

Scope & Sequence

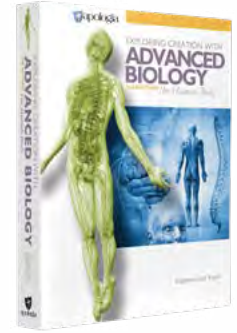
Exploring Creation with Advanced Biology The Human Body

GRADE LEVEL: 11th or 12th with prerequisite of Biology and Chemistry

TEXT SUMMARY: In this course you will explore the fascinating creation we call the human body. As you make your way through the modules, you will begin to understand how every part of the body has a purpose, each part being necessary for the other parts to function. This study will introduce the organizational levels of the human body from the cell to the 11 major systems. You will learn the anatomy and physiology of the human body and the efficiency with which each system works. The seamless integration of one system with the others and the intricacy at the molecular level represents a feat of engineering and design that could only come from God. We are truly fearfully and wonderfully made!

Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 1 <i>Introduction to Anatomy and Physiology</i></p>	<p>Module 1 provides an introduction to the organizational levels of the human body from the major organ systems to cellular functions.</p>	<ul style="list-style-type: none"> • Anatomy Terms • Organization of the Human Body • Homeostasis • Cell Structure and Function • Protein Synthesis • Cellular Mitosis • Plasma Membrane • Membrane Transport Processes 	<p>This module contains no experiments.</p>
<p>MODULE 2 <i>Histology: The Study of Tissues</i></p>	<p>Module 2 provides an in-depth look at different tissues in the body including their structures and functions.</p>	<ul style="list-style-type: none"> • Epithelial Tissues • Glandular Epithelium • Connective Tissues • Cartilage • Bone and Blood Tissues • Membranes • Tissue Repair 	<ul style="list-style-type: none"> • Microscope: Epithelial Tissues • Microscope: Microscopic Anatomy of the Salivary Glands
<p>MODULE 3 <i>The Integumentary and Skeletal Systems</i></p>	<p>A study of the integumentary system more commonly known as the skin. A study of the gross anatomy of the skeletal system.</p>	<ul style="list-style-type: none"> • Basic Structure of Skin • Epidermis • Hair and Nails • Skin Glands • Skeletal System • Gross Anatomy of Bone • Details of the Appendicular Skeleton • Details of the Axial Skeleton 	<ul style="list-style-type: none"> • Microscope: A Closer Look at the Skin • Microscope: A Closer Look at Follicles

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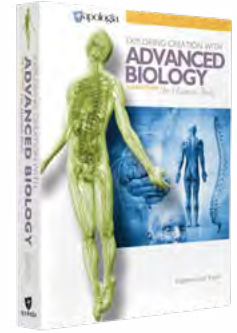


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<p>MODULE 4 <i>Skeletal System Histology and Movement</i></p>	<p>Module 4 provides a detailed look at the skeletal system: bone make-up and joint movement.</p>	<ul style="list-style-type: none"> • Bone Histology Overview • Cancellous and Compact Bone Histology • Bone Growth and Remodeling • Bone Homeostasis • Nutrition for Bone Health • Three Major Types of Joints • Motion and Terms of Movement 	<ul style="list-style-type: none"> • Calcium Salts in Bone • Microscope: Cancellous and Compact Bone Histology
<p>MODULE 5 <i>The Muscular System Histology and Physiology</i></p>	<p>Module 5 provides an introduction to muscle structures, functions, and how muscles perform those functions.</p>	<ul style="list-style-type: none"> • Skeletal Muscle Structure • How a Muscle Fiber Contracts • Neuromuscular Junction • How a Muscle Fiber Relaxes • Motor Units • Muscle Tone • Energy in Skeletal Muscle Fibers • Warm-Up and Cool-Down 	<ul style="list-style-type: none"> • Microscope: Skeletal Muscle Histology
<p>MODULE 6 <i>The Skeletal Muscle System</i></p>	<p>Module 6 provides an overview of how the individual muscles of the body come together to enable us to move and keep our shape.</p>	<ul style="list-style-type: none"> • General Terms and Principles • Overview of the Skeletal Muscle System • Major Muscles Groups Including the Head and Face; Anterior Chest and Abdominal Wall; Shoulder, Back and Arm; Forearm; Hand; Thigh; Leg; and Foot 	<p>This module contains no experiments.</p>

