

# Chapter 1: The Science of Biology



**Learning Goals:** Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. The process of science helps biologists investigate how nature works at all levels, from the molecules in cells to the biosphere. The metric system is a “universal language” of science and medicine. Data analysis in science often relies on the use of graphing and statistics. The diversity of life is the result of ongoing evolutionary change, and evolutionary relationships affect the way scientists name and classify organisms.

## Key Concepts:

Scientific Method  
Characteristics of Life

Graphing  
Classification

Statistics

## Essential Questions:

1. What characteristics do all living things share?
2. How are organisms classified into taxa?
3. What procedures are at the core of scientific methodology?
4. Why is it important to design a controlled experiment?
5. What are the important components of a controlled experiment?
6. How do we use statistics to analyze data?
7. Which graphs best represent the data collected in an experiment?
8. How are claims, evidence, and reasoning used to form conclusions?

CAN YOU SHOW  
WHAT YOU KNOW?

Fold along the line and glue this side down in your Interactive Science Notebook.

**Terms to Know:** (+) = Can explain it; (-) = Only heard it; 0 = No idea

Term	Pre	Post	Memory Clue or Example
1. biology			
2. hypothesis			
3. prediction			
4. evidence			
5. independent variable			
6. dependent variable			
7. control group			
8. controlled experiment			
9. sexual reproduction			
10. asexual reproduction			
11. sample size			
12. scientific theory			
13. repetition			
14. metabolism			
15. homeostasis			
16. stimulus			
17. response			
18. development			
19. evolution			
20. adaptation			
21. quantitative data			
22. qualitative data			
23. scatter plot			
24. t-test			
25. p-value			
26. taxonomy			
27. binomial nomenclature			
28. prokaryote			
29. eukaryote			

**Study Guide:**

1. **Describe** the steps used in scientific methodology.
2. **Explain** why sample size and repetition are important parts of an investigation.
3. **Distinguish** between dependent and independent variables.
4. When given a set of data: **explain how to choose** the most appropriate graph to use.
5. When given a set of data: **complete** a graph that includes the title, labeled axes, proper scale, units, etc.
6. **Interpret** t-test statistic results using probability values.
7. **Describe** the 9 characteristics of living things and give examples.
8. **Explain** with examples how *homeostasis* is essential to all living things.
9. **Differentiate** between response and adaptation.
10. **Differentiate** between development and evolution.
11. **Sequence** the biological levels of organization from subatomic particles to organism.
12. **Explain** why viruses are not considered living things.
13. **Identify** the correct use of binomial nomenclature to name an organism.
14. **Place** common organisms into the correct domain and kingdom.
15. **Sequence** the taxa in the classification system devised by Linnaeus.
16. **Explain** how general society and scientists view a scientific theory differently.