# Module 1: Biology - The Study of Life

## Comprehension & Critical Thinking Questions

### Part 1: Understanding Core Concepts

1. **The Characteristics of Life**

    - List the six shared characteristics of all living things.
    - Select one specific organism (e.g., a sunflower, a wolf, a bacteria) and briefly explain how it demonstrates *each* of the six characteristics.

2. **Levels of Organization**

    - Define the hierarchy of biological organization from specific to general: *Atom, Molecule, Cell, Tissue, Organ, Organ System, Organism, Population, Community, Ecosystem, Biosphere*.
    - Which level is considered the fundamental unit of life? Why?

3. **Classification Systems**

    - What is the primary purpose of biological classification (taxonomy)?
    - List the eight levels of classification in order from most inclusive (Domain) to most specific (Species).
    - Explain the rules of **Binomial Nomenclature**. Why is it important for scientists to use scientific names (e.g., *Homo sapiens*) rather than common names?

4. **The Scientific Method**

    - Outline the standard sequence of the scientific process.
    - Define **Homeostasis** and give one biological example of it in action.

## Part 2: Applying Biological Principles

1. **Energy Dynamics**
    - All life requires energy. Contrast how **Autotrophs** (producers) and **Heterotrophs** (consumers) acquire this energy.
    - Construct a simple flow chart showing how energy moves through an ecosystem (starting from the sun) versus how nutrients cycle.
2. **Evolutionary Pressures**
    - **Scenario**: A population of beetles lives in a forest with green and brown leaves. Some beetles are green, and some are brown. Birds love to eat these beetles.
    - **Apply**: How might the presence of the birds (predators) shape the natural selection of the beetles over time? Which beetles are likely to survive and reproduce?
3. **Scientific Inquiry in Action**
    - **Scenario**: You observe that cellular phones seem to lose battery faster in the cold.
    - **Apply**: Design a simple controlled experiment to test this. Identify your **Observation**, **Hypothesis**, **Independent Variable** (what you change), and **Dependent Variable** (what you measure).

## Part 3: Analyzing & Evaluating

1. **Structure and Function**
    - "Structure determines function" is a unifying theme in biology. Analyze how this principle applies at the **cellular level** (e.g., red blood cells) versus the **organ level** (e.g., the heart). How does the shape support the job?
2. **Theory vs. Law**
    - In common language, "theory" often means a guess. In science, it means something very different. Compare and contrast a **Scientific Theory** (e.g.,

Evolutionary Theory) with a **Scientific Law** (e.g., Law of Gravity). Which one explains *why* distinct biological phenomena happen?

3. **The Three Domains**

   - Compare the three domains of life: **Bacteria**, **Archaea**, and **Eukarya**.
   - Critique the statement: "All bacteria are harmful germs." Use your knowledge of the domains and biological diversity to support or refute this.