

The purpose of this Review Guide is to orient your study for Exam I from a more comprehensive viewpoint (“bird’s eye view”) so that you can identify major themes and principles. Each of the following is intended to enhance your “birds eye” view. By this approach, you will hopefully be able to identify the “targets” for your landing and detailed study/review, and eventually to have a smooth landing for Exam I.

COURSE OBJECTIVES – Turn to your Syllabus, page 1, and read carefully the objectives that have been central to our study so far, namely:

1. Knowledge – Objectives #1, 2, and 4 [Note: Woody plant ID helps us apply Obj. #1 and 2]
2. Skills – Objectives #1, 2, 3, and 5. [Note: Obj. #1, 2, and 3 have been tested on lab practicals.]
3. Attitudes-Values – Personally assess your commitment and attainment of Objectives #1 thru 6.

COVERAGE – All topics to date in the ‘Lecture-Lab Schedule’ except “Gymnosperms”–*i.e.* 02-06

1. Lecture – Text (assigned pages) and Study Guides
2. Laboratory – “Woody Stem” and “Fern & Allies” external morphology/terminology (less emphasis on use of morphology for species ID because this was the focus of Lab Practicals)
Example: a. Lab Practical – “Name a tree species with chambered pith.”
b. Exam I – “Distinguish chambered pith from diaphragmed pith.”

REVIEW QUESTIONS:

1. How are the activities of professional plant taxonomists different from the field ecologist or land manager who performs a plant inventory prior to recommending a conservation plan?
2. Describe the general structure of a dichotomous taxonomic key and describe how you would go about constructing one. Include mention of “common features” and “distinguishing characteristics.”
3. According to Walters, Keil, and Merrell, Chapter 1, their text is written for courses that seek to teach students how to be proficient in two skill areas. What are they?
4. Expand on your answer to Question #3 with respect to your growing skill in winter woody plant identification, scientific name recall, and use of taxonomic keys to identify them.
5. List and discuss at least three different areas in which plant taxonomy is valuable to society. Include a discussion of how taxon names function in information storage and retrieval. Be specific.
6. Discuss the role of taxonomy in conservation and preservation of biological diversity? Is there at least one principle that could be derived from this issue?
7. If asked to logon to CedarNet and access information related to plant taxonomy, you should be prepared to perform the following (e.g. from the BIO 3520 “Useful Website” resource page.:
 - a. Listing of genera for each plant family – *e.g.* see Plant Family Finder at Texas A & M
 - b. Locate taxon names from a given species up to class; *e.g.* U. of Wisconsin botany site

- c. Listing of invasive species in your home state.
 - d. Determine the authenticity of a given genus name or whether it has been changed.
 - e. Online winter twig key or key to woody plants in the Cedarville area
8. Given two complete scientific names of a species of plant (all three parts of name present), one being a later homonym:
 - a. Identify each part of the names
 - b. Indicate which name should have precedence
 - c. Explain your decision
 9. Define: type specimen holotype isotype type genus distinguishing character
 10. Distinguish a taxonomic synonym from a nomenclatural synonym.
 11. Given the hierarchial names of plant taxa within which two different woody species are classified, sort the names into a correct hierarchy for each one based upon suffixes and your understanding of types. See Question #1 of Exercise #2.
 12. Be able to define and/or distinguish major *vegetative terminology* of flowering plants (especially those in your W-K-M text, pages 27-37) and of ferns and fern allies (Chapter 9). Here are some application questions using vegetative morphology:
 - a. What leaf arrangement (phyllotaxy) is most commonly found in ferns?
 - b. Grass leaves lack petioles. What leaf attachment is found in grasses?
 - c. Relate the following fern terms: pinnatifid, simple leaf, pinnately compound leaf, lobe, pinnae
 - d. Distinguish the following and give a species example of each: thorn, spine, prickle, tendril
 13. Challenges in classifying the “green world of plants:”
 - a. Why have there been so many approaches to classification of the “plant world?”
 - b. How did (or do) each of the following view the world of plants: Aristotle, Linnaeus, de Jussieu (family of botanists), Darwin, Hennig (Ch. 4), Wyse and Wood (see notes)?
 14. Approaches to plant classification:
 - a. Distinguish *artificial* classification from *natural* classification. Give an example of each.
 - b. Why do your text authors (W-K-M) consider the phenetic approach to classification as *natural* (Chapter 6)?
 - c. Make the case that phenetic classification is more purely a natural classification than phyletic classification. Make the case that one is more scientific (*e.g.* inductive) than the other.
 - d. How are phenetic and cladistic approaches similar? How do they differ?
 - e. Which approach to classification would adhere to this statement: “Discontinuities in morphology (both in fossil record and in current life forms) are predicted in the Genesis account.” In what sense is this true or false? Is the resultant approach to classification scientific?
 - f. Explain how the doctrine of typology is more aligned with a creation view of origins than an evolutionary view.
 - g. Why is it important to taxonomists that classification be based upon monophyletic groupings?
 - i. How do phylogeneticists view the significance of genus, family, and higher taxa?
 - ii. How do cladists use shared-derived characteristics (synapomorphies, Chapter 4) to identify monophyletic groups?
 - iii. In what taxonomic context might a young earth Creationist and an evolutionary biologist work together to define the clade?