BIOL 1202 Fall 2019 **REVIEW SHEET for EXAM 2 covering CH 19, 26-27**

A. These are the items to focus on in addition to using your LECTURE NOTES as a study tool.
B. You should also take the "Practice EXAM 2 on CH 19, 26, and 27" on MOODLE to assess how well you know the material before taking the EXAM on Tuesday 10/15/2019.
C. Make sure you attempt and understand any MOODLE practice application problems sets and answer keys I posted.

1. Phylogenetic trees
   a. How is the topology of the tree related to evolutionary relatedness
   b. Can trees be "redrawn" so that the same information is depicted in a phylogenetic tree (i.e. identify how trees can spin on their axes and still depict the same information)
   c. Understand tree terminology such as sister taxa, clade, branch point, vertical tree vs. diagonal tree, homologies, etc.
   d. Understand how different sets of data may generate different trees (i.e. sequence data of coding vs. non-coding regions, DNA vs. RNA sequence data, sequence data vs. morphological data, etc.)
2. Identify the "outgroup" in a phylogenetic tree
   a. Why would an outgroup be used?
   b. Where would the placement of the outgroup in a phylogenetic tree be placed
3. Rank the groups from most to least inclusive using a Linnean classification system
   a. Which group has the MOST representatives in it
   b. Which group has the LEAST representatives in it
   c. Which group do we commonly see organisms being re-organized or renamed
4. The difference between ANALOGOUS and HOMOLOGOUS structures
   a. Give examples of each using different organisms (people bombed this on EXAM 1)
   b. How do these structures relate to DIVERGENT and CONVERGENT evolution
5. Identify PARA-, POLY-, and MONO-phyletic groups if shown a tree
   a. If shown trees, you should be able to identify groupings based on these terms
   b. You should be able to identify if a group circled on a tree is a mono-, para-, or polyphyletic group.
6. If given a data set, you should be able to reconstruct an evolutionary accurate cladogram or tree
   a. Look at the data sets I gave you on reindeer, elves, and fantastiflora.
   b. You will have a problem on the exam where you will need to build a tree using a data set.
7. Know the difference between maximum parsimony and maximum likelihood as it relates to tree building.
8. Know the difference between orthologous and paralogous genes as it relates to tree building
9. Understand what a "molecular clock" is and problems with using a clock
   a. The example of HIV
   b. The example of protein evolution on mammals
10. Bacterial classification
   a. How are bacteria classified (shape, reproduction, nutrition, oxygen, etc.)
   b. Understand how Gram staining works
   c. How are gram positive and gram negative bacteria different from each other structurally and chemically
   d. How do bacteria reproduce? Why would they prefer one type of reproduction over another one?
   e. How are mutation rates in bacteria different as compared to eukaryotes?
   f. What is a plasmid and why are they important in bacteria?

g. What role to bacteria play in the environment/ecosystem?

11. Explain how restriction enzymes work
    h. What is a palindrome
    i. How do restriction enzymes "cut" DNA
    j. If given hypothetical restriction enzymes, you should be able to identify if they would actually work
    k. You will have a problem(s) on the exam using restriction enzymes to cut DNA (linear vs. circular) and how those fragments can be visualized on an agarose gel.
12. Diseases or conditions caused by microorgamisms
    l. You should be able to match bacterial groups with diseases/conditions they cause or why they would be ecologically important
13. Virus classification
    a. How are viruses classified (shape, genetic material, genome size, etc.)
    b. How do viruses "hijack" other cells in order to make copies of themselves?
    c. What is a capsid?
    d. What is a viral envelope?
    e. What is a bacteriophage?
    f. For the flu H1N1, what does "H" and "N" stand for?
    g. The difference between VERTICAL and HORIZONTAL transmission?
14. The difference between the LYTIC and LYSOGENIC cycles in viruses
    m. How do these cycles differ
    n. What is the end result of each cycle
    o. Why would viruses use one cycle versus another
15. What is the CRISPR-Cas system?
    a. How does it work?
    b. Why is it important to bacterial immune systems?
16. You should know examples of animal viruses
    a. Table 19.1a is a good summary
    b. Which of these diseases are problematic here in the USA and/or worldwide?
17. Why is HIV unusual?
    a. Mutation rate?
    b. Different classes of HIV medications and the general process by which they work?
18. What is a prion?
    a. How is it similar to/different from a virus?
19. Identify disease transmission/infection patterns (i.e. PANdemic, EPIdemic, SPORadic, and ENdemic)
    p. If shown disease prevalence in a location, identify what type it would be
    q. What are examples of diseases that are PANdemic, EPIdemic, SPORadic, and Endemic
20. You can generate your own practice questions for the exam by using Mastering Biology. For a step-by-step way to accomplish this, please see the link below:

https://lsu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=c240ba60-2d9b-4a85-bf10-aadf015369cb

You can also download the EXAM 2 review resources.MP4 file in MOODLE if the above link does not work for you (which it should if you copy & paste into your internet browser).