



Jr. & Sr. High Science

# SCOPE and SEQUENCE



# Jr. & Sr. High Science **SCOPE and SEQUENCE**

## TABLE OF CONTENTS

Exploring Creation With General Science, 2nd Edition.....	3
Exploring Creation With Physical Science, 2nd Edition .....	7
Exploring Creation With Biology, 2nd Edition .....	11
Exploring Creation With Chemistry, 3rd Edition.....	17
Exploring Creation With Physics, 2nd Edition.....	25
Exploring Creation With Advanced Biology The Human Body.....	29
Exploring Creation With Marine Biology .....	34

# Scope & Sequence

## Exploring Creation with General Science, 2nd Edition



**GRADE LEVEL:** 7th

**TEXT SUMMARY:** This text is designed to be a student's first introduction to the sciences. For this reason its content is very wide by design. Some of the major topics examined include the history of science, scientific inquiry, experimental design and analysis, earth sciences and life sciences. All theory introduced is further supported with engaging labs to help deepen understanding of the topics being taught. Completion of this text will prepare a student to be able to more deeply investigate many areas of science.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 1</b> <i>A Brief History of Science</i>	<b>2 WEEKS</b> Module 1 provides a comprehensive overview of the history of science including the beginnings of scientific practices and the great scientists that have shaped our understanding of the world we know.	<ul style="list-style-type: none"> <li>History of Science from Ancient Times to the Present</li> <li>Greek Scientists</li> <li>Newton</li> </ul>	<ul style="list-style-type: none"> <li>Density in Nature</li> <li>Atomic Motion</li> <li>A Chemical Reaction</li> <li>Mapping the Paths of the Planets</li> </ul>
<b>MODULE 2</b> <i>Scientific Inquiry</i>	<b>2 WEEKS</b> Module 2 provides an introduction to the scientific method. Module 2 also applies the scientific method to facts of Christianity.	<ul style="list-style-type: none"> <li>What Science is Not</li> <li>Scientific Method</li> <li>Failures of the Scientific Method</li> <li>Limitations of Science</li> <li>Science and Christianity</li> </ul>	<ul style="list-style-type: none"> <li>How Does Weight Affect the Speed at which Objects Fall?</li> <li>Learning More About Weight and the Speed at Which Objects Fall</li> <li>The Broken Flashlight</li> </ul>
<b>MODULE 3</b> <i>How to Analyze and Interpret Experiments</i>	<b>2 WEEKS</b> Module 3 teaches the young scientist how to analyze and interpret experimental results using several tools including graphs.	<ul style="list-style-type: none"> <li>Experiments and Variables</li> <li>Using Experiments</li> <li>Recognizing Experimental Variables</li> <li>Interpreting Experimental Results</li> </ul>	<ul style="list-style-type: none"> <li>A Floating Egg</li> <li>Which "Boat" Will Move?</li> <li>What Does Soap Do To Water? – Part 1</li> <li>What Does Soap Do To Water? - Part 2</li> </ul>
<b>MODULE 4</b> <i>Science, Applied Science and Technology</i>	<b>2 WEEKS</b> Module 4 provides an overview of the differences between science, applied science and technology. Module 4 also provides an in-depth study of simple machines.	<ul style="list-style-type: none"> <li>Distinguishing Between Science, Applied Science and Technology</li> <li>Simple Machines (Lever, Wheel &amp; Axle, Pulley, Inclined Plane, Wedge, Screw)</li> </ul>	<ul style="list-style-type: none"> <li>The Lever</li> <li>A Simulation of Using Multiple Pulleys</li> </ul>

# Scope & Sequence

## Exploring Creation with General Science, 2nd Edition



### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 5</b> <i>Archaeology, Geology, and Paleontology</i>	<b>2 WEEKS</b> Module 5 provides an introduction to life science. Module 5 also focuses on the study of the history of life through archaeology.	<ul style="list-style-type: none"> <li>• Archeology And History</li> <li>• The Internal Test</li> <li>• The External Test</li> <li>• The Bibliographic Test</li> <li>• Relative Dating And The Principle Of Superposition</li> </ul>	NONE
<b>MODULE 6</b> <i>Foundations of Geology</i>	<b>2 WEEKS</b> Module 6 provides an introduction to geology including the study of rocks and soil to determine the history of Earth. Module 6 also discusses two different viewpoints of Earth's formation.	<ul style="list-style-type: none"> <li>• Soil, Rocks and Minerals</li> <li>• Strata in Sedimentary Rocks</li> <li>• Weathering</li> <li>• Erosion</li> <li>• The Basic Structure of the Grand Canyon</li> </ul>	<ul style="list-style-type: none"> <li>• "Growing" Crystals</li> <li>• Separation of Sedimentation</li> <li>• Physical Weathering: The Power of Plants</li> <li>• Chemical Weathering</li> <li>• Erosion</li> </ul>
<b>MODULE 7</b> <i>The Fossil Record</i>	<b>2 WEEKS</b> Module 7 focuses on the study of fossil records in determining the origins of Earth.	<ul style="list-style-type: none"> <li>• Casts and Molds</li> <li>• Petrification</li> <li>• Carbonized Remains</li> <li>• Avoiding Decomposition</li> <li>• Four General Features of the Fossil Record</li> <li>• Geology and Paleontology: The Uniformitarian and Catastrophist Perspectives</li> </ul>	<ul style="list-style-type: none"> <li>• Making a Fossil Cast</li> <li>• Minerals in Water and Evaporation</li> <li>• A Model of the Carbonization Process</li> </ul>
<b>MODULE 8</b> <i>Uniformitarianism and Catastrophism</i>	<b>2 WEEKS</b> Module 8 reviews the two theories of Earth's origins using the information discussed in the previous two chapters.	<ul style="list-style-type: none"> <li>• Uniformitarianism and Geology</li> <li>• Uniformitarianism and Evolution</li> <li>• Catastrophism and the Geological and Fossil Records</li> <li>• Uniformitarianism vs. Catastrophism</li> <li>• Evolution</li> </ul>	<ul style="list-style-type: none"> <li>• A Simulation of Index Fossils for Ordering Rock Layers</li> </ul>

## Scope & Sequence

### Exploring Creation with General Science, 2nd Edition

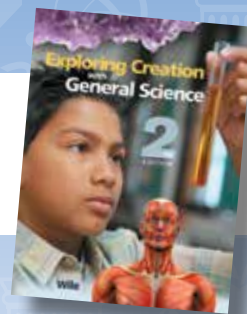


#### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 9</b> <i>What is Life?</i>	<b>2 WEEKS</b> Module 9 provides an in-depth look at the four basic criteria that define life.	<ul style="list-style-type: none"> <li>• DNA and Life</li> <li>• The Structure of DNA</li> <li>• Energy and Life</li> <li>• Sensing and Responding to Change</li> <li>• Reproduction and Life</li> <li>• The Cell: Life's Smallest Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Building a Model of DNA</li> <li>• Finding Food in Plants</li> <li>• Simple "Self-Sustaining" System</li> <li>• Sensing and Responding to Change</li> <li>• Fruit Fly Reproduction</li> </ul>
<b>MODULE 10</b> <i>Classifying Life</i>	<b>2 WEEKS</b> Module 10 provides an introduction to biology including the classification of living organisms. Module 10 also explores each kingdom.	<ul style="list-style-type: none"> <li>• The Five Kingdom System</li> <li>• Monera</li> <li>• Protista</li> <li>• Fungi</li> <li>• Plantae</li> <li>• Animalia</li> </ul>	<ul style="list-style-type: none"> <li>• Factors That Affect Bacterial Growth – Part 1</li> <li>• Factors That Affect Bacterial Growth – Part 2</li> <li>• Yeast is a Decomposer</li> <li>• Vegetative Reproduction</li> <li>• Turgor Pressure</li> </ul>
<b>MODULE 11</b> <i>The Human Body: Fearfully and Wonderfully Made</i>	<b>2 WEEKS</b> Module 11 provides an introduction to the structure of the human body. Module 11 also provides an overview of the make-up and functions of the bones, muscles and skin.	<ul style="list-style-type: none"> <li>• The Superstructure of the Human Body</li> <li>• Bones</li> <li>• Skeletons in Other Organisms</li> <li>• Skeletal Muscles</li> <li>• Smooth Muscles and Cardiac Muscles</li> <li>• Muscles and Movement in Other Organisms</li> <li>• Skin</li> <li>• Skin in Other Organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Minerals in Bone</li> <li>• Phototropism and Gravitropism</li> <li>• Skin Color</li> </ul>
<b>MODULE 12</b> <i>Energy and Life</i>	<b>2 WEEKS</b> Module 12 provides a comprehensive explanation of how energy is converted within the body to sustain life.	<ul style="list-style-type: none"> <li>• Life's Energy Cycle</li> <li>• Energy and the Body</li> <li>• Calories and Food</li> <li>• Metabolic Rates Throughout Creation</li> <li>• Combustion in Living Organisms</li> </ul>	<ul style="list-style-type: none"> <li>• What Combustion Needs</li> <li>• The Products of Combustion</li> <li>• Body Temperature</li> </ul>

# Scope & Sequence

## Exploring Creation with General Science, 2nd Edition



### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 13</b> <i>The Human Digestive System</i>	<b>2 WEEKS</b> Module 13 provides an introduction to the human digestive system, its structure and the process of digestion.	<ul style="list-style-type: none"> <li>• Digestion process</li> <li>• Human digestive system</li> <li>• Mouth, pharynx, esophagus, stomach, small intestine, liver, pancreas, and gall bladder</li> <li>• Micronutrients</li> </ul>	<ul style="list-style-type: none"> <li>• Seeing a Part of the Digestive Process</li> <li>• Stomach Acid and Antacids</li> <li>• The Effect of Sodium Bicarbonate and Stomach Acid</li> </ul>
<b>MODULE 14</b> <i>The Human Circulatory and Respiratory Systems</i>	<b>2 WEEKS</b> Module 14 provides an introduction to the human circulatory and respiratory systems and their partnership in the body.	<ul style="list-style-type: none"> <li>• Human circulatory system</li> <li>• Heart and blood flow</li> <li>• Blood components</li> <li>• Lungs</li> <li>• Respiratory system</li> <li>• Circulation and respiration in Creation</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring Your Own Cardiac Cycle</li> <li>• The Vital Capacity of Your Lungs</li> <li>• A Model of Your Lungs</li> <li>• A Model of Your Vocal Cords</li> <li>• Xylem</li> </ul>
<b>MODULE 15</b> <i>The Human Lymphatic, Endocrine, and Urinary Systems</i>	<b>2 WEEKS</b> Module 15 provides an introduction to the anatomy and physiology of the human lymphatic, endocrine and urinary systems.	<ul style="list-style-type: none"> <li>• The Lymphatic System</li> <li>• Lymph Nodes</li> <li>• Tears</li> <li>• The Urinary System</li> <li>• The Endocrine System</li> </ul>	<ul style="list-style-type: none"> <li>• Working Your Lacrimal Glands Too Hard</li> <li>• A Model of Kidney Function</li> </ul>
<b>MODULE 16</b> <i>The Human Nervous System</i>	<b>2 WEEKS</b> Module 16 provides an introduction to the anatomy and physiology of the human nervous system. Module 16 also provides an overview of the 5 senses in the human body.	<ul style="list-style-type: none"> <li>• Neurons</li> <li>• The Human Nervous System</li> <li>• The Brain</li> <li>• The Brain and Blood</li> <li>• Peripheral Nervous System</li> <li>• The Human Senses: Taste, Smell, Vision, Touch, Hearing</li> <li>• Do We Really Use Only 10 Percent of Our Brain?</li> </ul>	<ul style="list-style-type: none"> <li>• Determining a Person's Dominant Side</li> <li>• The Pupil of the Eye</li> <li>• The Sense of Smell and the Sense of Taste</li> <li>• The Human Blind Spot</li> <li>• Variation in Touch Sensitivity</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes a Study Guide at the end of each module which serves to guide a student in studying for the provided module tests. An additional study tool in the text is the Module Summary for each module. These are a summary of each of the modules which has missing information for a student to search for in the text and complete. Answers for the Study Guides, Module Summaries and the Tests are provided for the instructor. Two additional resources offered for added teacher/student support are a multimedia companion CD containing videos and word pronunciations specific to this course and the Apologia website providing links to additional websites for more in-depth exploration of the topics in the text.

