

# Biology I/Unit 1 Study Guide

bio1u1sg (Nature of Science – a body of knowledge and a process)

Online Unit Resource: <http://undsci.berkeley.edu/>

## Learning Objectives

1. Explain the implications of the assumption that the rules of the universe are the same everywhere and these rules can be discovered by careful and systematic investigation.
2. Understand that scientists conduct investigations for a variety of reasons, including: to discover new aspects of the natural world, to explain observed phenomena, to test the conclusions of prior investigations, or to test the predictions of current theories.
3. Explain how the traditions and norms of science guide professional scientific practice and reveal instances of scientific error or misconduct.
4. Explain how societal and scientific ethics impact research practices.
5. Identify sources of bias and explain how bias might influence the direction of research and the interpretation of data.
6. Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.
7. Explain how scientific and technological innovations – as well as new evidence– can challenge portions of, or entire accepted theories and models.
8. Formulate a testable hypothesis, design and conduct an experiment to test the hypothesis, analyze the data, consider alternative explanations and draw conclusions supported by evidence from the investigation.
9. Evaluate the explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the scientifically acceptable evidence, and suggesting alternative scientific explanations.
10. Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.
11. Use primary sources or scientific writings to identify and explain how different types of questions and their associated methodologies are used by scientists for investigations in different disciplines.
12. Relate the reliability of data to consistency of results, identify sources of error, and suggest ways to improve data collection and analysis.
13. Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.
14. Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts.

## Terminology to Know

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

## Assignments/Assessments

- ⤴ Resources: “Understanding Science” website and Modern Biology Chapter 1
- ⤴ Case Study: “Poison Ivy – taking the itch out of the rash”
- ⤴ Extra Credit: “Lady Tasting Tea – Part II” (Moodle)
- ⤴ Notebook **10pts** \_\_\_\_\_
  - Notes/Input (right page)
  - Reflection/Output (left page)
  - Spider Questions (left)
  - Science Is. . . (right)
  - Science Checklist (right)
  - Experimental Design – “Lady Tasting Tea – Part I” (left)
- ⤴ Greenspace Investigation **10pts** \_\_\_\_\_
- ⤴ Skill **Lab**: “Head vs Height” **10 pts** \_\_\_\_\_
- ⤴ Unit **Quiz 20pts** (online; take as many times as you need to test your knowledge and understanding) \_\_\_\_\_
- ⤴ Unit **Exam** (a final test of what you know and understand) **20pts**

# How science works

