

Anatomy & Physiology, Part 1

Course Outline & Objectives

Course Description:

In Anatomy & Physiology Part 1, students investigate the organization and function of the human body, beginning with anatomical terminology, body organization, metabolism, and homeostasis. They examine the chemistry of life, including atoms, chemical bonds, water, pH, and biological macromolecules, before exploring cell structure, membrane transport, and cellular processes. Students also study the cell cycle, tissues, the integumentary system, and the skeletal system, emphasizing the relationship between structure and function. Through scientific inquiry, laboratory investigations, data analysis, and real-world applications, students develop a strong foundation in human anatomy and physiology and an understanding of how body systems work together to maintain homeostasis.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits) | Prerequisites: Biology

Course Outline

Unit 1: Body Organization & Homeostasis

- 1.1 Introduction to Anatomy & Physiology
- 1.2 Levels of Body Organization
- 1.3 Metabolism
- 1.4 Anatomical Planes & Directional Terms
- 1.5 Body Cavities & Organ Systems
- 1.6 Homeostasis & Feedback Mechanisms

Next Generation Science Standards (NGSS) National Health Science Standards

In this unit, students will:

Explain the relationship between anatomy and physiology and describe the levels of organization in the human body.
Differentiate between anabolic and catabolic metabolic processes and explain their role in maintaining life.
Apply anatomical planes, directional terms, and body regions to describe the locations of body structures.
Identify the major body cavities, abdominal quadrants, and the organs they contain.
Explain how homeostasis is maintained through negative and positive feedback mechanisms.

[HS-LS1-2, HS-LS1-3]

[HN.1, HN.2, HN.3]

Unit 2: Chemistry of Life

- 2.1 Matter & Atomic Structure
- 2.2 Elements, Compounds & Molecules
- 2.3 Chemical Bonds
- 2.4 Electrolytes & Ions
- 2.5 Water & pH Balance
- 2.6 Biological Macromolecules & Cellular Respiration

In this unit, students will:

Describe the structure of atoms and distinguish between elements, compounds, and mixtures.
Compare ionic, covalent, and hydrogen bonds and explain their importance in living organisms.
Explain the role of electrolytes, ions, and water in maintaining physiological balance.
Analyze the properties of water and the importance of pH in human body systems.
Describe the structure and function of carbohydrates, lipids, proteins, and nucleic acids and explain how they support cellular respiration.

[HS-PS1-1, HS-PS1-2, HS-PS1-3, HS-LS1-7]

[HN.1, HN.2, HN.3]

Course Outline

Unit 3: Cells & Transport

- 3.1 Cell Structure & Organelles
- 3.2 Cell Membrane Structure
- 3.3 Body Fluids & Cellular Environments
- 3.4 Passive Membrane Transport
- 3.5 Active Membrane Transport
- 3.6 Osmosis & Tonicity

Next Generation Science Standards (NGSS) National Health Science Standards

In this unit, students will:

Identify the major structures and organelles of animal cells and explain their functions.

Describe the structure of the cell membrane and explain how it regulates movement into and out of cells.

Compare intracellular and extracellular fluid and explain their roles in maintaining homeostasis.

Differentiate between passive and active transport, including diffusion, osmosis, and membrane pumps.

Predict how cells respond to isotonic, hypotonic, and hypertonic solutions.

[HS-LS1-1, HS-LS1-2, HS-LS1-3]

[HN.1, HN.2, HN.3]

Unit 4: Cell Cycle, Tissues & Skin

- 4.1 Mitosis & Meiosis
- 4.2 Tissue Types
- 4.3 Tissue Membranes
- 4.4 Integumentary System Structures
- 4.5 Skin Layers & Functions
- 4.6 Endocrine & Exocrine Glands
- 4.7 Integumentary Disorders

In this unit, students will:

Compare mitosis and meiosis and explain their roles in growth, repair, and reproduction.

Identify the four major tissue types and relate their structures to their functions.

Distinguish among the major tissue membranes and explain their protective roles.

Describe the structures and functions of the integumentary system, including skin, hair, nails, and glands.

Explain how disorders of the skin and integumentary system affect normal body function.

[HS-LS1-1, HS-LS1-2, HS-LS1-4]

[HN.1, HN.2, HN.3]

Unit 5: Skeletal System

- 5.1 Functions of the Skeletal System
- 5.2 Bone Structure & Classification
- 5.3 Bone Markings
- 5.4 Axial Skeleton
- 5.5 Appendicular Skeleton
- 5.6 Joints & Ligaments
- 5.7 Skeletal Disorders

In this unit, students will:

Describe the major functions of the skeletal system and explain how bones grow, remodel, and repair.

Classify bones by shape and identify the major structures of a typical long bone.

Identify common bone markings and explain their functional significance.

Differentiate between the axial and appendicular skeletons and identify their major components.

Compare the structure and function of joints and ligaments and explain how skeletal disorders affect movement.

[HS-LS1-2, HS-LS1-3]

[HN.1, HN.2, HN.3]