# Scope & Sequence

## Exploring Creation with Physical Science, 2nd Edition



**GRADE LEVEL:** 8th

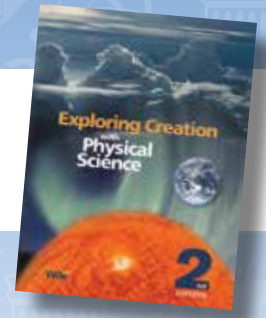
**TEXT SUMMARY:** Physical science is a study of the key concepts and theories explaining and/or modeling specific aspects of the behavior of creation. This text covers the basic principles of earth science, physics, chemistry and astronomy. Interspersed amongst the reading portion of the modules are many thought provoking and engaging labs which help to bring new concepts to life and to further spurn the curiosity of the young scientist.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 1</b> <i>The Basics</i>	<b>2 WEEKS</b> Module 1 provides an introduction to atoms and molecules. Module 1 also provides an introduction to units and measurement.	<ul style="list-style-type: none"> <li>• Atoms and Molecules</li> <li>• Measurement and Units</li> <li>• The Metric System</li> <li>• The English System</li> <li>• Unit conversions</li> <li>• Concentration</li> </ul>	<ul style="list-style-type: none"> <li>• Atoms and Molecules</li> <li>• Cubits and Fingers</li> <li>• Concentration</li> </ul>
<b>MODULE 2</b> <i>Air</i>	<b>2 WEEKS</b> Module 2 provides an introduction to the composition of air. Views on global warming, ozone and air pollution are also discussed in this module.	<ul style="list-style-type: none"> <li>• The Air and Humidity</li> <li>• The Composition of Air</li> <li>• Carbon Dioxide in the Air</li> <li>• Global Warming</li> <li>• Parts Per Million</li> <li>• Ozone</li> <li>• Air Pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Evaporation and Temperature</li> <li>• Oxygen and Fire</li> <li>• Carbon Dioxide and the Greenhouse Effect</li> </ul>
<b>MODULE 3</b> <i>The Atmosphere</i>	<b>2 WEEKS</b> Module 3 provides an introduction to Earth's atmosphere and an overview of the many layers within the atmosphere.	<ul style="list-style-type: none"> <li>• Atmospheric Pressure</li> <li>• Layers of the Earth's Atmosphere</li> <li>• The Homosphere</li> <li>• Temperature</li> <li>• The Heterosphere</li> </ul>	<ul style="list-style-type: none"> <li>• Atmospheric Pressure</li> <li>• Seeing the Effect of Changing Temperature</li> </ul>
<b>MODULE 4</b> <i>The Wonder of Water</i>	<b>2 WEEKS</b> Module 4 provides an introduction to the composition of water and water's amazing properties which make it a unique and vital substance on Earth.	<ul style="list-style-type: none"> <li>• The Composition of Water</li> <li>• Chemical Formulas</li> <li>• Water's Polarity</li> <li>• Water as a Solvent</li> <li>• Hydrogen Bonding in Water</li> <li>• Water's Cohesion</li> <li>• Hard Water and Soft Water</li> </ul>	<ul style="list-style-type: none"> <li>• The Chemical Composition of Water</li> <li>• Water's Polarity</li> <li>• Solvents and Solutes</li> <li>• Comparing Solid Water to Solid Butter</li> <li>• Water's Cohesion</li> <li>• The Forces Between Molecules</li> </ul>

# Scope & Sequence

## Exploring Creation with Physical Science, 2nd Edition



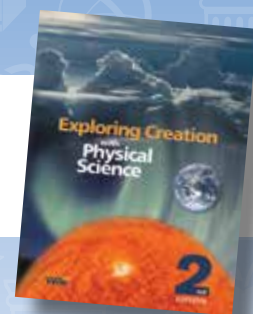
### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 5</b> <i>The Hydrosphere</i>	<b>2 WEEKS</b> Module 5 provides a detailed examination of the water sources found on our “blue” planet. Module 5 also provides an introduction to the hydrologic cycle.	<ul style="list-style-type: none"> <li>• Parts of the Hydrosphere</li> <li>• The Hydrologic Cycle</li> <li>• The Ocean</li> <li>• Glaciers and Icebergs</li> <li>• Groundwater and Soil Moisture</li> <li>• Surface Water</li> <li>• Atmospheric Moisture</li> <li>• Water Pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Evaporation, Condensation, Precipitation</li> <li>• Ice and Salt</li> <li>• Cloud Formation</li> </ul>
<b>MODULE 6</b> <i>Earth and the Lithosphere</i>	<b>2 WEEKS</b> Module 6 provides an overview of Earth’s make-up and a more in-depth look at the earth’s crust and varied topographical formations.	<ul style="list-style-type: none"> <li>• Earth’s Crust, Mantle and Core</li> <li>• Plate Tectonics</li> <li>• Earthquakes</li> <li>• Mountains and Volcanoes</li> </ul>	<ul style="list-style-type: none"> <li>• How Sound Travels Through Different Substances</li> <li>• A Simulation of Plastic Rock</li> <li>• Making an Electromagnet</li> <li>• A Model of Plate Tectonics</li> </ul>
<b>MODULE 7</b> <i>Factors that Affect Earth’s Weather</i>	<b>2 WEEKS</b> Module 7 provides an overview of three main factors that influence the earth’s weather: thermal energy, uneven distribution of thermal energy and water vapor in the atmosphere.	<ul style="list-style-type: none"> <li>• Factors That Influence Weather</li> <li>• Clouds</li> <li>• Earth’s Thermal Energy</li> <li>• Latitude and Longitude</li> <li>• Uneven Thermal Energy Distribution</li> <li>• Air Masses</li> </ul>	<ul style="list-style-type: none"> <li>• A Long – Term Weather Experiment</li> </ul>
<b>MODULE 8</b> <i>Weather and Its Prediction</i>	<b>2 WEEKS</b> Module 8 provides an introduction to the study of weather. Module 8 also offers an overview on how to read weather maps and forecast weather.	<ul style="list-style-type: none"> <li>• Precipitation</li> <li>• Thunderstorms</li> <li>• Tornadoes and Hurricanes</li> <li>• Weather Maps</li> <li>• Weather Prediction</li> </ul>	<ul style="list-style-type: none"> <li>• Making Your Own Lightning</li> <li>• Turning Experiment 7.1 into a Weather Prediction Tool</li> </ul>



# Scope & Sequence

## Exploring Creation with Physical Science, 2nd Edition



### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 9</b> <i>An Introduction to the Physics of Motion</i></p>	<p><b>2 WEEKS</b> Module 9 provides an introduction to motion and mathematical approaches and applications to real world situations.</p>	<ul style="list-style-type: none"> <li>• Mechanics—The Study of Motion, Force, and Energy</li> <li>• Speed</li> <li>• Velocity</li> <li>• Acceleration</li> <li>• Acceleration Due to Gravity</li> </ul>	<ul style="list-style-type: none"> <li>• The Importance of Direction</li> <li>• The Acceleration Due to Gravity is Independent of the Object Falling</li> <li>• Measuring Height With a Stopwatch</li> </ul>
<p><b>MODULE 10</b> <i>Newton's Laws</i></p>	<p><b>2 WEEKS</b> Module 10 provides a detailed study of Newton's three laws of motion including an introduction to friction as well as mathematical applications involved with Newton's Second Law.</p>	<ul style="list-style-type: none"> <li>• Sir Isaac Newton</li> <li>• Newton's First Law of Motion</li> <li>• Friction</li> <li>• Newton's Second Law of Motion</li> <li>• Static and Kinetic Friction</li> <li>• Newton's Third Law of Motion</li> </ul>	<ul style="list-style-type: none"> <li>• Two Experiments Demonstrating Newton's First Law</li> <li>• An Experiment to See How Well You Understand Newton's First Law</li> <li>• Friction</li> <li>• Newton's Third Law</li> </ul>
<p><b>MODULE 11</b> <i>The Forces in Creation Part 1</i></p>	<p><b>2 WEEKS</b> Module 11 provides an introduction to the four fundamental forces in creation with emphasis on the gravitational force.</p>	<ul style="list-style-type: none"> <li>• Four Fundamental Forces of Creation</li> <li>• The Gravitational Force</li> <li>• Force and Circular Motion</li> <li>• A Frictional Force</li> <li>• Gravitational Force and Our Solar System</li> <li>• Comets</li> <li>• Hey, What About Pluto?</li> <li>• What Causes the Gravitational Force?</li> <li>• A Brief History of Our View of the Solar System</li> </ul>	<ul style="list-style-type: none"> <li>• Force and Circular Motion</li> <li>• The "Bent Space and Time" Theory of Gravity</li> <li>• The Graviton Theory of Gravity</li> </ul>
<p><b>MODULE 12</b> <i>The Forces in Creation Part 2</i></p>	<p><b>2 WEEKS</b> Module 12 provides an overview of the electromagnetic force and introduces the study of electricity and magnetism.</p>	<ul style="list-style-type: none"> <li>• James Clerk Maxwell</li> <li>• The Electromagnetic Force</li> <li>• Photons</li> <li>• Electrical Charges</li> <li>• Electrical Circuits</li> <li>• Resistance</li> <li>• Switches and Circuits</li> <li>• Switches and Parallel Circuits</li> <li>• Magnetism</li> <li>• Permanent Magnets</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical Attraction and Repulsion</li> <li>• Making and Using an Electroscope</li> <li>• Current and Resistance</li> </ul>