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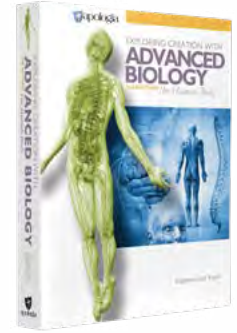


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<p>MODULE 7 <i>The Nervous System</i></p>	<p>Module 7 provides an overview of the central nervous system and the peripheral nervous system. Module 7 also provides an in-depth study of the nervous system at the cellular and molecular levels.</p>	<ul style="list-style-type: none"> • Overview of the Entire Nervous System • The Nervous System at the Cellular Level • Neuroglia • Nerve Structure • Action Potentials • Synaptic Transmission • Neuron Arrangements 	<ul style="list-style-type: none"> • Microscope: Neurons and Neuroglia
<p>MODULE 8 <i>The Central Nervous System</i></p>	<p>Module 8 provides an introduction to the complexity of the human brain and spinal cord.</p>	<ul style="list-style-type: none"> • Brain Anatomy • Cerebrum in Detail • Important Brain Structures • Protection of the Brain • The Spinal Cord • The Reflex Arc • Ascending and Descending Pathways in the Spinal Cord 	<p>This module contains no experiments.</p>
<p>MODULE 9 <i>The Peripheral Nervous System</i></p>	<p>Module 9 provides a detailed look at the peripheral nervous system and the general senses.</p>	<ul style="list-style-type: none"> • Divisions of the Autonomic Nervous System (ANS) • Control of the ANS • Afferent Division of the Peripheral Nervous System • General Senses • Sense of Taste • Sense of Balance • Sense of Hearing • Sense of Vision: Eye Anatomy and Physiology 	<ul style="list-style-type: none"> • Two-Point discrimination • Cow Eye Dissection

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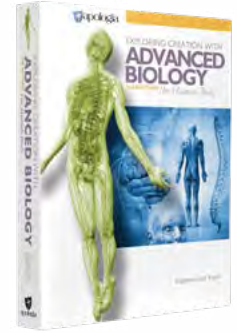


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Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 10 <i>The Endocrine System</i></p>	<p>Module 10 provides an introduction to the endocrine system's make-up, chemical production, and function in the human body.</p>	<ul style="list-style-type: none"> • Endocrine System as a Whole • Endocrine Glands and Hormones • Hormone Chemistry • Hormone Secretion Control • Hormone Receptors in the Body • Prostaglandins 	<p>This module contains no experiments.</p>
<p>MODULE 11 <i>The Cardiovascular System</i></p>	<p>Module 11 provides an introduction to the blood, heart, and blood vessels that make up the cardiovascular system.</p>	<ul style="list-style-type: none"> • Composition of Blood • Formed Elements in Blood • Blood as a Connective Tissue • Blood Types • Blood Circulation • Heart Anatomy • Cardiac Muscle and the Cardiac Cycle • Blood Vessels and the Entire Circulatory System 	<ul style="list-style-type: none"> • Microscope: Examining a Blood Smear • Cow's Heart Dissection
<p>MODULE 12 <i>The Lymphatic System</i></p>	<p>Module 12 provides an introduction to the vast network of lymph vessels and lymph tissues in the human body and their functions.</p>	<ul style="list-style-type: none"> • Lymph and Lymph Vessels • Functions of the Lymphatic System • Lymph Nodes • Spleen and Thymus Gland • Immunity • Innate Immunity • Innate Defense • Acquired Immunity: Humoral and Cell-Mediated • Types of Acquired Immunity and Autoimmunity 	<ul style="list-style-type: none"> • Microscope: Histology of a Tonsil

