

Unit 5 Study Guide, BIOL 180, Fall 2015

Use this as a **study aid only**. This is intended to get you thinking about the major lecture topics. Do not assume exam questions will be limited to the material seen here.

1. Understand how natural selection acts on individuals, but shapes populations. Give some examples. Also understand the concept of fitness and why it is important in an evolutionary context.
2. Have a working knowledge of the Lederberg experiment. What did they find? Explain their results within the concepts of variation within a population, and how natural selection operates on preexisting variation.
3. Describe the role of natural selection in other “real world” examples of evolution. Be sure to include examples of antibiotic resistance and pesticide resistance.
4. What is mimicry? Provide an example of mimicry. Explain why such a system developed.
5. What is industrial melanism? Provide an example of industrial melanism. Explain why such a system developed. Understand when a trait is selected against or selected for.
6. Support or refute the following statement: “Humans descended from the apes.” What is meant by such a statement? Is this correct? How might it be misunderstood?
7. Identify the four other mechanisms of evolutionary change (i.e., other than natural/artificial selection). Explain how these mechanisms are different from selection. Be able to give examples.
8. What is the Modern Synthesis? Which three scientists are largely credited for bringing about the Modern Synthesis?
9. What is a population? What is variation? What is continuous variation? What is discontinuous variation?
10. What are ways to measure variation in a population? What is a mean? What is a standard deviation? Are these measures of individuals or of populations?
11. What is population genetics? How would a population geneticist define evolution? What is an allele frequency?
12. Understand what can be learned by use of the Hardy-Weinberg Equilibrium model. You will not be asked to recreate the calculations involved, but you will need to know the assumptions that go into the model, and what happens if one or more of those assumptions is violated. What do the five assumptions represent?

13. In what ways can natural selection influence phenotypes in a population? Differentiate between stabilizing selection, directional selection, and disruptive selection.
14. What is sickle-cell anemia? Why is a potentially lethal allele present at such a high level in people of African descent?
15. Explain the differences in skin color between races of people in relation to incoming solar radiation and vitamin D synthesis.
16. What is speciation? What is a species? What is a species concept?
17. What sorts of reproductive barriers exist that can help lead to speciation? Differentiate between prezygotic barriers and postzygotic barriers. Be able to give examples of each.
18. In what ways can reproductive isolation occur? What is allopatric speciation? What is sympatric speciation? Be able to give examples of each.
19. Differentiate between properties of a reducing atmosphere and an oxidizing atmosphere. What kind does modern Earth have? What was the atmosphere like on the early Earth? Why is this significant?
20. Who was Aleksandr Oparin? What were the four stages of his hypothesis? Why was a reducing atmosphere important for this idea?
21. Who was Stanley Miller? Describe the experiments conducted by Stanley Miller. What was done? What were the conclusions? What other experiments have been done in relation to the four stages of Oparin's hypotheses? What does this mean for early life on Earth?
22. Provide a brief description on the origin of life on Earth and its history. (By "brief" I mean focus on about 6 or 7 MAJOR steps.) Have a working knowledge of the order of these major steps. Also point out how humans fit into the scheme.
23. What are mass extinctions? How many mass extinction events are known to have happened on Earth?
24. What was the Cambrian Explosion? When did it happen? Who was Charles Doolittle Walcott? What was the significance of the fossils found at the Burgess Ridge? Who was Simon Conway Morris?
25. What is a species? What is the Biological Species Concept?
26. Who originally set up the hierarchical naming system that is still in use today? What are the traditional seven taxonomic ranks? How has this changed? What is a scientific name? Understand how to write scientific names correctly.

27. What is a cladogram? What is a clade? Be able to recognize relationships in simple cladograms. Be able to differentiate between monophyletic and paraphyletic groups.
28. What are the six kingdoms of life? What are the three domains? How are the six kingdoms sorted into three domains? What cell type is associated with each kingdom?
29. Be able to list some GENERAL characters about life in each domain and each kingdom. What is a plant? What is an animal? What is an Archaeon? What is a bacterium? What is a fungus? What is a protist? You will not need to know all the details about each kingdom, but have a working knowledge of what each kingdom is and what kinds of organisms are included. Understand how humans fit in with other animals and with other kingdoms of life.
30. Have a basic knowledge of the various types of animals. How many animal phyla are recognized? How many of these phyla include vertebrates? Have a basic knowledge of some of the major groups of animals. Know: protostome and deuterostome. What are some of the most diverse phyla of animals?
31. Know the scientific name for a human being. Be able to spell and write it correctly. Also know the family, order, class, phylum, kingdom, and domain. What are some closely related species?