## Scope & Sequence

### Exploring Creation with Physical Science, 2nd Edition



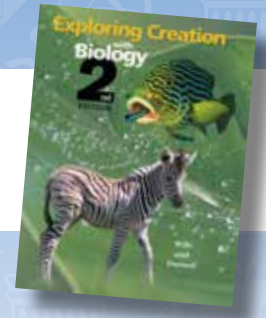
#### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 13</b> <i>The Forces in Creation Part 3</i>	<b>2 WEEKS</b> Module 13 provides an introduction to the structure and forces of an atom. Module 13 also provides an introduction to the periodic table of the elements.	<ul style="list-style-type: none"> <li>• The Atructure of the Atom</li> <li>• The Periodic Table of Elements</li> <li>• The Strong Force</li> <li>• Radioactivity (Dangers, Decay, Dating)</li> </ul>	NONE
<b>MODULE 14</b> <i>Waves and Sound</i>	<b>2 WEEKS</b> Module 14 provides an introduction to the structure of waves and their relationship to sound. Module 14 also explains how to analyze sound using mathematical formulas.	<ul style="list-style-type: none"> <li>• Waves</li> <li>• Sound Waves</li> <li>• Speed of Sound</li> <li>• Sound Wavelength and Frequency</li> <li>• Doppler Effect</li> <li>• Volume of Sound</li> <li>• Uses of Sound Waves</li> </ul>	<ul style="list-style-type: none"> <li>• The Medium Through Which Sound Waves Travel</li> <li>• The Speed of Sound</li> <li>• Wavelength and Sound</li> <li>• The Doppler Effect</li> <li>• The Amplitude of a Sound Wave</li> </ul>
<b>MODULE 15</b> <i>Light</i>	<b>2 WEEKS</b> The study of the makeup, characteristics and behaviors of light. Mathematical formulas and applications related to analyzing sound. A scientific look at color.	<ul style="list-style-type: none"> <li>• Dual Nature of Light</li> <li>• Wavelength and Frequency of Light</li> <li>• Reflection and Refraction</li> <li>• Lenses</li> <li>• The Human Eye</li> <li>• Color</li> </ul>	<ul style="list-style-type: none"> <li>• Seeing Different Wavelengths of Light</li> <li>• The Law of Reflection</li> <li>• Refraction of Light</li> <li>• The “Magical” Quarter</li> <li>• How the Eye Detects Color</li> </ul>
<b>MODULE 16</b> <i>An Introduction to Astrophysics</i>	<b>2 WEEKS</b> Module 16 provides an overview of astrophysics including a brief study of the sun, nuclear energy, stars and galaxies.	<ul style="list-style-type: none"> <li>• The Sun</li> <li>• Nuclear Energy</li> <li>• Star Classifications</li> <li>• Measuring Distances Between Stars</li> <li>• Galaxies</li> <li>• Expanding Universe</li> </ul>	<ul style="list-style-type: none"> <li>• An Expanding Universe</li> </ul>

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# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition



**GRADE LEVEL:** 9th

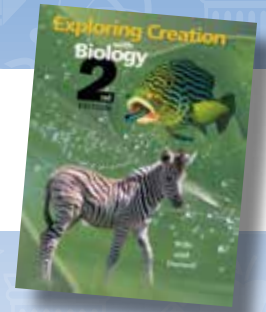
**TEXT SUMMARY:** Biology is the study of life. This text provides a student a broad overview of the many disciplines involved in the study of life. It starts with a brief introduction to the definition of life and then discretely examines and explores each of the five biological kingdoms. There are many content-rich labs to support the theory introduced in these studies. These labs include animal dissections, microscopic life studies and many chemical process labs simulating the complex intricacies involved in making a living system.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 1</b> <i>Biology: The Study of Life</i></p>	<p><b>2 WEEKS</b> Module 1 provides an introduction to the four characteristics used to define life, the scientific method, and classification tools. Module 1 also teaches proper microscope usage.</p>	<ul style="list-style-type: none"> <li>• DNA</li> <li>• Energy Conversion</li> <li>• Sensing and Responding to Change</li> <li>• Reproduction</li> <li>• Life's Secret Ingredient</li> <li>• The Scientific Method</li> <li>• Spontaneous Generation</li> <li>• Biological Classification</li> <li>• Characteristics Used to Separate Organisms into Kingdoms</li> <li>• Definition of Species</li> <li>• Biological Keys</li> <li>• Naming Organisms Based on Classification</li> <li>• Alternate Forms of Taxonomy</li> <li>• The Microscope</li> </ul>	<ul style="list-style-type: none"> <li>• Using a Biological Key</li> <li>• Introduction to the Microscope</li> </ul>
<p><b>MODULE 2</b> <i>Kingdom Monera</i></p>	<p><b>2 WEEKS</b> Module 2 provides an introduction to the kingdom Monera whose primary organism is bacteria. Module 2 also provides an overview of the eating habits and reproduction methods of bacteria along with the prevention of bacterial growth.</p>	<ul style="list-style-type: none"> <li>• Bacteria</li> <li>• The Eating Habits of Bacteria</li> <li>• Asexual Reproduction</li> <li>• Genetic Recombination</li> <li>• Transformation and Transduction</li> <li>• Endospore Formation</li> <li>• Bacterial Colonies</li> <li>• Classification in Kingdom Monera</li> <li>• Other Classification Systems</li> <li>• Specific Bacteria</li> <li>• Conditions for Bacterial Growth</li> <li>• Preventing Bacterial Infections</li> <li>• The Microscopic World</li> </ul>	<ul style="list-style-type: none"> <li>• Pond Life: Part A</li> <li>• Pond Life: Part B</li> </ul>

# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition

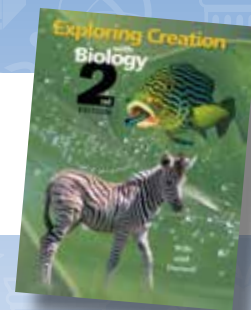


### SEMESTER I: QUARTER 1, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 3</b> <i>Kingdom Protista</i>	<b>2 WEEKS</b> Module 3 provides an introduction to the kingdom Protista. Module 3 also provides an overview of the subkingdoms Protozoa and Algae.	<ul style="list-style-type: none"> <li>• Classification in Kingdom Protista</li> <li>• Subkingdom Protozoa</li> <li>• 4 Phylum of Protozoa: Sacodina, Mastigophora, Ciliophora, Sporozoa</li> <li>• Subkingdom Algae</li> <li>• 5 Phylum of Algae: Chlorophyta, Chrysophyta, Pyrrophyta, Phaeophyta, Rhodophyta</li> </ul>	<ul style="list-style-type: none"> <li>• Pond Life: Part C</li> <li>• Subkingdom Protozoa</li> <li>• Subkingdom Algae</li> </ul>
<b>MODULE 4</b> <i>Kingdom Fungi</i>	<b>2 WEEKS</b> Module 4 provides an introduction to the kingdom Fungi including general characteristics, reproduction methods and classification. Module 4 provides further understanding of this kingdom through exploration of the six phylum within this kingdom.	<ul style="list-style-type: none"> <li>• General Characteristics</li> <li>• Reproduction</li> <li>• Classification</li> <li>• 6 Phylum: Basidiomycota, Ascomycota, Zygomycota, Chtridiomycota, Deuteromycota, Myxomycota</li> <li>• Yeast</li> <li>• Symbiosis</li> </ul>	<ul style="list-style-type: none"> <li>• Phylum Basidiomycota</li> <li>• Yeast and the Fermentation Process</li> <li>• Molds</li> <li>• Imperfect Fungi</li> </ul>

# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition

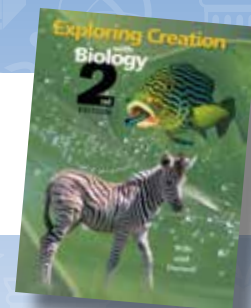


### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 5</b> <i>The Chemistry of Life</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 5 provides an introduction to the chemistry of life including the basics of atoms, elements, molecules and matter. Module 5 also provides an overview of organic chemistry as students learn about carbohydrates, acids, bases, lipids, proteins and enzymes.</p>	<ul style="list-style-type: none"> <li>• Atoms</li> <li>• Elements</li> <li>• Molecules</li> <li>• Changes in Matter: Physical, Chemical</li> <li>• Photosynthesis</li> <li>• Organic Chemistry</li> <li>• Carbohydrates</li> <li>• Organic Acids and Bases</li> <li>• Lipids</li> <li>• Proteins and Enzymes</li> <li>• DNA</li> </ul>	<ul style="list-style-type: none"> <li>• Diffusion</li> <li>• Osmosis</li> <li>• The Fragility of an Enzyme</li> </ul>
<b>MODULE 6</b> <i>The Cell</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 6 provides an introduction to the cell and all of its complexities. Module 6 also provides an overview of the process of aerobic cellular respiration.</p>	<ul style="list-style-type: none"> <li>• Cellular Functions</li> <li>• Cellular Structure: Cell Wall, Plasma Membrane, Cytoplasm</li> <li>• Cellular Organelles and Their Functions: Mitochondrion, Lysosomes, Ribosomes, Endoplasmic Reticulum, Plastids, Vacuoles and Vesicles, Golgi Bodies, Centrioles, Nucleus, Cytoskeleton</li> <li>• How Substances Travel In and Out of Cells</li> <li>• Cellular Energy</li> <li>• ATP and ADP</li> </ul>	<ul style="list-style-type: none"> <li>• Cell Structure I</li> <li>• Cell Structure II</li> </ul>
<b>MODULE 7</b> <i>Cellular Reproduction and DNA</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 7 provides an introduction to cellular reproduction and DNA. Module 7 also provides an overview of genes, chromosomes, and DNA along with the process of protein synthesis and the types of cells produced through sexual and asexual reproduction.</p>	<ul style="list-style-type: none"> <li>• Genes, Chromosomes, and DNA</li> <li>• Protein Synthesis: Transcription and Translation</li> <li>• Mitosis</li> <li>• Diploid and Haploid Cells</li> <li>• Meiosis</li> <li>• Viruses</li> </ul>	<ul style="list-style-type: none"> <li>• DNA Extraction</li> <li>• Mitosis</li> </ul>

# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition



### SEMESTER I: QUARTER 2, continued

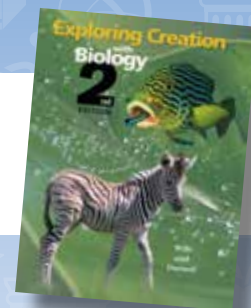
Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 8</b> <i>Mendelian Genetics</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> Module 8 provides an introduction to Mendelian Genetics and tools used to calculate the probabilities of specific genetic traits. Module 8 also discusses specific genetic disorders and diseases.	<ul style="list-style-type: none"> <li>• Gregor Mendel</li> <li>• Mendel's Experiments</li> <li>• Terminology</li> <li>• Punnett Squares</li> <li>• Pedigrees</li> <li>• Sex and Sex-Linked Genetic Traits</li> <li>• Genetic Disorders and Diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Making Your Own Earlobe Pedigree</li> <li>• A Dihybrid Cross</li> <li>• Sex-Linked Genetic Traits</li> <li>• Environmental Factors and Their Effect on Radish Leaf Color</li> </ul>

### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 9</b> <i>Evolution: Part Scientific Theory, Part Unconfirmed Hypothesis</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> The history of Charles Darwin's theory of evolution. Micro and macroevolution are compared. The remainder of the module takes a look at science's biological facts surrounding macroevolution and the subsequent lack of supporting evidence for macroevolution in light of these facts.	<ul style="list-style-type: none"> <li>• History of Charles Darwin</li> <li>• Darwin's theory of evolution</li> <li>• Microevolution</li> <li>• Macroevolution</li> <li>• Using biological facts to prove/disprove evolution</li> </ul>	NONE
<b>MODULE 10</b> <i>Ecology</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> Module 10 provides an introduction to ecosystems through exploring the water, oxygen, carbon and nitrogen cycles.	<ul style="list-style-type: none"> <li>• Energy and Ecosystems</li> <li>• Mutualism</li> <li>• The Physical Environment</li> <li>• Water, Oxygen, Carbon, and Nitrogen cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Carbon Dioxide and the Greenhouse Effect</li> </ul>
<b>MODULE 11</b> <i>The Invertebrates of Kingdom Animalia</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> Module 11 provides an introduction to the invertebrates of kingdom Animalia and the several phylum associated with it. Module 11 also provides a more in-depth discussion of the earthworm.	<ul style="list-style-type: none"> <li>• Symmetry</li> <li>• Phylum Porifera, (Sponges), Cnidaria, Annelida, Platyhelminthes, Nematoda, Mollusca</li> <li>• Earthworm Feeding Habits, Respiratory and Circulatory Systems and Reproduction</li> <li>• Other Segmented Worms</li> </ul>	<ul style="list-style-type: none"> <li>• Observations of the Spicules of a Sponge</li> <li>• Observation of a Hydra</li> <li>• Earthworm Dissection</li> <li>• Observation of a Planarian</li> </ul>

# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition



### SEMESTER II: QUARTER 3, continued

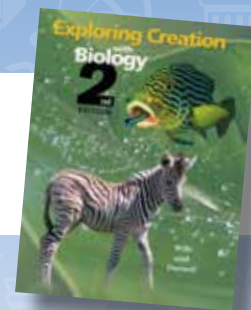
Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 12</b> <i>Phylum Arthropoda</i>	<b>2 WEEKS</b> Module 12 provides an introduction to the phylum Arthropoda and its many classes. Examples of the organisms studied in this module include the crayfish, spiders and insects.	<ul style="list-style-type: none"> <li>• Characteristics of Arthropods</li> <li>• Classes Crustacea, Arachnida, Chilopoda, Diplopoda, and Insecta</li> <li>• Crayfish's Respiratory, Circulatory, Digestive, Nervous and Reproductive Systems</li> <li>• The Spider and Spider Anatomy</li> <li>• Insects: Anatomy, Respiration, Circulation, Feeding Habits, Reproduction and Development</li> <li>• A Few Orders in Class Insecta</li> </ul>	<ul style="list-style-type: none"> <li>• Crayfish Dissection</li> <li>• Insect Classification</li> </ul>

### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 13</b> <i>Phylum Chordata</i>	<b>2 WEEKS</b> Module 13 provides an introduction to the phylum Chordata; the subphyla Urochordata, Cephalochordata, and Vertebrata; and four more classes within this phylum.	<ul style="list-style-type: none"> <li>• Subphyla Urochordata, Cephalochordata, Vertebrata</li> <li>• The Endoskeleton</li> <li>• The Circulatory and Nervous Systems</li> <li>• Reproduction</li> <li>• Classes Agnatha, Chondrichthyes, Osteichthyes, Amphibia</li> </ul>	<ul style="list-style-type: none"> <li>• Perch Dissection</li> <li>• Frog Dissection</li> <li>• Alternate Experiment for Module 13: Field Study II</li> </ul>
<b>MODULE 14</b> <i>Kingdom Plantae: Anatomy and Classification</i>	<b>2 WEEKS</b> Module 14 provides an introduction to the kingdom Plantae including basic plant anatomy, leaf collection and identification, and plant classification. Additionally, a comparison between seedless and seed-making plants is studied in this module.	<ul style="list-style-type: none"> <li>• Plant Anatomy</li> <li>• Leaf: Macroscopic Structure and Microscopic Structure</li> <li>• Leaf Color</li> <li>• Roots and Stems</li> <li>• Classification of Plants</li> <li>• Bryophytes</li> <li>• Seedless Vascular Plants</li> <li>• Seed-Making Plants</li> </ul>	<ul style="list-style-type: none"> <li>• Leaf Collection and Identification</li> <li>• How Anthocyanins and pH Help Determine Leaf Color</li> <li>• Cross Sections of Roots, Stems and Leaf</li> </ul>

# Scope & Sequence

## Exploring Creation with Biology, 2nd Edition



### SEMESTER II: QUARTER 4, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 15</b> <i>Kingdom Plantae: Physiology and Reproduction</i>	<b>2 WEEKS</b> Module 15 provides further study of the characteristics of kingdom Plantae. Module 15 also provides an overview of plant physiology and reproduction.	<ul style="list-style-type: none"> <li>• How a Plant Depends on Water</li> <li>• Water Absorption and Transport</li> <li>• Plant Growth</li> <li>• Insectivorous Plants</li> <li>• Reproduction in Plants</li> <li>• Vegetative Reproduction</li> <li>• Sexual Reproduction in Phylum Anthophyta</li> <li>• Seeds and Fruits</li> <li>• Germination and Early Growth</li> </ul>	<ul style="list-style-type: none"> <li>• Flower Anatomy</li> <li>• Fruit Classification</li> </ul>
<b>MODULE 16</b> <i>Reptiles, Birds, and Mammals</i>	<b>2 WEEKS</b> Module 16 provides a closer look at many classes and orders in kingdom Animalia. Examples of organisms studied in this module include reptiles, lizards, snakes, mammals and birds.	<ul style="list-style-type: none"> <li>• Classes Reptilia, Aves and Mammalia</li> <li>• Orders Rhynchocephalia, Squamata, Testudines, and Crocodilia</li> <li>• Lizards, Snakes, Dinosaurs</li> <li>• A Bird's Ability to Fly</li> </ul>	<ul style="list-style-type: none"> <li>• Bird Embryology</li> <li>• Bird Identification</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes a Study Guide at the end of each module which serves to guide a student in studying for the provided module tests. An additional study tool in the text is the Module Summary for each module. These are a summary of each of the modules which has missing information for a student to search for in the text and complete. Answers for the Study Guides, Module Summaries and the Tests are provided for the instructor. Also available for more advanced studies are a CD that relates to what is being learned and the Apologia website which provides links to additional websites for the further exploration of the topics in the text.



# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



**GRADE LEVEL:** 10th

**TEXT SUMMARY:** Chemistry is not just elements on a chart or dots around a symbol. Chemistry is the substance of life on Earth. Exploring Creation with Chemistry 3rd edition introduces the student to the concepts of chemistry and provides the strong foundation necessary to further understand many of the other sciences including biology, physics, astronomy, and countless others. Exploring Creation with Chemistry 3rd edition will bring students one step closer to understanding their surroundings while strengthening their faith that the Creator has designed a magnificent and purposeful world. The material covered in this text lay the ground work for college level classes and will provide the student with the confidence needed to advance to more in-depth study and research.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 1</b> <i>Measurement, Units, and the Scientific Method</i>	<b>2 WEEKS</b> Module 1 provides an introduction to matter and how matter is measured. It provides a foundation of using units and converting units. Module 1 also introduces the scientific method.	<ul style="list-style-type: none"> <li>• Units of Measurement</li> <li>• The Metric System</li> <li>• Manipulating Units</li> <li>• Converting Between Units and Unit Systems</li> <li>• More Complex Unit Conversions and Problem Solving</li> <li>• Derived Units</li> <li>• Making Measurements</li> <li>• Accuracy, Precision, and Significant Figures</li> <li>• Scientific Notation</li> <li>• Using Significant Figures in Mathematical Problems</li> <li>• Measuring Temperature</li> <li>• The Nature of a Scientific Law</li> <li>• Experimentation and Scientific Method</li> </ul>	<ul style="list-style-type: none"> <li>• Determining If Air Has Mass</li> <li>• Determining If Air Takes Up Space</li> <li>• Comparing Conversions to Measurements</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER I: QUARTER 1, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 2</b> <i>Atoms and Molecules</i>	<b>2 WEEKS</b> Module 2 introduces elements and compounds. It also provides an understanding of how to name compounds and classify matter.	<ul style="list-style-type: none"> <li>• Early Attempts to Understand Matter</li> <li>• The Law of Mass Conservation</li> <li>• Elements: The Basic Building Blocks of Matter</li> <li>• Compounds</li> <li>• The Law of Multiple Proportions</li> <li>• Dalton's Atomic Theory</li> <li>• Molecules: The Basic Building Blocks of Compounds</li> <li>• Abbreviating and Classifying Compounds</li> <li>• Classifying Matter as Ionic or Covalent</li> <li>• Naming Compounds</li> <li>• Classifying Matter</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation of Mass</li> <li>• Electrical Conductivity of Compounds Dissolved in Water</li> <li>• Separating a Mixture of Sand and Salt</li> </ul>
<b>MODULE 3</b> <i>Atomic Structure</i>	<b>2 WEEKS</b> Module 3 provides an in-depth look at the structure of atoms. Module 3 also teaches about the properties of light.	<ul style="list-style-type: none"> <li>• Historical Overview</li> <li>• Electrical Charge and Atomic Structure</li> <li>• Determining the Number of Protons, Electrons and Neutrons in an Atom</li> <li>• Isotopes and Nuclear Bombs</li> <li>• Atomic Structure in More Detail</li> <li>• The Nature of Light</li> <li>• The Electromagnetic Spectrum</li> <li>• The Relationship Between Frequency and Energy</li> <li>• How the Eye Detects Color</li> <li>• The Bohr Model of the Atom</li> <li>• The Quantum Mechanical Model of the Atom</li> <li>• Electron Configurations</li> <li>• The Amazing Design of Atoms</li> </ul>	<ul style="list-style-type: none"> <li>• Investigating Electrical Charge</li> <li>• How Our Eyes Detect Color</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER I: QUARTER 1, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 4</b> <i>Molecular Structure</i>	<b>2 WEEKS</b> Module 4 introduces the student to the periodic table and the structures of compounds. Lewis Structures and the application of Lewis Structures is also covered in this module.	<ul style="list-style-type: none"> <li>• Electron Configurations and the Periodic Table</li> <li>• Lewis Structures</li> <li>• Lewis Structures for Ionic Compounds</li> <li>• Handling the Exceptions in Ionic Compounds</li> <li>• Ionization Energy and Periodic Properties</li> <li>• Electronegativity</li> <li>• Atomic Radius</li> <li>• Lewis Structures of Covalent Compounds</li> <li>• Complicated Lewis Structures</li> <li>• An Application of Lewis Structures</li> </ul>	This module contains no experiments.

### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 5</b> <i>Polyatomic Ions and Molecular Geometry</i>	<b>2 WEEKS</b> Module 5 introduces molecular bonds and the VSEPR Theory. It discusses nonpolar covalent and polar covalent bonds and molecules.	<ul style="list-style-type: none"> <li>• Polyatomic Ions</li> <li>• Molecular Geometry: The VSEPR Theory</li> <li>• Nonpolar Covalent and Polar Covalent Bonds</li> <li>• Nonpolar Covalent and Polar Covalent Molecules</li> <li>• The Practical Consequence of Whether or Not a Molecule Is Polar Covalent</li> </ul>	<ul style="list-style-type: none"> <li>• Comparing Polar Covalent and Nonpolar Covalent Compounds</li> <li>• Comparing Solubility of Ionic Compounds in Polar Covalent and Nonpolar Covalent Compounds</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER I: QUARTER 2, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 6</b> <i>Changes in Matter and Chemical Reactions</i>	<b>2 WEEKS</b> Module 6 provides an in-depth look at changes that occur in matter and illustrates this through chemical equations. The concept of balancing equations is also introduced.	<ul style="list-style-type: none"> <li>• Classifying Changes That Occur in Matter</li> <li>• Phase Changes</li> <li>• The Kinetic Theory of Matter</li> <li>• Density</li> <li>• Phase Changes in Water</li> <li>• Chemical Reactions and Chemical Equations</li> <li>• Determining Whether or Not a Chemical Equation Is Balanced</li> <li>• Balancing Chemical Equations</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishing Between Chemical and Physical Change</li> <li>• Condensing Steam</li> <li>• The Relation Between the Speed and Temperature of Molecules</li> <li>• Comparing the Density of Liquids</li> </ul>
<b>MODULE 7</b> <i>Describing Chemical Reactions</i>	<b>2 WEEKS</b> Module 7 reviews different types of chemical reactions and introduces the mole concept.	<ul style="list-style-type: none"> <li>• Three Basic Types of Chemical Reactions</li> <li>• Decomposition Reactions</li> <li>• Formation Reactions</li> <li>• Combustion Reactions</li> <li>• Combustion of Metals</li> <li>• Complete Combustion Reactions</li> <li>• Incomplete Combustion Reactions</li> <li>• Atomic Mass</li> <li>• Molecular Mass</li> <li>• The Mole Concept</li> <li>• Using the Mole Concept in Chemical Equations</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring the Width of a Molecule</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER I: QUARTER 2, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p style="text-align: center;"><b>MODULE 8</b> <i>Stoichiometry</i></p>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 8 teaches the student how to analyze chemical equations and use them to determine relationships and formulas.</p>	<ul style="list-style-type: none"> <li>• Mole Relationships in Chemical Equations</li> <li>• Limiting Reactants and Excess Components</li> <li>• Fully Analyzing Chemical Equations</li> <li>• Relating Products to Reactants in Chemical Equations</li> <li>• Using Chemical Equations When the Limiting Reactant Is Identified</li> <li>• Volume Relationships for Gases in Chemical Equations</li> <li>• Mass Relationships in Chemical Equations</li> <li>• Using Stoichiometry to Determine Chemical Formulas</li> <li>• Empirical and Molecular Formulas</li> <li>• Complicated Experiments for Determining Chemical Formulas</li> </ul>	<ul style="list-style-type: none"> <li>• Determining Which Reactant Is the Limiting Reactant</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 9</b> <i>Acid-Base Chemistry</i>	<b>2 WEEKS</b> Module 9 introduces acids and bases to the student. It provides a detailed look at the reactions between the two and the importance of concentration.	<ul style="list-style-type: none"> <li>• Acids and Bases</li> <li>• The Chemical Definitions of Acids and Bases</li> <li>• The Behavior of Ionic Compounds in Aqueous Solutions</li> <li>• Identifying Acids and Bases in Chemical Reactions</li> <li>• Recognizing Acids and Bases from Their Chemical Formulas</li> <li>• Predicting the Reactions That Occur Between Acids and Bases</li> <li>• The Reactions Between Acids and Covalent Bases</li> <li>• The Dilution Equation</li> <li>• The Importance of Concentration in Chemistry</li> <li>• Using Concentration in Stoichiometry</li> <li>• Acid-Base Titrations</li> </ul>	<ul style="list-style-type: none"> <li>• Common Household Examples of Acids and Bases</li> <li>• Determining the Concentration of Ammonia</li> </ul>
<b>MODULE 10</b> <i>The Chemistry of Solutions</i>	<b>2 WEEKS</b> Module 10 provides a closer look at solutions and the energy changes within solutions. It also teaches the student how to apply stoichiometry to solutions.	<ul style="list-style-type: none"> <li>• How Solutes Dissolve in Solvents</li> <li>• Solubility</li> <li>• Energy Changes That Occur When Making a Solution</li> <li>• Applying Stoichiometry to Solutions</li> <li>• Molality</li> <li>• Freezing-Point Depression</li> <li>• Boiling-Point Elevation</li> </ul>	<ul style="list-style-type: none"> <li>• Determining the Effect of Temperature on the Solubility of Solid Solutes</li> <li>• Determining the Effect of Temperature on the Solubility of a Gas</li> <li>• Investigating a Solute That Releases Heat When Dissolved</li> <li>• Measuring Freezing-Point Depression</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER II: QUARTER 3, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 11</b> <i>The Gas Phase</i>	<b>2 WEEKS</b> Module 11 introduces the laws associated with pressure and gas. It also provides practice in using the Ideal Gas Law in stoichiometry.	<ul style="list-style-type: none"> <li>• The Definition of Pressure</li> <li>• Boyle's Law</li> <li>• Charles's Law</li> <li>• The Combined Gas Law</li> <li>• Ideal Gases</li> <li>• Dalton's Law of Partial Pressures</li> <li>• Vapor Pressure</li> <li>• An Alternative Statement of Dalton's Law</li> <li>• The Ideal Gas Law</li> <li>• Using the Ideal Gas Law in Stoichiometry</li> </ul>	<ul style="list-style-type: none"> <li>• Determining the Ideal Gas Constant</li> <li>• Using the Ideal Gas Equation to Determine the Amount of Acid in Vinegar</li> </ul>
<b>MODULE 12</b> <i>Energy, Heat and Temperature</i>	<b>2 WEEKS</b> Module 12 takes a look at energy and heat and its measurement. It also introduces the First Law of Thermodynamics.	<ul style="list-style-type: none"> <li>• Energy and Heat</li> <li>• The First Law of Thermodynamics</li> <li>• Units for Measuring Heat and Energy</li> <li>• The Calorie Unit</li> <li>• Measuring Heat</li> <li>• Calorimetry</li> </ul>	<ul style="list-style-type: none"> <li>• Thermometer Calibration and Confirmation of Boiling and Freezing Temperatures of Water</li> <li>• Measuring the Specific Heat of a Metal</li> </ul>

### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 13</b> <i>Thermodynamics</i>	<b>2 WEEKS</b> In this module the student learns more about how energy is transferred during chemical reactions. Almost all chemical reactions either release or absorb energy. The universe runs on energy and since energy cannot be created or destroyed it is important to know how to keep a detailed accounting of what happens to the energy in order to fully understand the world around us.	<ul style="list-style-type: none"> <li>• Enthalpy and determining <math>\Delta H</math> of a chemical reaction</li> <li>• Hess's law</li> <li>• Applying enthalpy to stoichiometry</li> <li>• Energy diagrams</li> <li>• Second Law of Thermodynamics</li> <li>• Gibbs free energy</li> </ul>	<ul style="list-style-type: none"> <li>• Determining the Change in H of a Chemical Reaction</li> </ul>

# Scope & Sequence

## Exploring Creation with Chemistry, 3rd Edition



### SEMESTER II: QUARTER 4, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 14</b> <i>Kinetics</i>	<b>2 WEEKS</b> Module 14 provides an introduction to kinetics and rate equations. Module 14 also provides an overview of catalysts and their role in the kinetics of chemical reactions.	<ul style="list-style-type: none"> <li>• Reaction Kinetics</li> <li>• Factors that Affect the Kinetics of a Chemical Reaction</li> <li>• The Rate Equation</li> <li>• Using Experiments to Determine the Details of the Rate Equation</li> <li>• Rate Orders</li> <li>• Using Rate Equations</li> <li>• Temperature Dependence in the Rate Equation</li> <li>• Catalysts and Reaction Rate</li> </ul>	<ul style="list-style-type: none"> <li>• How Concentration and Temperature Affect Chemical Reaction Rates</li> <li>• The Effect of a Catalyst on the Decomposition of Hydrogen Peroxide</li> </ul>
<b>MODULE 15</b> <i>Chemical Equilibrium</i>	<b>2 WEEKS</b> Module 15 provides an introduction to the concept of chemical equilibrium, the equilibrium constant and the use of the equilibrium constant in predicting the progress of a reaction.	<ul style="list-style-type: none"> <li>• Chemical Equilibrium</li> <li>• The Equilibrium Constant</li> <li>• Using the Equilibrium Constant to Predict the Progress of a Reaction</li> <li>• Le Chatelier's Principle</li> <li>• Pressure and Le Chatelier's Principle</li> <li>• Temperature and Le Chatelier's Principle</li> <li>• Acid/Base Equilibria</li> <li>• The pH Scale</li> <li>• Acid Rain</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of Equilibrium</li> <li>• Temperature Effects on Reactions and Le Chatelier's Principle</li> </ul>
<b>MODULE 16</b> <i>Reduction/Oxidation Reactions</i>	<b>2 WEEKS</b> Module 16 provides an introduction to reduction/oxidation reactions including key concepts such as determining the oxidation number of an atom and recognizing a reduction/oxidation reaction. Module 16 also provides insight to how batteries work.	<ul style="list-style-type: none"> <li>• Oxidation Numbers</li> <li>• Oxidation and Reduction</li> <li>• Recognizing Reduction-Oxidation Reactions</li> <li>• An Important Characteristic of Reduction-Oxidation Reactions</li> <li>• How Batteries Work</li> <li>• Real Batteries</li> <li>• Corrosion</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrating an Oxidation-Reduction Reaction</li> <li>• Creating a Galvanic Cell from Lemons</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes Review Questions at the end of each module, which serves to guide a student in studying for the provided module tests. Additional study tools are the Practice Problems and the Extra Practice Problems for each module. These are to be solved after each module and serve to give the student review and practice of the important quantitative skills just covered. A password is included so that the student can access a book extras website for more in-depth study.

Answers for the Review Questions, Practice Problems, Extra Practice Problems, the tests, and test solutions are provided for the parent/teacher in a separate Solutions Manual.