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Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 13 <i>The Digestive System</i></p>	<p>Module 13 provides an introduction to the digestive system as a whole and a detailed look at the anatomy and function of each of its parts. Module 13 also provides an in-depth look at nutrition and what the body needs to stay healthy.</p>	<ul style="list-style-type: none"> • Overview of the Digestive System • Mouth, Pharynx, and Esophagus • Stomach • Small Intestine • Large Intestine • Accessory Organs: Liver, Pancreas, Gallbladder • Nutrition • Micronutrients 	<ul style="list-style-type: none"> • Microscope: Histology of the Stomach • Microscope: Histology of the Liver
<p>MODULE 14 <i>The Respiratory System</i></p>	<p>Module 14 provides an introduction to the anatomy of the respiratory system and the functions it performs at macro and micro levels.</p>	<ul style="list-style-type: none"> • Anatomy and Functions of Respiratory System • Voice • Muscles and Mechanics of Ventilation • Factors that Aid Ventilation • External Respiration • Gas Exchange During External and Internal Respiration • Respiratory Control • Cellular Respiration: Glycolysis, Oxidation of Pyruvate, Citric Acid (Krebs) Cycle, Electron Transport Chain • Review of Cellular Respiration 	<ul style="list-style-type: none"> • Microscope: Histology of the Lung

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Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 15 <i>The Urinary System</i></p>	<p>Module 15 provides an introduction to the anatomy of the urinary system and the processes that it performs to provide balance to the body while removing harmful toxins.</p>	<ul style="list-style-type: none"> • Anatomy of Urinary System • Urine Formation: Overall Scheme, Glomerular Filtration, Secretion, Reabsorption of Water • Storage and Release of Urine • Blood Pressure Control by the Kidneys • Acid-Base Balance in the Body 	<ul style="list-style-type: none"> • The Bicarbonate Buffer
<p>MODULE 16 <i>The Reproductive System</i></p>	<p>Module 16 provides an introduction to the anatomy of both the male and female reproductive systems and the part they play in the miraculous conception of human life.</p>	<ul style="list-style-type: none"> • Anatomy of the Male Reproductive System • Meiosis • Spermatogenesis • Hormonal Control of Male Reproduction • Anatomy of the Female Reproductive System • Oogenesis • The Menstrual Cycle • Fertilization, Development, and Parturition 	<ul style="list-style-type: none"> • Microscope: Spermatogenesis and Sperm • The Fetal Pig Dissection

ADDITIONAL INFORMATION: This text has several complementary products that can be found at apologia.com. Additional resources and websites for further exploration of the topics in the text are provided at the Book Extras link for this title.



Scope & Sequence

Exploring Creation with Advanced Chemistry, 2nd Edition

GRADE LEVEL: 12th with prerequisite of Chemistry and Algebra 2

TEXT SUMMARY: *Exploring Creation with Advanced Chemistry, 2nd Edition* will take you on a journey through the fascinating world of dancing molecules, balancing electrons, and the physical creation of all things including ourselves. Building on the concepts and tools learned in general chemistry, this text will provide a solid understanding of complex chemistry theories and models so that the student is prepared for the college advanced placement exam.

Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 1 <i>Units, Chemical Equations, and Stoichiometry Revisited</i></p>	<p>Module 1 reviews basic concepts of chemistry. The modules following will build upon these concepts.</p>	<ul style="list-style-type: none"> • Units Review • Chemical Equations • Hess's Law • Stoichiometry and Limiting Reactants • Stoichiometry, Percent Yield, and Multiple Reactions 	<ul style="list-style-type: none"> • The Strength of Household Ammonia
<p>MODULE 2 <i>The Atom Revisited</i></p>	<p>Module 2 delves into the make-up of the world at the atomic level. Grasp the concept of "the atom" in all of its complexity and color.</p>	<ul style="list-style-type: none"> • The Atom • The Bohr Model and Atomic Spectra • The Size of an Atom • Quantum Mechanical Model • Determining Quantum Numbers for Individual Electrons 	<ul style="list-style-type: none"> • Colors in Chemistry
<p>MODULE 3 <i>The Electronic Structure of Molecules</i></p>	<p>Module 3 provides an understanding of how atoms interact with each other and share space. Learn the concept and see it in color.</p>	<ul style="list-style-type: none"> • How Atoms Share Electrons • Hybrid Orbitals • Molecular Orbitals • Molecular Orbitals—The Rule Breakers 	<ul style="list-style-type: none"> • The Effect of Solvent on the Color of a Substance

