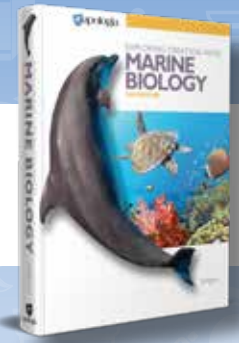


# Scope & Sequence

## Exploring Creation with Marine Biology, 2nd Edition



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

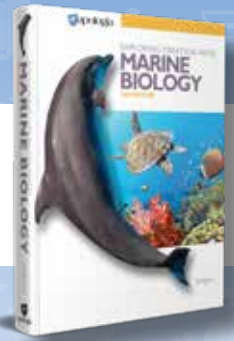
**TEXT SUMMARY:** Water covers 72% of our planet and makes up close to 99% of the living space on Earth. However, we know more about the surface of Mars than we know about the ocean floor. Dive into *Exploring Creation with Marine Biology 2nd Edition* and discover the living waters that God has placed 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>• Mountain Formation from Plate Movement</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, 2nd Edition

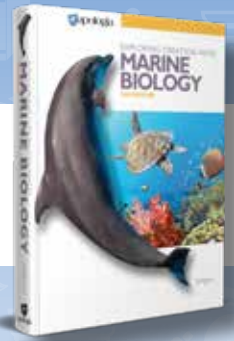


### SEMESTER I: QUARTER 1, continued

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 Porifera</li> <li>• Phylum Cnidaria</li> <li>• Classes Hydrozoa, Scyphozoa, Anthozoa</li> <li>• Phylum Ctenophora</li> <li>• The Bilateral Worms</li> <li>• Phyla Platyhelminthes, Nemertea, Nematoda, Annelida</li> <li>• Class Polychaeta</li> <li>• Lophophorates</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of a Sponge</li> <li>• One-Opening Gut vs. a True Digestive System</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology, 2nd Edition

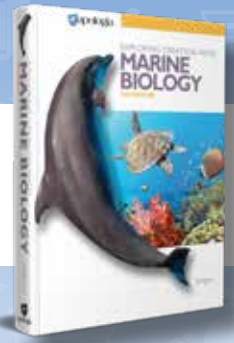


### SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 5</b> <i>Marine Invertebrates II</i></p>	<p><b>2 WEEKS</b> Module 5 continues the study of marine invertebrates.</p>	<ul style="list-style-type: none"> <li>• Phylum Mollusca</li> <li>• Classes Gastropoda, Bivalvia, Cephalopoda, Other 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>• Subphyla Urochordata and Cephalochordata</li> </ul>	<ul style="list-style-type: none"> <li>• The Clam</li> <li>• Crustacean Larvae</li> <li>• The Sea Star</li> </ul>
<p><b>MODULE 6</b> <i>Marine Vertebrates I</i></p>	<p><b>2 WEEKS</b> Module 6 provides a study of several marine vertebrates and an in-depth look at their biology and behaviors.</p>	<ul style="list-style-type: none"> <li>• Classes Agnatha, Chondrichthyes</li> <li>• Rays and Skates</li> <li>• The Bony Fishes</li> <li>• The Biology of Fishes</li> <li>• Coloration</li> <li>• Locomotion</li> <li>• Feeding and Digestion</li> <li>• The Circulatory System</li> <li>• The Gills and Respiratory System</li> <li>• Osmoregulation and Osmosis</li> <li>• The Nervous System</li> <li>• Social Behavior</li> <li>• Migration</li> <li>• Reproduction</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, 2nd Edition



### SEMESTER I: QUARTER 2, continued

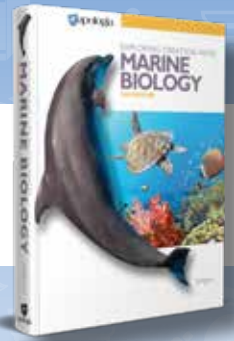
Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 7</b> <i>Marine Vertebrates II</i></p>	<p><b>2 WEEKS</b> Module 7 continues the study of marine vertebrates including reptiles, birds, and mammals.</p>	<ul style="list-style-type: none"> <li>• Classes Reptilia, Aves</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>• Dolphin Echolocation</li> <li>• What Causes the Bends?</li> </ul>
<p><b>MODULE 8</b> <i>Marine Ecology</i></p>	<p><b>2 WEEKS</b> Module 8 delves into the marine ecosystem and 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>

### SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 9</b> <i>The Intertidal Zone</i></p>	<p><b>2 WEEKS</b> Module 9 introduces intertidal communities and breaks down these communities into different intertidal zones.</p>	<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 Intertidal Zones: Upper, Middle, Lower</li> <li>• The Sandy and Muddy Intertidal</li> <li>• Survival in the Mud</li> </ul>	<ul style="list-style-type: none"> <li>• Exploring Intertidal Sediments</li> <li>• The Movement of Water Through Sediment</li> </ul>

# Scope & Sequence

## Exploring Creation with Marine Biology, 2nd Edition



### SEMESTER II: QUARTER 3, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
<p><b>MODULE 10</b> <i>Estuary Communities</i></p>	<p><b>2 WEEKS</b> Module 10 provides an introduction to estuaries and an in-depth look at different aspects of estuaries.</p>	<ul style="list-style-type: none"> <li>• The Ice Age</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>
<p><b>MODULE 11</b> <i>Coral Reefs</i></p>	<p><b>2 WEEKS</b> Module 11 provides an introduction to coral reefs and the intricate details of their formations, growth, and relationships.</p>	<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>
<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>

## Scope & Sequence

### Exploring Creation with Marine Biology, 2nd Edition



#### SEMESTER II: 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 there.</p>	<ul style="list-style-type: none"> <li>• The Epipelagic Zone</li> <li>• Life in the Epipelagic</li> <li>• Epipelagic Phytoplankton, Zooplankton, Nekton</li> <li>• Staying Afloat in the Epipelagic</li> <li>• Living 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 Niño—Southern Oscillation</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>• Food Webs</li> <li>• Body Design</li> <li>• The Deep Sea</li> <li>• The Deep Sea Floor</li> <li>• Hydrothermal Vents and 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>
<p><b>MODULE 15</b> <i>Ocean Resources</i></p>	<p><b>2 WEEKS</b> Module 15 provides a study of living and nonliving ocean resources.</p>	<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>
<p><b>MODULE 16</b> <i>Effects of Humans on the Sea</i></p>	<p><b>2 WEEKS</b> Module 16 provides a closer look at how the human lifestyle effects all water sources.</p>	<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**. Answers to the study guides, module summaries and the tests are provided for the instructor.