**Spring Applied Biological Systems Final Exam Study Guide**

***Directions***: On a separate sheet of paper, write out the answer to each of the following prompts.

The more detail you give the better off you will be for the exam. (50 points awarded for completion)

1. Describe ecology.
2. Differentiate between biotic and abiotic factors.
3. Differentiate between an autotroph and a heterotroph.
4. What is the role of an ecologist?
5. Describe how energy is transferred through an energy pyramid and what levels have the most energy.
6. Define the roles in an energy pyramid (producer, primary consumer, secondary consumer, tertiary consumer, decomposer) and provide an example for each.
7. Describe what is meant by the term “predator-prey relationship”. Give an example.
8. Describe the oxygen cycle. Draw and label.
9. Describe the nitrogen cycle. Draw and label.
10. Describe the carbon cycle. Draw and label.
11. Describe the water cycle. Draw and label.
12. Describe the carbon cycle. Draw and label.
13. Differentiate between niche and habitat.
14. Describe symbiosis. List, describe and give an example of the 3 types of symbiotic relationships.
15. Describe the levels of organization found in ecology. List them in order of smallest to largest. Give examples of each. (Begin with Individual and end with Biosphere).
16. Define primary succession and secondary succession.
17. What is adaptation? How do adaptations help drive natural selection? Give an example.
18. Differentiate between camouflage and mimicry. Give an example of each.
19. What is a cladogram? Sketch an example and label it. Include clade, node, ancestral and derived traits.
20. What is the purpose of a cladogram?
21. Describe a living thing. What makes a living thing categorized as “alive”?
22. What is an extremophile? Give an example.
23. Draw and label a prokaryote cell. Describe the basic parts of a prokaryote cell.
24. Describe the different types of symbiotic relationships. Give an example of each.
25. Sketch a food web that involves grass, a rabbit, a fox and a hawk. Label each of the various trophic levels involved. Describe each of the roles that the organisms play in this small ecosystem.
26. Describe the various levels of organization that ecologists study.
27. Describe what a predator-prey relationship looks like. Describe how it can be often considered cyclical.
28. Differentiate between phenotype and genotype. Give an example of each.
29. Describe the process of natural selection. What is the main driving force behind natural selection?
30. Differentiate between analogous and homologous structures. Give an example of each.
31. Differentiate between a derived and ancestral trait..
32. What is the appropriate way to write a scientific name? Give an example.
33. What is taxonomy?
34. Differentiate between the various levels of taxonomic classification. Define each.
35. What is a cladogram? Briefly draw and label one.
36. What is cladistics?
37. Describe the process of taxonomy.
38. Describe the modern classification system. List the various levels of classification and give an example of an organism using this system (from Domain to species).
39. What is binomial nomenclature?
40. What are the three domains?
41. Describe the proper way to list a scientific name using binomial nomenclature
42. Who developed binomial nomenclature (our modern system of classifying organisms)?
43. Describe the steps in reading a dichotomous key.
44. List the correct order in which we classify organisms.
45. What kingdoms contain prokaryotes? What kingdoms contain eukaryotes?
46. What are the four defining characteristics for each of the six kingdoms?
47. The attraction of water molecules to other water molecules is called?
48. What is concrete made of?
49. What is the name of chemical reaction that occurs when cement mixes with water?
50. What is the formula for electron shell number?
51. Where do you find atomic mass on the periodic table?
    1. What does it represent?
52. Where do you find atomic number on the periodic table?
    1. What does it represent?
53. What are valence electrons?
    1. How many can each shell of an atom hold?
54. Define the following;
    1. Atom
    2. Element
    3. Electron
    4. Proton
    5. Neutron
    6. Molecule
    7. compound
55. Describe the structures used in the respiratory system of fish. Of frogs.
56. Tadpoles are…
57. List all the parts of a flower.
    1. What are the male parts?
    2. What are the female parts?
58. What is the function of plant leaves?
59. What is the function of plant flowers?
60. What is the function of plant stems?
61. What is the function of plant fruits?
62. List the steps in the scientific method in order.
63. What is the scientific method?
64. What is an independent variable?
65. What is a dependent variable?
66. What is a control variable?
67. What is a hypothesis?
    1. How are they written?
    2. What must they have?
68. How are experiments shared with others?
69. How do we make an experiment less biased?