# Scope & Sequence

## Exploring Creation with Physics, 2nd Edition



**GRADE LEVEL:** 12th and/or working knowledge of Algebra 1, Geometry and basic Trigonometric functions.

**TEXT SUMMARY:** The science of physics is an attempt to explain everything that is observed in nature. This text is an overview of the advances made over the last three thousand years in that monumental task. It is designed as a college-prep physics course. Some important concepts covered are one and two-dimensional motion, Newton's laws and their applications in nature, work and energy, electricity, magnetism, momentum, periodic motion, waves and optics. This course uses quantitative applications to teach the details of how matter interacts in nature.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 1</b> <i>Motion in One Dimension</i></p>	<p><b>2 WEEKS</b> Module 1 provides an introduction to and basic understanding of distance, displacement, speed, velocity and acceleration.</p>	<ul style="list-style-type: none"> <li>• Distance and Displacement</li> <li>• Speed and Velocity</li> <li>• Acceleration</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring Average Velocity</li> <li>• Measuring an Object's Acceleration</li> </ul>
<p><b>MODULE 2</b> <i>One-Dimensional Motion Equations and Free Fall</i></p>	<p><b>2 WEEKS</b> Module 2 provides an introduction to mathematical applications used in analyzing one-dimensional motion. Module 2 also introduces the concept of free fall.</p>	<ul style="list-style-type: none"> <li>• Relating Velocity, Acceleration, Time, and Displacement</li> <li>• Using Mathematical Equations For One-Dimensional Motion</li> <li>• Free Fall</li> <li>• Terminal Velocity</li> </ul>	<ul style="list-style-type: none"> <li>• The Acceleration Due to Gravity Is the Same for All Objects</li> <li>• Determining a Person's Reaction Time</li> <li>• Factors That Affect Air Resistance</li> </ul>
<p><b>MODULE 3</b> <i>Two-Dimensional Vectors</i></p>	<p><b>2 WEEKS</b> Module 3 provides an introduction to vectors and the use of vectors in analyzing two dimensional motion.</p>	<ul style="list-style-type: none"> <li>• Vectors</li> <li>• Adding and Subtracting Two-Dimensional Vectors: Graphical and Analytical Approaches</li> <li>• Vector Components</li> <li>• Determining a Vector's Components From Its Magnitude and Direction</li> <li>• Applying Vector Addition to Physical Situations</li> </ul>	<ul style="list-style-type: none"> <li>• Vector Components</li> <li>• Vector Addition</li> </ul>
<p><b>MODULE 4</b> <i>Motion in Two Dimensions</i></p>	<p><b>2 WEEKS</b> Module 4 provides an introduction to quantitative science by applying two dimensional vectors to navigation and projectile motion.</p>	<ul style="list-style-type: none"> <li>• Navigation in Two Dimensions</li> <li>• Projectile Motion in Two Dimensions</li> <li>• The Range Equation</li> </ul>	<ul style="list-style-type: none"> <li>• The Two Dimensions of a Rubber Band's Flight</li> <li>• Measuring the Horizontal Speed of an Object Without a Stopwatch</li> </ul>

# Scope & Sequence

## Exploring Creation with Physics, 2nd Edition



### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p style="text-align: center;"><b>MODULE 5</b> <i>Newton's Laws</i></p>	<p style="text-align: center;"><b>2 WEEKS</b> Module 5 provides an overview of Newton's Laws of Motion. Module 5 also provides an introduction to friction.</p>	<ul style="list-style-type: none"> <li>• Sir Isaac Newton</li> <li>• Newton's First Law</li> <li>• Newton's Second Law</li> <li>• Mass and Weight</li> <li>• The Normal Force</li> <li>• Friction</li> <li>• An Equation for the Frictional Force</li> <li>• Newton's Third Law</li> </ul>	<ul style="list-style-type: none"> <li>• Inertia</li> <li>• The Frictional Force</li> </ul>
<p style="text-align: center;"><b>MODULE 6</b> <i>Applications of Newton's Second Law</i></p>	<p style="text-align: center;"><b>2 WEEKS</b> Module 6 provides an in-depth study of Newton's Second Law of Motion applied to situations when multiple forces are involved.</p>	<ul style="list-style-type: none"> <li>• Translational Equilibrium</li> <li>• Translational Equilibrium and Measuring Weight</li> <li>• Rotational Motion and Torque</li> <li>• Rotational Equilibrium</li> <li>• Objects on an Inclined Surface</li> <li>• Applying Newton's Second Law to More Than One Object at a Time</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring Acceleration in an Elevator</li> <li>• What Causes Rotational Acceleration?</li> <li>• Measuring a Coefficient of Static Friction</li> </ul>
<p style="text-align: center;"><b>MODULE 7</b> <i>Uniform Circular Motion and Gravity</i></p>	<p style="text-align: center;"><b>2 WEEKS</b> Module 7 provides an analytical and quantitative approach to circular motion and gravity.</p>	<ul style="list-style-type: none"> <li>• Uniform Circular Motion</li> <li>• Centripetal Force and Centripetal Acceleration</li> <li>• Frictional Force</li> <li>• Gravity</li> <li>• Circular Motion Technology</li> <li>• Gravity and the Motion of Planets</li> </ul>	<ul style="list-style-type: none"> <li>• Centripetal Force</li> </ul>
<p style="text-align: center;"><b>MODULE 8</b> <i>Work and Energy</i></p>	<p style="text-align: center;"><b>2 WEEKS</b> Module 8 provides an introduction to the concepts of work and energy and the role that friction plays in analyzing these two concepts.</p>	<ul style="list-style-type: none"> <li>• Defining Work and Energy</li> <li>• Kinetic and Potential Energy</li> <li>• The First Law of Thermodynamics</li> <li>• Friction, Work and Energy</li> <li>• Energy and Power</li> </ul>	<ul style="list-style-type: none"> <li>• Energy in a Pendulum</li> <li>• Estimating the Work Done by Friction</li> </ul>

# Scope & Sequence

## Exploring Creation with Physics, 2nd Edition



### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 9</b> <i>Momentum</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 9 provides an introduction to the concept of momentum and its relationship to impulse. Module 9 also provides an overview of the conservation of momentum and angular momentum.</p>	<ul style="list-style-type: none"> <li>• Momentum</li> <li>• Impulse</li> <li>• The Conservation of Momentum</li> <li>• The Mathematics of Momentum Conservation</li> <li>• Angular Momentum</li> </ul>	<ul style="list-style-type: none"> <li>• Egg Drop</li> <li>• Momentum and Energy Conservation</li> </ul>
<b>MODULE 10</b> <i>Periodic Motion</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 10 provides an introduction to periodic motion. Module 10 also provides a study of uniform circular motion and teaches a mathematical approach in examining a mass/spring system and a simple pendulum.</p>	<ul style="list-style-type: none"> <li>• Hooke's Law</li> <li>• Uniform Circular Motion</li> <li>• The Mass/Spring System</li> <li>• Potential Energy in Mass/Spring System</li> <li>• The Simple Pendulum</li> </ul>	<ul style="list-style-type: none"> <li>• Hooke's Law</li> <li>• The Characteristics of a Mass/Spring System</li> </ul>
<b>MODULE 11</b> <i>Waves</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 11 provides an introduction to waves and the different types of waves that have been found in nature.</p>	<ul style="list-style-type: none"> <li>• Waves</li> <li>• The Physical Nature of Sound</li> <li>• The Doppler Effect</li> <li>• Speed of Light</li> <li>• Light as a Wave</li> <li>• Light as a Particle</li> <li>• Biographies of Two Important Physicists</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency and Volume of Sound Waves</li> <li>• The Doppler Effect</li> </ul>
<b>MODULE 12</b> <i>Geometric Optics</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 12 provides an introduction to optics (the study of the behavior of light) and provides an in-depth look at the use of mirrors and lenses in examining the behavior of light.</p>	<ul style="list-style-type: none"> <li>• The Law of Reflection</li> <li>• Flat/Spherical mirrors</li> <li>• Ray Tracing in Convex and Concave Spherical Mirrors</li> <li>• Snell's Law of Refraction</li> <li>• Converging/Diverging</li> <li>• Lenses</li> <li>• The Human Eye</li> </ul>	<ul style="list-style-type: none"> <li>• The Law of Reflection</li> <li>• Real and Virtual Images in a Concave Mirror</li> <li>• Measuring the Index of Refraction of Glass</li> </ul>
<b>MODULE 13</b> <i>Coulomb's Law and the Electric Field</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 13 provides an introduction to electrostatics by building on the basic understanding of electric charge.</p>	<ul style="list-style-type: none"> <li>• The Basics of Electric Charge</li> <li>• Electrostatic Force/Coulomb's Law</li> <li>• Multiple Charges and the Electrostatic Force</li> <li>• The Electric Field</li> <li>• Calculating the Strength of the Electric Field</li> <li>• Applying Coulomb's Law to the Bohr Model of the Atom</li> </ul>	<ul style="list-style-type: none"> <li>• Attraction and Repulsion</li> <li>• Making and Using an Electroscope</li> </ul>

# Scope & Sequence

## Exploring Creation with Physics, 2nd Edition



### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 14</b> <i>Electric Potential</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 14 provides an introduction to electrical potential and its relationships to potential energy and potential difference. Module 14 also provides an overview of the application of electrical potential in capacitors and televisions.</p>	<ul style="list-style-type: none"> <li>• Electric Potential, Potential Energy, and Potential Difference</li> <li>• Conservation of Energy in an Electrical Potential</li> <li>• Capacitors</li> <li>• An Application of Capacitors</li> <li>• How a Television Makes Its Picture</li> </ul>	<ul style="list-style-type: none"> <li>• Making a Parallel-Plate Capacitor and Storing Charge</li> </ul>
<b>MODULE 15</b> <i>Electric Circuits</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 15 provides an introduction to electric circuits and their abilities to harness the kinetic energy of freely moving charges. Module 15 also provides an overview of circuit design and mathematical applications used to analyze circuits.</p>	<ul style="list-style-type: none"> <li>• Batteries, Circuits, and Conventional Current</li> <li>• Resistance</li> <li>• Electric Heaters</li> <li>• Electric Power</li> <li>• Switches and Circuits</li> <li>• Series and Parallel Circuits</li> <li>• Fuses and Circuit Breakers</li> <li>• Current and Power in Series and Parallel Circuits</li> <li>• Analyzing More Complicated Circuits</li> </ul>	<ul style="list-style-type: none"> <li>• Current and Resistance</li> <li>• Building a Simple Circuit to Turn on a Light Bulb</li> <li>• Series and Parallel Resistors</li> </ul>
<b>MODULE 16</b> <i>Magnetism</i>	<p style="text-align: center;"><b>2 WEEKS</b></p> <p>Module 16 provides an introduction to the concept of magnetism. Module 16 also provides a in-depth look at magnetization, magnetic fields and the use of magnets in producing electricity.</p>	<ul style="list-style-type: none"> <li>• Permanent Magnets</li> <li>• Magnetic Fields</li> <li>• How Magnets Become Magnetic</li> <li>• Earth's Magnetic Field</li> <li>• The Magnetic Field of a Current-Carrying Wire</li> <li>• Faraday's Law of Electromagnetic Induction</li> <li>• Alternating Current</li> </ul>	<ul style="list-style-type: none"> <li>• Oersted's Experiment</li> <li>• Diamagnetic, Paramagnetic, and Ferromagnetic Compounds</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes Review Questions at the end of each module, which serves to guide a student in studying for the provided module tests. Additional study tools are the Practice Problems and the Extra Practice Problems for each module. These are to be solved after each module and serve to give the student review and practice of the important quantitative skills just covered. These are also additional study tools for the module tests. Answers for the Review Questions, Practice Problems, Extra Practice Problems and the Tests are provided for the instructor. Two additional resources offered for added teacher/student support are a multi-media companion CD containing videos, word pronunciations, mathematics support, etc. specific to this course and the Apologia website providing links to additional websites for more in-depth exploration of the topics in the text.

