Chapter 1 Study Guide

# Important Ideas

* Living organisms exhibit certain general features that humans have used to categorize organisms. (Modules 1.1-1.3)
* Investigations in biology have certain characteristics. (Modules 1.4-1.7)
* Biology is a science that impacts the everyday world. (Modules 1.8)
* Evolution is central to unifying themes in biology. (Modules 1.9 and 1.14)

# Learning Objectives

Upon successful completion of Chapter 1 you will be able to

1. Explein what is meant by the term ‘Biology’.
2. List and recognize examples of the characteristics displayed by living organisms.
3. Compare and contrast the three Domains of Life: Archaea, Bacteria, and Eukarya. Given a description of an organism, place it in its appropriate domain.
4. Describe the levels of biological organization from molecule to the biosphere.
5. Recognize examples of and apply biology’s key themes (listed below) to various scientific discoveries.
   1. Evolution
      1. Unity and Diversity
   2. Flow of information
   3. Structure and function
   4. Transfer and transformation of energy and matter
   5. Interactions within & between systems
      1. Emergent properties
6. Summarize the principle of common descent with modification and identify examples of the concept.
7. Summarize the principle of natural selection and identify examples of the concept.
8. Explain how Charles Darwin developed his theory of evolution by natural selection.
9. Explain the importance of artificial selection to Darwin’s ability to understand natural selection.
10. Describe and recognize the general characteristics of a biological investigation.
11. Construct a hypothesis based on given observations and design an experiment to test it.
12. Given a situation describing a biological phenomenon:
    1. Identify the component characteristics of a scientific investigation.
    2. Suggest alternative hypotheses that could be tested by the design.
    3. Evaluate the validity of conclusions based on the given results.
    4. Suggest ways to improve the experimental design.
13. Differentiate between a scientific “theory” and a layperson’s definition of “theory.”
14. Define and recognize of examples of experimental group, control group, independent variable, and dependent variable.
15. Explain why nothing is ever “proven” in science and, given this limitation, defend scientists’ ability to understand the world with certain degrees of confidence.
16. Describe why a basic knowledge of biology is important to the general population.