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Scope & Sequence

Exploring Creation with Advanced Chemistry, 2nd Edition

Module & Major Themes	Summary	Main Themes	Supporting Experiments
MODULE 4 <i>Intermolecular Forces and the Phases of Matter</i>	<p>Module 4 provides information about the forces that hold everything together.</p>	<ul style="list-style-type: none"> • Applying the Kinetic Theory of Matter to Phase Changes • Different Types of van der Waals Forces • Cohesive Forces, Adhesive Forces, and Surface Tension • Phase Diagrams • Crystals and Unit Cells • Metallic Crystals • Determining Density from Crystal Structure • Ionic Crystals 	<ul style="list-style-type: none"> • The Kinetic Theory of Matter • Separating a Mixture Using Sublimation • Identifying Unit Cells
MODULE 5 <i>Solutions and Colloids</i>	<p>Module 5 provides the key terms, concepts and mathematical formulas to create and measure solutions. Learn how to use temperature to conceptualize and measure change.</p>	<ul style="list-style-type: none"> • Concentration, Solubility, and the Formation of Solutions • Relating Units of Concentration • Solubility, van der Waals Forces, and Entropy • Temperature and Solubility • The Effect of a Solute on a Solvent's Phase Diagram • Separating Solute From Solvent in a Solution • Colloids 	<ul style="list-style-type: none"> • A Solubility Curve • A Simple Distillation • Paper Chromatography • Forming Colloidal Particles with Soap
MODULE 6 <i>Solutions and Equilibrium</i>	<p>Module 6 clarifies the meaning of equilibrium and why it is important in understanding solubility and saturation. This module also explains <i>the common ion effect</i>.</p>	<ul style="list-style-type: none"> • The Equilibrium Constant and Gibbs Free Energy • Solubility Equilibria • The Common Ion Effect • Precipitation from Solution 	<ul style="list-style-type: none"> • The Common Ion Effect • Precipitation • Making Your Own Precipitate

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Exploring Creation with Advanced Chemistry, 2nd Edition

Module & Major Themes	Summary	Main Themes	Supporting Experiments
MODULE 7 <i>Acid/Base Equilibria</i>	<p>Module 7 applies the equilibrium constant to other types of chemical reactions. This module focuses on acids and bases.</p>	<ul style="list-style-type: none"> • Common Definitions of Acids and Bases • Conjugate Acids and Conjugate Bases • The Real Meaning Behind the pH Scale • Calculating the pH of a Solution of an Acid or Base • Amphiprotic Substances and Their Behaviors • Diprotic and Triprotic Acids • Alternate Definitions of Acids and Bases 	<ul style="list-style-type: none"> • Calculating Concentration from pH
MODULE 8 <i>More on Equilibrium</i>	<p>Module 8 continues to discuss equilibrium while introducing buffers.</p>	<ul style="list-style-type: none"> • Buffer Solutions • The pH of a Buffer • The Common Ion Effect and pH • The Technique of Successive Approximations • Other Equilibrium Situations 	<ul style="list-style-type: none"> • The Bicarbonate Buffer
MODULE 9 <i>Electrochemistry Part 1</i>	<p>Module 9 introduces the concept of electrochemistry by reviewing redox reactions and establishing mathematical equations to produce and measure chemical reactions. Electrolysis is also discussed.</p>	<ul style="list-style-type: none"> • Review of Oxidation Numbers • Analyzing Redox Reactions • Galvanic Cells • The Nernst Equation • Electrolytic Cells • Faraday's Law of Electrolysis 	<ul style="list-style-type: none"> • A Redox Reaction between Copper and Zinc • Making Your Own Galvanic Cell • The Electrolysis of Copper Sulfate