# Scope & Sequence

## Exploring Creation with Advanced Biology The Human Body



**GRADE LEVEL:** 1th 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!*

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 1</b> <i>Introduction to Anatomy and Physiology</i>	<b>2 WEEKS</b> Module 1 provides an introduction to the organizational levels of the human body from the major organ systems to cellular functions.	<ul style="list-style-type: none"> <li>• Anatomy Terms</li> <li>• Organization of the Human Body</li> <li>• Homeostasis</li> <li>• Cell Structure and Function</li> <li>• Protein Synthesis</li> <li>• Cellular Mitosis</li> <li>• Plasma Membrane</li> <li>• Membrane Transport Processes</li> </ul>	NONE
<b>MODULE 2</b> <i>Histology: The Study of Tissues</i>	<b>2 WEEKS</b> Module 2 provides an in-depth look at different tissues in the body including their structures and functions.	<ul style="list-style-type: none"> <li>• Epithelial Tissues</li> <li>• Glandular Epithelium</li> <li>• Connective Tissues</li> <li>• Cartilage</li> <li>• Bone and Blood Tissues</li> <li>• Membranes</li> <li>• Tissue Repair</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Epithelial Tissues</li> <li>• Microscope: Microscopic Anatomy of the Salivary Glands</li> </ul>
<b>MODULE 3</b> <i>The Integumentary and Skeletal Systems</i>	<b>2 WEEKS</b> A study of the integumentary system more commonly known as the skin. A study of the gross anatomy of the skeletal system.	<ul style="list-style-type: none"> <li>• Basic Structure of Skin</li> <li>• Epidermis</li> <li>• Hair and Nails</li> <li>• Skin Glands</li> <li>• Skeletal System</li> <li>• Gross Anatomy of Bone</li> <li>• Details of the Appendicular Skeleton</li> <li>• Details of the Axial Skeleton</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: A Closer Look at the Skin</li> <li>• Microscope: A Closer Look at Follicles</li> </ul>
<b>MODULE 4</b> <i>Skeletal System Histology and Movement</i>	<b>2 WEEKS</b> Module 4 provides a detailed look at the skeletal system: bone make-up and joint movement.	<ul style="list-style-type: none"> <li>• Bone Histology Overview</li> <li>• Cancellous and Compact Bone Histology</li> <li>• Bone Growth and Remodeling</li> <li>• Bone Homeostasis</li> <li>• Nutrition for Bone Health</li> <li>• Three Major Types of Joints</li> <li>• Motion and Terms of Movement</li> </ul>	<ul style="list-style-type: none"> <li>• Calcium Salts in Bone</li> <li>• Microscope: Cancellous and Compact Bone Histology</li> </ul>

# Scope & Sequence

## Exploring Creation with Advanced Biology The Human Body



### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 5</b> <i>The Muscular System Histology and Physiology</i></p>	<p><b>2 WEEKS</b> Module 5 provides an introduction to muscle structures, functions, and how muscles perform those functions.</p>	<ul style="list-style-type: none"> <li>• Skeletal Muscle Structure</li> <li>• How a Muscle Fiber Contracts</li> <li>• Neuromuscular Junction</li> <li>• How a Muscle Fiber Relaxes</li> <li>• Motor Units</li> <li>• Muscle Tone</li> <li>• Energy in Skeletal Muscle Fibers</li> <li>• Warm-Up and Cool-Down</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Skeletal Muscle Histology</li> </ul>
<p><b>MODULE 6</b> <i>The Skeletal Muscle System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• General Terms and Principles</li> <li>• Overview of the Skeletal Muscle System</li> <li>• Major Muscles Groups Including the Head and Face; Anterior Chest and Abdominal Wall; Shoulder, Back and Arm; Forearm; Hand; Thigh; Leg; and Foot</li> </ul>	NONE
<p><b>MODULE 7</b> <i>The Nervous System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Overview of the Entire Nervous System</li> <li>• The Nervous System at the Cellular Level</li> <li>• Neuroglia</li> <li>• Nerve Structure</li> <li>• Action Potentials</li> <li>• Synaptic Transmission</li> <li>• Neuron Arrangements</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Neurons and Neuroglia</li> </ul>
<p><b>MODULE 8</b> <i>The Central Nervous System</i></p>	<p><b>2 WEEKS</b> Module 8 provides an introduction to the complexity of the human brain and spinal cord.</p>	<ul style="list-style-type: none"> <li>• Brain Anatomy</li> <li>• Cerebrum in Detail</li> <li>• Important Brain Structures</li> <li>• Protection of the Brain</li> <li>• The Spinal Cord</li> <li>• The Reflex Arc</li> <li>• Ascending and Descending Pathways in the Spinal Cord</li> </ul>	NONE

# Scope & Sequence

## Exploring Creation with Advanced Biology The Human Body



### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 9</b> <i>The Peripheral Nervous System</i></p>	<p><b>2 WEEKS</b> Module 9 provides a detailed look at the peripheral nervous system and the general senses.</p>	<ul style="list-style-type: none"> <li>• Divisions of the Autonomic Nervous System (ANS)</li> <li>• Control of the ANS</li> <li>• Afferent Division of the Peripheral Nervous System</li> <li>• General Senses</li> <li>• Sense of Taste</li> <li>• Sense of Balance</li> <li>• Sense of Hearing</li> <li>• Sense of Vision: Eye Anatomy and Physiology</li> </ul>	<ul style="list-style-type: none"> <li>• Two-Point discrimination</li> <li>• Cow Eye Dissection</li> </ul>
<p><b>MODULE 10</b> <i>The Endocrine System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Endocrine System as a Whole</li> <li>• Endocrine Glands and Hormones</li> <li>• Hormone Chemistry</li> <li>• Hormone Secretion Control</li> <li>• Hormone Receptors in the Body</li> <li>• Prostaglandins</li> </ul>	NONE
<p><b>MODULE 11</b> <i>The Cardiovascular System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Composition of Blood</li> <li>• Formed Elements in Blood</li> <li>• Blood as a Connective Tissue</li> <li>• Blood Types</li> <li>• Blood Circulation</li> <li>• Heart Anatomy</li> <li>• Cardiac Muscle and the Cardiac Cycle</li> <li>• Blood Vessels and the Entire Circulatory System</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Examining a Blood Smear</li> <li>• Cow's Heart Dissection</li> </ul>
<p><b>MODULE 12</b> <i>The Lymphatic System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Lymph and Lymph Vessels</li> <li>• Functions of the Lymphatic System</li> <li>• Lymph Nodes</li> <li>• Spleen and Thymus Gland</li> <li>• Immunity</li> <li>• Innate Immunity</li> <li>• Innate Defense</li> <li>• Acquired Immunity: Humoral and Cell-Mediated</li> <li>• Types of Acquired Immunity and Autoimmunity</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Histology of a Tonsil</li> </ul>

# Scope & Sequence

## Exploring Creation with Advanced Biology The Human Body



### SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 13</b> <i>The Digestive System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Overview of the Digestive System</li> <li>• Mouth, Pharynx, and Esophagus</li> <li>• Stomach</li> <li>• Small Intestine</li> <li>• Large Intestine</li> <li>• Accessory Organs: Liver, Pancreas, Gallbladder</li> <li>• Nutrition</li> <li>• Micronutrients</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Histology of the Stomach</li> <li>• Microscope: Histology of the Liver</li> </ul>
<p><b>MODULE 14</b> <i>The Respiratory System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Anatomy and Functions of Respiratory System</li> <li>• Voice</li> <li>• Muscles and Mechanics of Ventilation</li> <li>• Factors that Aid Ventilation</li> <li>• External Respiration</li> <li>• Gas Exchange During External and Internal Respiration</li> <li>• Respiratory Control</li> <li>• Cellular Respiration: Glycolysis, Oxidation of Pyruvate, Citric Acid (Krebs) Cycle, Electron Transport Chain</li> <li>• Review of Cellular Respiration</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Histology of the Lung</li> </ul>
<p><b>MODULE 15</b> <i>The Urinary System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Anatomy of Urinary System</li> <li>• Urine Formation: Overall Scheme, Glomerular Filtration, Secretion, Reabsorption of Water</li> <li>• Storage and Release of Urine</li> <li>• Blood Pressure Control by the Kidneys</li> <li>• Acid-Base Balance in the Body</li> </ul>	<ul style="list-style-type: none"> <li>• The Bicarbonate Buffer</li> </ul>



## Scope & Sequence

### Exploring Creation with Advanced Biology The Human Body



#### SEMESTER II: QUARTER 4, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 16</b> <i>The Reproductive System</i></p>	<p><b>2 WEEKS</b> 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"> <li>• Anatomy of the Male Reproductive System</li> <li>• Meiosis</li> <li>• Spermatogenesis</li> <li>• Hormonal Control of Male Reproduction</li> <li>• Anatomy of the Female Reproductive System</li> <li>• Oogenesis</li> <li>• The Menstrual Cycle</li> <li>• Fertilization, Development, and Parturition</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope: Spermatogenesis and Sperm</li> <li>• The Fetal Pig Dissection</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes a Study Guide at the end of each module which serves to guide a student in studying for the provided module tests. Answers for the Study Guides and the Tests are provided for the instructor. An additional study tool available as a companion with the text is “The Anatomy Coloring Book”. It contains detailed drawings of all the anatomy that the student needs to learn in this course and more. As the student colors the pictures, this process serves as a review. Apologia also offers the pre-made slides and dissection specimens and supplies needed for this course.

# Scope & Sequence

## Exploring Creation with Marine Biology



**GRADE LEVEL:** 12th with prerequisite of Biology

**TEXT SUMMARY:** Water covers 72% of our planet and makes up close to 99% of the living space on Earth. However, we know more about the surface of Mars than we know about the ocean floor. Dive into *Exploring Creation with Marine Biology* and discover the living waters that God has placed all around us. Journey to the farthest depths of the ocean to explore life that exists in the most unlikely places. Learn how the ocean ecology is essential to our existence. Creation exists on every part of our planet. There is not one space that our Creator has not touched. Even the ocean floor is intelligently designed in order to support life.

### SEMESTER I: QUARTER 1

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 1</b> <i>The Oceans of Our Planet</i></p>	<p><b>2 WEEKS</b> Module 1 provides an introduction to the earth's structure and to ocean geography. Module 1 also introduces the properties of water and the forces that act on the oceans.</p>	<ul style="list-style-type: none"> <li>• The Geography of the Oceans</li> <li>• The Earth's Structure</li> <li>• Continental Drift and Plate Tectonics</li> <li>• Plate Interactions</li> <li>• Features of the Ocean Bottom</li> <li>• Properties of Water</li> <li>• Seawater</li> <li>• Salinity, Temperature, and Density</li> <li>• Light in the Sea</li> <li>• Pressure</li> <li>• The Motion of the Ocean</li> <li>• Waves</li> <li>• Tides</li> <li>• Vertical Motion</li> </ul>	<ul style="list-style-type: none"> <li>• The Expansion of Solid Water</li> <li>• Removing the Salt from Salt Water</li> <li>• The Effects of Salinity and Temperature on the Density of Water</li> <li>• The Coriolis Effect</li> <li>• The Motion of Waves</li> </ul>
<p><b>MODULE 2</b> <i>Life in the Sea</i></p>	<p><b>2 WEEKS</b> Module 2 introduces the student to life under the water. It provides an in-depth look at the essential elements necessary for life and the reproductive processes that enable life to continue.</p>	<ul style="list-style-type: none"> <li>• The Process of Life</li> <li>• Photosynthesis</li> <li>• Respiration</li> <li>• Cells</li> <li>• Levels of Organization</li> <li>• The Challenge of Life in the Sea</li> <li>• Diffusion and Osmosis</li> <li>• Temperature</li> <li>• Reproduction in the Sea</li> <li>• Asexual and Sexual Reproduction</li> <li>• Reproductive Strategies</li> <li>• Classifying Life in the Sea</li> </ul>	<ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Respiration</li> <li>• Osmosis</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology



