

# Biology I/Unit 1 Study Guide

## bio1u1sg (Nature of Science)

### Study Objectives

1. List the characteristics of living things.
  - What are the ties that seem to bind all living things?
  - List the levels of organization of living things from atomic to organism. Can you go beyond these?
2. Identify three important themes that help explain or describe the living world.
3. **Distinguish among hypothesis, theory, and law as scientific terms and how they are used to answer a specific question.**
  - Hypothesis
  - Law
  - Theory
4. Explain how scientific and technological innovations as well as new evidence can challenge portions of or entire accepted theories and models.
  - List some advances that propelled us into deeper understandings
  - What were the consequences of those advances?
5. Recognize that in order to be valid, scientific knowledge must meet certain criteria.
  - Understandable
  - Subject to change
  - Durable
  - Cannot answer all questions
  - Demands evidence
  - Logic and imagination
  - Explains and predicts
  - Avoids bias
  - Not authoritarian
6. Explain how traditions of ethics, peer review, conflict and general consensus influences the conduct of science.
7. Recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.
  - Give example of a scientific idea that remains incomplete
  - Where are there opportunities for new advances?

### Vocabulary

hypothesis theory law ethics peer review consensus empirical evidence prediction control group  
experimental group independent variable dependent variable quantitative data qualitative data inference bias

### Assignments/Assessments

- Text: Chapter 1 (pages 5-20)
- Handouts "Nature of Science"; "What Science Is Not"; "Scientific Laws, Hypotheses and Theories"; "Science Is"
- Notebook **10pts**
  - ✓ Notes (2-column)
  - ✓ Crossword
- Inquiry Lab: "Greenspace Investigation" **10pts**
- Skill Lab: "Head vs Height" **10 pts**
- Vocabulary Quiz **15pts** (with online crossword puzzle for practice)
- Test **20pts**

### Misconception

Theory - the word theory is frequently used to suggest an idea that is uncertain or an opinion. A scientific theory is a general truth that explains the observations of many scientists. A scientific theory is accepted only after it has been supported by a vast body of experimental data. Several theories that have been widely accepted by scientists are the **cell theory**, **atomic theory**, **theory of evolution by natural selection**, **plate tectonic theory**, **germ theory of disease** and **big bang theory**.