

**EXAM COVERAGE:**

1. Study Assignments:
  - a. From Part II (Review and integrate with Part III) – SA #14– SA #23 (Review Strategy)
  - b. Part III – SA #24–SA #27 <math>\diamond</math> Text – Stern, Ch. 4 & 8 (parts), and Chapters 21–23
2. Laboratory – Manual, Ex. # 7 through #10 (Ex. #11-12 will come in on Exam IV)

**REVIEW STRATEGY FOR EXAM III:**

Please turn to SA #23 which contains “**REVIEW STRATEGY FOR EXAM II**” and simply continue what has worked well as a review strategy, or modify accordingly as you seek to master the concepts. The following “Review Questions” represent an extension of the earlier “Review Strategy” as applies largely to the Seedless Vascular Plants, Gymnosperms, and Angiosperms. Although Exam III will be comprehensive and includes content from Part II, principal emphasis will be upon Autotrophic Protists (particularly Chlorophyta in a comparative sense to Kingdom Plantae) and Kingdom Plantae.

**REVIEW QUESTIONS:**

1. Update your list of Greek and Latin “roots” ☺ such as *gymno-*, *angio-*, *-angium*, etc.” It is also helpful to identify “sticky terms” such as ovary vs. ovule, seta vs. sorus, megasporangium vs. ovule
2. Extend your summary table (SA #23, Question #2) with the Kingdom Plantae, especially the following: phyla:
  - a. Bryophyta (with recognition knowledge of the Phylum Hepaticophyta, the liverworts)
  - b. Polypodiophyta (major emphasis, but be able to recognize other “Seedless Vascular” phyla)
  - c. Pinophyta (major emphasis; but, be able to recognize other “Gymnosperm” phyla)
  - d. Magnoliophyta

Then, devote one row to each of the following:

- a. Major representatives (common name, genus or other grouping; many are included above)
  - b. Distinguishing features for visual recognition of representatives of each (sketches may help)
  - c. General classification appropriate to each – *i.e.* nonvascular plant, seedless vascular plant, seed plant
  - d. Distinguishing features:
    - i. Morphological features – *e.g.* microphylls, megaphylls, seeds, fruit, *etc.*
    - ii. Relative dependence of sporophyte on gametophyte; or *vice versa*
  - e. Comparative adaptation to land – *e.g.* compare *Oedogonium*, *Sphagnum* and *Polytrichum* (moss). *Polypodium* (a fern), *Salaginella* (spike moss), and *Pinus* sp. with respect to the following:
    - i. Anchoring structures – *e.g.* holdfasts, rhizoids
    - ii. Vascular system
    - iii. Dermal features – epidermis, cuticle, cellular layers around gametangia
    - iv. Relative role of sporophyte in nurture of the offspring.
3. Sexual life cycles usually involve both meiosis and mitosis.
    - a. Distinguish the respective roles of these processes.
    - b. Compare the relative prominence of MITOSIS in the diploid generation of *Chlamydomonas*, *Oedogonium*, *Mnium* (moss), and *Lilium* (flowering plant); in the haploid gametophyte generation.
    - c. Evaluate the significance of the differences in (b.) with respect to fitness for survival/reproduction.

4. Evaluate the following statement: "Angiosperms are more successful and 'phenotypically fit' as land plants than bryophytes."
5. Define or describe each of the following [NOTE: Your definition or description must include all of the variations represented among Chlorophyta (e.g. *Oedogonium*), Bryophyta, Polypodiophyta, Pinophyta, and Magnoliophyta.:
  - a. Spore (define)
  - b. Gametophyte (define)
  - c. gamete production
  - d. dispersal of offspring (define and describe process)
  - e. nurture of offspring (energy, nutrients, protection)
6. The following questions relate to the origin of winged propagules in Pinophyta and in Magnoliophyta:
  - a. What is the developmental or embryological origin of "wings" in these two taxa?
  - b. How would an evolutionary biologist explain the phylogenetic origin of tissue that forms "wings" on seeds during presumed evolutionary origin of the genus *Pinus*? Answer the question for the genus *Acer*? (Use your answers to address part c. below.)
  - c. How would an evolutionary biologist explain the fact that "wings" occur in both the genus *Pinus* (in Pinophyta) and the genus *Acer* (in Magnoliophyta)? Provide evolutionary line of reasoning.
  - d. Propose an alternative explanation from a creation/design perspective. What evidences is needed to establish which explanation, evolutionary or creationist is valid?
7. Given the varying degree of self-sufficiency of the gametophyte generation between the mosses and the flowering plants, which would be the most adversely affected by the occurrence of a recessive mutation in a gene that is partly responsible for chlorophyll synthesis-- a bryophyte or a flowering plant? What implications are there in this for genetic variation?

**Botany Review** – This Authorware program provides sample questions of the type that have been used on previous botany exams. *Botany Review* is available at Start...CedarNet....Science...Biology. Please read the instructions and philosophy before using the program. The items selected below fit the objectives and expectations of BIO 2500. The other questions are more compatible with an earlier approach in a previous course and may not be helpful.

Selected questions for review:

Algae -- #2, 5, 6, 7, 8, 10  
 Bryophytes – all 10 items  
 Seedless Vascular – 1, 2, 3, 5, 6, 7  
 Gymnosperms – all 8 items  
 Angiosperms – 1, 2, 3, 5