SA #23 BIO 2500	REVIEW STRATEGY Exam II

COVERAGE:

Study Assignments – SA #14 to SA #22 <> Text – Stern, Chapters 3, 12, 15-20 as supporting material
Laboratory – Labs Ex. #7, 8;and science logic /writing (see Question #7, below)

REVIEW STRATEGY FOR EXAM II:

Since the Exam I, we have discussed biological origins models, challenges of taxonomic classification, and have made a *taxonomic survey* of autotrophic prokaryotes, autotrophic protists, and the bryophytes. The laboratory and lecture have both encouraged you to achieve the following:

1. Learn to visually recognize and associate "representative organisms" with correct taxon (e.g. phylum).
2. Explain reproductive processes and morphology using appropriate terminology and life cycle models
3. Present an evolution and a creation perspective on the shared and unique characteristics among the different phyla.

Notice that these cognitive levels (recognition to synthesis and application) must be taken in sequence. Thus, your prior study of the Study Outlines should be helping to orient you toward the major terminology so that you are building a foundation through memorizing definitions and being able to visually recognize structures. Then, you can compare and apply using **LECTURE-DISCUSSION QUESTIONS** in your Study Guide. Finally, the **GENERAL REVIEW QUESTIONS** below provide a framework as you develop an overview of content. Several 1-hr sessions of intense study spread over the next few days will enhance your preparation.

EXAM II REVIEW QUESTIONS – Developing the "Big Picture":

1. Have you created a list of Greek and Latin "roots" ☺ such as *proto-, phyto-, rhizo-, nemato-, -angium*, etc." It is also helpful to identify "sticky terms" such as sporocyte vs. sporophyte, gamete vs. zoospore

2. Create a summary table with one row for each of the following taxonomic groups:
   a. Kingdom Bacteria - Class Cyanobacteriae (e.g. genera *Anabaena, Nostoc*)
   b. Kingdom Bacteria - Class Prochlorobacteriae (e.g *Prochloron*)
   c. Kingdom Archaea - methanogenic, halophilic, and thermophilic bacteria
   d. Kingdom Protista - Phyla Chlorophyta, etc. (See SA #18-19)
   e. Kingdom Plantae - Phylum Bryophyta - mosses and Hepaticophyta - liverworts

   Then, devote one column 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.* prokaryotic, eukaryotic algae, nonvascular plant
   d. Distinguishing features:
      i. Morphological features – *e.g.* heterocysts, pili, conjugation tube, stipe, thalloid, *etc.*
      ii. Chemical – *e.g.* pigments, cell support, energy storage
      iii. Functional (physiological) – *e.g.* biological N_2 fixation, methanogenesis, phototaxis
   e. Comparative adaptation to land – *e.g.* compare *Spirogyra*, *Nereocystis* (bull kelp), *Chara, Sphagnum*, and *Polytrichum* (moss)
      i. Anchoring structures – e.g. holdfasts, rhizoids
      ii. Absence/presence of multicellular jacket around gametes
      iii. Absence/presence of dermal layers, gas exchange pores

3. Review your answer to question #4 in SA #16-17 and refine it to include as many points to consider as you can from what is being learned about Kingdom Archaea and Bacteria.

4. Cytokinesis involves the coordinated activity of the cytoskeleton and membrane system. What composes these systems and how are they involved in forming the new cell wall during cell division? Do all algae have the same process of cytokinesis? If not, which group is unique?

5. The Bryophyta are said to be phylogenetically more advanced than the typical members of the Chlorophyta because of the greater structural complexity of the Bryophyta. Explain what constitutes this greater complexity, and suggest an alternative interpretation based upon creationist or intelligent design presuppositions.

6. 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 *Chlamydomonas, Oedogonium*, and *Mnium* (moss).
   c. Evaluate the significance of the differences in (b.) with respect to fitness for survival/reproduction.

7. In keeping with our emphasis on scientific research methods and science writing, I want to maintain a growing sensitivity to data analysis and interpretation. The following data is from our 2008 study:

Table 2. Response to Mid-Summer Mowing: Cedarville U. Prairie Restoration 20

Parameter	Control	Mowed			
Total Sample Points (n)	20	20			
Statistical Analysis of Response Variable Means:					
	Control	Mowed	df	*t-value*	*p*
Species Richness per Sample	7.85	7.9	38	0.06	> 0.10
Plant Height	15.1	12.8	118	3.34	<0.001

   a. State an experimental hypothesis which would have been the guiding force for designing this experiment involving soil disturbance and re-seeding.
   b. Assuming you are ready to analyze your data, state a null hypothesis (H_o) to set up the logic for your statistical analysis.
   c. Based upon the results of *t*-tests reported in the table, write one sentence which concisely states your conclusion regarding the effect of disturbance on species richness. This sentence would be suitable for a journal abstract or article and would emphasize the "biology" over and above the "statistics." Choose a "good subject" and refer to your statistical analysis only indirectly, assuming the entire table above would be available to the reader. Utilize your experience in writing and your study of writing suggestions given in your graded lab report.

8. State one or two of what you consider to be major hindrances to human well being in developing nations; then, indicate how you or another BIO major, if so led could "make a difference" in that culture whether by "going" or from a career in the USA. Include any specific comments you may wish to share in regard to how this study has impacted your current vocational goals or direction.