



# BIOLOGY

## REQUIRED READING

## Molecular and Cellular Biology (33%)

### Chemical Composition of Organisms

- **Chapter 2: The Chemical Foundation of Life**
  - 2.1 Atoms, Isotopes, Ions, and Molecules: The Building Blocks
  - 2.2 Water
  - 2.3 Carbon
- **Chapter 3: Biological Macromolecules**
  - 3.1 Synthesis of Biological Macromolecules
  - 3.2 Carbohydrates
  - 3.3 Lipids
  - 3.4 Proteins
  - 3.5 Nucleic Acids

### Cells and Their Organization

- **Chapter 4: Cell Structure**
  - 4.1 Studying Cells
  - 4.2 Prokaryotic Cells
  - 4.3 Eukaryotic Cells
  - 4.4 The Endomembrane System and Proteins, etc.
- **Chapter 5: Structure and Function of Plasma Membranes**
  - 5.1 Components and Structure
  - 5.2 Passive Transport
  - 5.3 Active Transport
  - 5.4 Bulk Transport

### Enzymes and Energy Transformations

- **Chapter 6: Metabolism**
  - 6.5 Enzymes (plus topics on energy, ATP, and the laws of thermodynamics)

- **Chapter 7: Cellular Respiration**
  - 7.1 Energy in Living Systems
  - 7.2 Glycolysis
  - 7.3 Citric Acid Cycle
  - 7.4 Oxidative Phosphorylation, etc.
- **Chapter 8: Photosynthesis**
  - 8.1 Overview
  - 8.2 Light-Dependent Reactions
  - 8.3 Using Light Energy to Make Organic Molecules

## **Cell Division and the Gene's Nature**

- **Chapter 10: Cell Reproduction**
  - 10.1 Cell Division
  - 10.2 The Cell Cycle, etc.
- **Genetics Unit (Chapters 11–16)** covering:
  - Chapter 11: Meiosis and Sexual Reproduction
  - Chapter 12: Mendel's Experiments and Heredity
  - Chapter 13: Modern Understandings of Inheritance
  - Chapter 14: DNA Structure and Function
  - Chapter 15: Genes and Proteins (including the genetic code and transcription/translation)
  - Chapter 16: Gene Expression

## **Organismal Biology (34%)**

### **Plant Structure, Function, and Reproduction**

- **Chapters 25 & 26: Seedless Plants and Seed Plants** (plant diversity and evolution)
- **Chapter 30: Plant Form and Physiology**
  - 30.1 The Plant Body
  - 30.2 Stems
  - 30.3 Roots
  - 30.4 Leaves
  - 30.5 Water/Solute Transport
  - 30.6 Sensory Systems
- **Chapter 31: Soil and Plant Nutrition**
- **Chapter 32: Plant Reproduction**
  - 32.1 Reproductive Development and Structure
  - 32.2 Pollination and Fertilization
  - 32.3 Asexual Reproduction

### **Animal Structure, Function, and Reproduction**

- **Chapter 27: Introduction to Animal Diversity (overview of classification and major groups)**
- **Chapters 33–43: Animal Structure and Function**
  - Chapter 33: Basic form and function

- Chapters 34–42: Major systems (digestive, nervous, endocrine, circulatory, etc.)
- Chapter 43: Animal Reproduction and Development

## **Principles of Heredity**

- Covered in **Genetics Chapters (11–16)**, as noted above.

## **Population Biology (33%)**

### **Ecology and Environmental Interactions**

- Chapter 44: Ecology and the Biosphere
- Chapter 45: Population and Community Ecology
- Chapter 46: Ecosystems
- Chapter 47: Conservation Biology and Biodiversity

### **Evolutionary Processes**

- Chapter 18: Evolution and the Origin of Species
- Chapter 19: The Evolution of Populations
- Chapter 20: Phylogenies and the History of Life

### **Behavior and Social Biology**

- Topics appear throughout **Ecology and Evolution Chapters (especially 18–20, 45, and 47)**, covering learned and stereotyped behavior, social organization, and human impacts.