* of a leaf's **cuticle**. Contrast the cuticle *thicknesses* found on leaves of a *hot* climate, *frigid* climate, and a *temperate* climate. Support your argument with at least one reason as to why their cuticles might differ. (10 points)

e. Write out the *balanced* **Photosynthetic Equation** and describe the **origins** of the reactants and the **destinations** of the products. (12 points)

f. We studied four key factors which influence a plant's rate of photosynthesis. Share two and tell how they affect the rate. (9 points)

g. What is the main cause of the annual, autumn leaf drop? Why does it seem to happen around the same time every year regardless of year to year temperature fluctuations (ie warm fall/cold fall)? Consider these questions and include two pigments (name & color(s)) responsible for our lavish autumn colors. (9 points)

h. Explain how turgor pressure relates to opening and closing the **stomata**. Also, include how the stomata affect the **rate of transpiration** when *open* and when *closed*. (12 points)

i. Share the equation given in class for wilting and tell where the two separate yet interconnected actions are taking place on the plant; distinguish, also, between the two types of wilting. (9 points)