### SEMESTER I: QUARTER 1, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 3</b> <i>The First Four Kingdoms</i></p>	<p><b>2 WEEKS</b> Module 3 provides a detailed look at the Kingdoms Monera, Protista, Fungi, and Plantae</p>	<ul style="list-style-type: none"> <li>• Kingdom Monera</li> <li>• Kingdom Protista: The Unicellular Algae</li> <li>• Diatoms</li> <li>• Dinoflagellates</li> <li>• Kingdom Protista: The Marine Protozoans</li> <li>• Foraminiferans</li> <li>• Radiolarians</li> <li>• Ciliates</li> <li>• Kingdom Protista: The Multicellular Algae</li> <li>• Green, Brown and Red Algae</li> <li>• Reproduction of Multicellular Algae</li> <li>• Kingdom Fungi</li> <li>• Kingdom Plantae</li> <li>• The Seagrasses</li> <li>• Salt Water Marsh Plants</li> <li>• The Mangroves</li> </ul>	<ul style="list-style-type: none"> <li>• Unicellular Algae</li> <li>• Marine Protozoans</li> </ul>
<p><b>MODULE 4</b> <i>Marine Invertebrates I</i></p>	<p><b>2 WEEKS</b> Module 4 discusses invertebrates and vertebrates and provides an in-depth look at many marine invertebrates</p>	<ul style="list-style-type: none"> <li>• Phylum Porefera</li> <li>• Phylum Cnidaria</li> <li>• Classes Hydrozoa, Scyphozoa, Anthozoa</li> <li>• Phylum Ctenophora</li> <li>• The Bilateral Worms</li> <li>• Phylum Platyhelminthes</li> <li>• Phylum Nemertea</li> <li>• Phylum Nematoda</li> <li>• Phylum Annelida</li> <li>• Class Polychaeta</li> <li>• Lophophorates</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of a Sponge</li> <li>• Locomotion in the Annelids</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology



### SEMESTER 1: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 5</b> <i>Marine Invertebrates II</i>	<b>2 WEEKS</b> Module 5 continues the study of marine invertebrates.	<ul style="list-style-type: none"> <li>• Phylum Mollusca</li> <li>• Classes Gastropoda, Bivalvia, Cephalopoda</li> <li>• Other Mollusk Classes</li> <li>• Mollusk Biology</li> <li>• Phylum Arthropoda</li> <li>• Class Crustacea</li> <li>• Crustacean Biology</li> <li>• Other Arthropod Classes</li> <li>• Phylum Echinodermata</li> <li>• Classes Asterozoa, Ophiurozoa, Echinozoa, Holothurozoa, Crinozoa</li> <li>• Echinoderm Biology</li> <li>• Phylum Chordata</li> <li>• Subphylum Cephalochordata</li> </ul>	<ul style="list-style-type: none"> <li>• The Clam</li> <li>• Crustacean Larvae</li> <li>• The Sea Star</li> </ul>
<b>MODULE 6</b> <i>Marine Vertebrates I</i>	<b>2 WEEKS</b> Module 6 provides a study of several marine vertebrates	<ul style="list-style-type: none"> <li>• Class Agnatha</li> <li>• Class Chondrichthyes</li> <li>• Rays and Skates</li> <li>• The Bony Fishes</li> <li>• The Biology of Fishes</li> <li>• Coloration in Fishes</li> <li>• Locomotion</li> <li>• Feeding and Digestion</li> <li>• The Circulatory System</li> <li>• The Gills and Respiratory System</li> <li>• The Nervous System in the Fishes</li> <li>• Social Behavior</li> <li>• Migrations</li> <li>• Reproduction in the Fishes</li> </ul>	<ul style="list-style-type: none"> <li>• Types of Fish Scales</li> <li>• The Shark</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology



### SEMESTER 1: QUARTER 2, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 7</b> <i>Marine Invertebrates II</i></p>	<p><b>2 WEEKS</b> Module 7 continues the study of marine vertebrates.</p>	<ul style="list-style-type: none"> <li>• Class Reptilia</li> <li>• Class Aves</li> <li>• Gulls and Similar Birds</li> <li>• Penguins</li> <li>• Shearwaters and Similar Birds</li> <li>• Pelicans and Similar Birds</li> <li>• Birds at the Shore</li> <li>• Class Mammalia</li> <li>• Orders Cetacea, Sirenia, Pinnipedia, Carnivora</li> <li>• Echolocation</li> <li>• Movement in the Water</li> <li>• Behavior</li> <li>• Mating and Reproduction</li> </ul>	<ul style="list-style-type: none"> <li>• What Causes the Bends?</li> </ul>
<p><b>MODULE 8</b> <i>Marine Ecology</i></p>	<p><b>2 WEEKS</b> Module 8 offers a look at the ecosystem and the different types of relationships that exist in marine life.</p>	<ul style="list-style-type: none"> <li>• The Ecosystem</li> <li>• Population Growth</li> <li>• Predator and Prey Relationships</li> <li>• Symbiosis</li> <li>• Trophic Relationships</li> <li>• Primary Productivity</li> <li>• The Nitrogen and Carbon Cycles</li> <li>• Environmental Zones</li> </ul>	<ul style="list-style-type: none"> <li>• Exploring Carbon Fixation</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology



### SEMESTER 2: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 9</b> <i>The Intertidal Zone</i>	<b>2 WEEKS</b> Module 9 introduces intertidal communities and breaks down these communities into different intertidal zones.	<ul style="list-style-type: none"> <li>• Intertidal Communities</li> <li>• The Rocky Intertidal</li> <li>• Rocky Intertidal Abiotic Conditions</li> <li>• Intertidal Feeding and Reproduction</li> <li>• Wave Action</li> <li>• Surviving the Waves</li> <li>• Zonation of the Rocky Intertidal</li> <li>• The Upper Intertidal Zone</li> <li>• The Middle Intertidal Zone</li> <li>• The Lower Intertidal Zone</li> <li>• The Sandy and Muddy Intertidal</li> <li>• Survival in the Mud</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution of Mangroves in an Estuary</li> </ul>
<b>MODULE 10</b> <i>Estuary Communities</i>	<b>2 WEEKS</b> Module 10 provides an introduction to estuaries and an in-depth look at different aspects of estuaries.	<ul style="list-style-type: none"> <li>• The Ice Age: The Most Likely Cause of Most Estuaries</li> <li>• Types of Estuaries</li> <li>• Abiotic Factors in Estuaries</li> <li>• Estuarine Communities</li> <li>• Estuarine Habitats</li> <li>• Wetland</li> <li>• Mudflats</li> <li>• Channels</li> <li>• Estuary Production</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution of Mangroves in an Estuary</li> </ul>
<b>MODULE 11</b> <i>Coral Reefs</i>	<b>2 WEEKS</b> Module 11 provides an introduction to coral reefs and the intricate details of their formations, growth, and relationships.	<ul style="list-style-type: none"> <li>• Coral Reef Requirements and Locations</li> <li>• Reef Composition</li> <li>• Coral Reef Formation and Growth</li> <li>• Types of Reefs</li> <li>• Coral Reef Ecology</li> <li>• Reef Relationships</li> <li>• Symbiotic Relationships</li> </ul>	<ul style="list-style-type: none"> <li>• Examining Coral</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology



### SEMESTER 2: QUARTER 3, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 12</b> <i>Continental Shelf Communities</i></p>	<p><b>2 WEEKS</b> Module 12 provides an overview of the continental shelf and the different communities that exist there.</p>	<ul style="list-style-type: none"> <li>Physical Features of the Continental Shelf</li> <li>Soft-Bottom Shelf Communities</li> <li>Unvegetated Soft Bottom Environments</li> <li>Vegetated Soft-Bottom Environments</li> <li>Hard-Bottom Shelf Communities</li> <li>Kelp Beds and Forests</li> <li>Sea Urchins</li> </ul>	<ul style="list-style-type: none"> <li>Meiofaunal Organisms</li> </ul>

### SEMESTER 2: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 13</b> <i>The Epipelagic Zone</i></p>	<p><b>2 WEEKS</b> Module 13 provides an introduction to the epipelagic zone and an in-depth look at life in the epipelagic</p>	<ul style="list-style-type: none"> <li>The Epipelagic Zone</li> <li>Life in the Epipelagic</li> <li>Epipelagic Phytoplankton</li> <li>Epipelagic Zooplankton</li> <li>Epipelagic Nekton</li> <li>Staying Afloat in the Epipelagic</li> <li>Life in the Epipelagic Zone</li> <li>Vertical Migration</li> <li>The Epipelagic Food Web</li> <li>Primary Productivity</li> <li>Nutrients and Productivity</li> <li>El Nino</li> </ul>	<ul style="list-style-type: none"> <li>Observing Live Microplankton</li> <li>Water Drag</li> </ul>
<p><b>MODULE 14</b> <i>The Deep Ocean</i></p>	<p><b>2 WEEKS</b> Module 14 provides a study of the two zones under the epipelagic zone: the mesopelagic zone and the deep sea.</p>	<ul style="list-style-type: none"> <li>The Mesopelagic</li> <li>Mesopelagic Food Webs</li> <li>Mesopelagic Body Design</li> <li>The Deep Sea</li> <li>The Deep Sea Floor</li> <li>Hydrothermal Vents</li> <li>Other Vent Communities</li> <li>Deep Sea Photosynthesis</li> </ul>	<ul style="list-style-type: none"> <li>Chemical "Bioluminescence"</li> <li>The Bioluminescence of Plankton</li> </ul>

## Scope & Sequence

### Exploring Creation with Marine Biology



#### SEMESTER 2: QUARTER 4, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<b>MODULE 15</b> <i>Ocean Resources</i>	<b>2 WEEKS</b> Module 15 provides a study of living and nonliving ocean resources.	<ul style="list-style-type: none"> <li>• Food From the Sea</li> <li>• Food Species and Their Locations</li> <li>• Managing Populations</li> <li>• Mariculture</li> <li>• Other Living Resources</li> <li>• Nonliving Ocean Resources</li> </ul>	<ul style="list-style-type: none"> <li>• Mapping Ocean Resources</li> </ul>
<b>MODULE 16</b> <i>Effects of Humans on the Sea</i>	<b>2 WEEKS</b> Module 16 provides a closer look at human lifestyle and its long term effects on all water sources.	<ul style="list-style-type: none"> <li>• Ocean Habitat Damage</li> <li>• Effects on Coral Reefs</li> <li>• Pollution</li> <li>• Sewage, Fertilizers, Oil, Synthetic Pollutants, DDT</li> <li>• Other Toxic Chemicals</li> <li>• Metals and Other Toxic Materials</li> <li>• Trash and Other Debris</li> <li>• Our Responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• Biomagnification</li> </ul>

**ADDITIONAL INFORMATION:** This text also includes a Study Guide at the end of each module which serves to guide a student in studying for the provided module tests. An additional study tool in the text is the Module Summary for each module. These are a summary of each of the modules which has missing information for a student to search for in the text and complete. The textbook also contains a password to access the Apologia book extra website which provides links to additional websites for more in-depth exploration of the topics in the text.

Answers for the Study Guides, Module Summaries and the Tests are provided for the parent/teacher, the separate *Solutions and Test Manual*.

Additional resources offered for added teacher/student support are a multimedia companion CD containing videos and word pronunciations specific to this course, a full course CD-ROM which is used on the computer and takes the place of the textbook and solutions manual, and an audio CD which is the complete audio recording of the course. More detailed information is available on the Apologia website: [apologia.com](http://apologia.com).