

BIOL 300 – Foundations of Biology  
Summer 2017 – Telleen  
Exam #4 Study Guide – Revised 7/21/17

Disclaimer: This outline is designed to help you organize the major topics that we have covered since the last exam and help you study. However, you need to be familiar with all of the material covered in class, not just the general topics listed here.

**New:** It is taking me longer than expected to put together the remaining materials for next week. For now, focus on Evolution, Ecology, and your old Exams.

**Exam 4** will include up to one third of the questions from previous exams, so make sure that you go over your old exam and understand the questions you missed!

### I. Evolution and Natural Selection

- A. Know what biologists mean when we use the term evolution
- B. Know what is meant by **variation** and how it relates to evolution and selection
- C. Know and understand the types of evidence that support biological evolution
- D. Know whether individuals or populations evolve and be able to explain why
- E. Be able to explain the selection theory of change and the evidence for it
- F. Be able to describe what natural selection is and who originally came up with the theory
- G. Understand what is meant by the **Modern Synthesis** and what is meant by **microevolution** and **macroevolution**.
- H. Understand the basic ideas of population genetics and Hardy-Weinberg Equilibrium (including how to calculate allele frequencies)
- I. Understand the assumptions made by Hardy/Weinberg and how the violations of these assumptions lead to evolution
- J. Understand the common misconceptions about evolution and why they are incorrect
- K. Be able to explain the **biological species concept**
- L. Define **speciation** and be able to differentiate between **allopatric** and **sympatric speciation**.
- M. Understand what is meant by **reproductive isolating mechanisms** and how they relate to speciation, including the various types.

### II. Ecology and Ecosystems

- A. Be able to define **ecology**
- B. Know the different levels of ecological organization and how they relate to each other
- C. Know what an **ecosystem** is and how different species fill different roles.
- D. Understand the flow of energy through an ecosystem and how **trophic level** relates to this. Also, know the different roles that organisms of different trophic levels play in an ecosystem

- E. Know what **nutrient cycles** are and how the flow of nutrients differs from the flow of energy in an ecosystem
- F. Understand the concepts of **population growth** and **population demography**, including the terms used and what they mean
- G. Know how **populations** interact within **communities**
- H. Understand **coevolution** and the different types of **symbioses**