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Module & Major Themes	Summary	Main Themes	Supporting Experiments
MODULE 10 <i>Electrochemistry</i> Part 2	<p>Module 10 explores electrochemistry that occurs outside of a cell, teaches how to balance redox reactions, and explains how to measure redox reactions.</p>	<ul style="list-style-type: none"> • Balancing Redox Reaction—The Half-Reaction Method • Balancing Redox Reactions—The Change in Oxidation Number Method • The Strengths of Oxidizing and Reducing Agents • Relating Redox Potential to ΔG and the Equilibrium Constant • Corrosion 	<ul style="list-style-type: none"> • Predicting Redox Reactions
MODULE 11 <i>Chemical Kinetics</i>	<p>Module 11 focuses on understanding and measuring the kinetic properties of a chemical reaction.</p>	<ul style="list-style-type: none"> • Reaction Rate, the Rate Equation, and the Rate Constant • The Kinetics of a Chemical Reaction • First-Order Chemical Reactions • Second-Order Reactions • The Collision Theory of Chemical Kinetics • Reaction Mechanisms and Reaction Rates 	<ul style="list-style-type: none"> • The Rate of an Iodine Clock Reaction
MODULE 12 <i>An Introduction to Organic Chemistry</i>	<p>Module 12 introduces organic chemistry, describes what makes something “organic” and compares how it is chemically different from something “inorganic”.</p>	<ul style="list-style-type: none"> • Saturated Hydrocarbons • Alkenes and Alkynes • Aromatic Compounds • Petroleum Polymers 	<ul style="list-style-type: none"> • Investigating the Properties of Polyethylene • Making Slime • Cross-Linking a Polymer

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Module & Major Themes	Summary	Main Themes	Supporting Experiments
<p>MODULE 13 <i>Functional Groups in Organic Chemistry</i></p>	<p>Module 13 introduces variations of the common organic carbon chain. These are called functional groups.</p>	<ul style="list-style-type: none"> • Alcohols • Ethers • Aldehydes and Ketones • Carboxylic Acids • Esters • Amino Acids and Proteins • Carbohydrates • Organic Chemistry and Biochemistry 	<ul style="list-style-type: none"> • Yeast and Fermentation Process • The Hydrolysis of Sucrose
<p>MODULE 14 <i>Nuclear Chemistry</i></p>	<p>Module 10 explores electrochemistry that occurs outside of a cell, teaches how to balance redox reactions, and explains how to measure redox reactions.</p>	<ul style="list-style-type: none"> • Balancing Redox Reaction—The Half-Reaction Method • Balancing Redox Reactions—The Change in Oxidation Number Method • The Strengths of Oxidizing and Reducing Agents • Relating Redox Potential to ΔG and the Equilibrium Constant • Corrosion 	<p>This module contains no experiments.</p>
<p>MODULE 15 <i>Review Part 1</i></p>	<p>Module 15 is designed to review basics taught in this course through questions and problems.</p>	<ul style="list-style-type: none"> • Questions and Problems to Assist in Review of the Material Learned in this Course 	<p>This module contains no experiments.</p>
<p>MODULE 16 <i>Review Part 2</i></p>	<p>Module 16 continues to review the basic and more complex concepts through questions and problems. This module also provides some insight into preparing for the Advanced Placement Chemistry Exam.</p>	<ul style="list-style-type: none"> • Questions and Problems to Assist in the Review of the Material Learned in this Course • How to Prepare for the Advanced Placement Chemistry Exam 	<p>This module contains no experiments.</p>

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