DISCOVER ANATOMY & PHYSIOLOGY

Scope & Sequence

This high school honors anatomy and physiology course introduces students to the structure and functions of the human body, from cells and tissues to each of the 11 major body systems. With an emphasis on how these systems work together to maintain homeostasis, students will discover how the body responds to challenges and supports everyday life. Through engaging video lessons, diagrams, and hands-on activities, they'll gain a solid foundation in anatomy and physiology that prepares them for future studies in advanced biology, health, or medical-related fields and deepens their awe for God's incredible design.

Lesson 1: Meet the Human Body

What anatomy and physiology are—and how they work together
Levels of organization in the human body, from cells to systems
Introduction to anatomical terms, positions, and body planes

Lesson 2: The Cell: Building Blocks of Life

The structure and function of the cell and its parts
Roles of key organelles
How the plasma membrane regulates what enters and exits the cell
Homeostasis and feedback loops

Lesson 3: The Blueprint of Life: Protein Synthesis & The Cell Cycle

The structure and function of DNA
DNA Replication
Stages of the cell cycle
Protein synthesis: transcription and translation

Lesson 4: The Body's Living Framework

How cells join together to form tissues
The four main tissue types in the human body
Structure and function of epithelial, connective, muscle, and nervous tissues
The role of membranes in protection and support

Lesson 5: The Integumentary System: The Body's First Defense

The structure and function of the skin's layers
The roles of keratinocytes and melanocytes
Accessory structures—hair, nails, and glands—and their unique functions
How sensory receptors connect the skin to the nervous system

Lesson 6: The Skeletal System: Support from the Inside Out

The functions of the skeletal system
Organization of the skeleton: axial vs. appendicular
Types of bones and their roles in the body
Gross and microscopic anatomy of a long bone
The role of bone marrow and bone cells in maintaining bone health

Lesson 7: The Skeletal System: Growth, Repair, & Movement

How bones develop and grow throughout life
The role of growth plates and hormones in bone lengthening
Bone remodeling and repair
The anatomy and types of joints

Lesson 8: Exam 1

Lesson 9: The Muscular System: Designed For Motion

The functions of the muscular system
Three types of muscle tissue and their shared and unique characteristics
The structure of skeletal muscle fibers and how they contract
How skeletal muscles are named
Basic movement vocabulary

Lesson 10: The Muscular System: Power That Lasts

- How nerves signal muscles to contract
- The sliding filament theory: actin, myosin, calcium, and ATP
- Energy systems for muscle contraction and why fatigue happens
- Fast-twitch vs. slow-twitch fibers: built for power or endurance

Lesson 11: The Muscular System: Mechanics in Motion

- How muscles attach to bones: origins, insertions, and tendons
- Why muscles pull (not push) and how opposing pairs create balance
- Lever systems: how bones, joints, and muscles generate movement
- Roles of agonists, antagonists, synergists, and stabilizers

Lesson 12: The Nervous System: Wired for Action

- The central and peripheral nervous systems
- The sensory–integration–motor pathway
- Somatic (voluntary) vs. autonomic (involuntary) control
- The structure and function of neurons and glial cells

Lesson 13: The Central Nervous System: The Control Center

- The brain's regions and their specialized functions
- Structures that support brain complexity: gyri, sulci, fissures, arbor vitae
- The spinal cord: structure, communication, and the reflex arc
- Spinal nerves and dermatomes
- How the brain and spinal cord are protected

Lesson 14: The Peripheral Nervous System: The Nerve Network

- Cranial nerves and their roles
- How spinal nerves form plexuses and connect the body
- The somatic nervous system and proprioception
- The autonomic nervous system: sympathetic vs. parasympathetic control

Lesson 15: The Wonder of the Senses

- How the body gathers and interprets sensory information
- General senses: touch, temperature, pain, and sensory adaptation
- Special senses: sight, hearing, balance, smell, and taste
- How eyes and ears translate stimuli into signals
- What happens when sensory systems fail

Lesson 16: The Endocrine System: Chemical Commands

How hormones regulate body functions and maintain balance
The role of the hypothalamus and pituitary gland
How hormones travel and bind to target cells
Major endocrine glands and their key hormones

Lesson 17: Exam 2

Lesson 18: The Cardiovascular System: Powered by the Heart

Functions of the cardiovascular system: transport, regulation, protection
Heart structure: chambers, valves, layers, and vessels
The design and function of cardiac muscle
Blood flow through pulmonary and systemic circuits
Common structural disorders of the heart

Lesson 19: The Cardiovascular System: Keeping the Beat

The cardiac cycle: systole and diastole
The heart's electrical conduction system
Heart sounds and basics of an EKG
How heart rate and vessel tone adjust to body demands

Lesson 20: The Cardiovascular System: Blood & Vessels

What blood is made of and what each part does
How blood clots to prevent loss
Blood vessel structure and function
What blood pressure is and factors that influences it
Vascular health disorders and lifestyle influences

Lesson 21: The Respiratory System: Breath of Life

The primary functions of the respiratory system: oxygen in, carbon dioxide out
The structures of the upper and lower respiratory tracts and the path of a breath
How the diaphragm and intercostal muscles use pressure changes to move air
The design of the lungs: bronchial tree, pleura, alveoli, and surfactant
Introductory respiratory disorders

Lesson 22: The Respiratory System: Fueling Cells with Oxygen

How gas exchange occurs in the alveoli and capillaries (external respiration)

Oxygen transport by hemoglobin and delivery to body tissues (internal respiration)
Aerobic cellular respiration in the mitochondria
Carbon dioxide as a normal waste product and breathing regulator
How the respiratory, cardiovascular, and cellular systems work together

Lesson 23: The Lymphatic & Immune System: Transport, Balance, & Preparation

Structure and functions of the lymphatic system
Lymph vessels, nodes, and organs
Why fluid balance matters and how edema affects tissue health
How lymphatic structures support immune defense

Lesson 24: The Lymphatic & Immune System: Innate Defense

The body's first lines of defense against pathogens
Surface membrane barriers and antimicrobial defenses
Inflammation, fever, and phagocytosis
Innate immune cells and nonspecific immune responses

Lesson 25: The Lymphatic & Immune System: Adaptive Defense & Memory

Adaptive immunity and immune specificity
The roles of B cells, T cells, and antibodies
Active vs. passive immunity and immune memory
Cell-mediated immune responses

Lesson 26: Exam 3

Lesson 27: The Digestive System: Anatomy & Mechanics

The functions of the digestive system
The organs of the digestive tract and accessory organs
Mechanical digestion and movement of food through the digestive tract
Peristalsis and segmentation and their roles in digestion

Lesson 28: The Digestive System: Absorption & Regulation

Digestive enzymes, secretions, and pH regulation
Nutrient absorption in the small intestine
The roles of the liver, gallbladder, and pancreas in digestion
The gut microbiome and its influence on digestive health
Introductory digestive disorders and lifestyle influences

Lesson 29: The Urinary System: Filtering for Balance

- The functions of the urinary system
- Kidney structure and nephron function
- How blood is filtered and urine is formed
- The role of the urinary system in homeostasis

Lesson 30: The Urinary System: Fluid, Electrolytes, & pH

- How the kidneys regulate water balance
- Electrolyte and acid–base regulation
- Hormonal control of urine production
- Common urinary system disorders

Lesson 31: The Reproductive System: Structure & Function

- The primary functions of the reproductive system
- Male and female reproductive anatomy
- Hormonal regulation of reproduction
- How the reproductive system connects to overall physiology

Lesson 32: Human Development Across the Lifespan

- Fertilization and early development
- Embryonic and fetal stages
- How body systems form and specialize
- Growth and development from infancy through adolescence

Lesson 33: Genetics, Inheritance, & the Continuity of Life

- How genes influence human structure and function
- Basic patterns of inheritance and genetic variation
- How genes influence traits and development
- Genetic mutations and their effects on body systems

Lesson 34: The Body in Balance: Systems Working Together

- How multiple body systems respond to changing internal and external conditions
- Feedback mechanisms that maintain stability in the body
- Integrated responses to exercise, stress, and illness

Lesson 35: Exam 4