

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
MODULE 1 <i>Biology: The Study of Life</i>	2 WEEKS 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.	<ul style="list-style-type: none"> • DNA • Energy Conversion • Sensing and Responding to Change • Reproduction • Life's Secret Ingredient • The Scientific Method • Spontaneous Generation • Biological Classification • Characteristics Used to Separate Organisms into Kingdoms • Definition of Species • Biological Keys • Naming Organisms Based on Classification • Alternate Forms of Taxonomy • The Microscope 	<ul style="list-style-type: none"> • Using a Biological Key • Introduction to the Microscope
MODULE 2 <i>Kingdom Monera</i>	2 WEEKS 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.	<ul style="list-style-type: none"> • Bacteria • The Eating Habits of Bacteria • Asexual Reproduction • Genetic Recombination • Transformation and Transduction • Endospore Formation • Bacterial Colonies • Classification in Kingdom Monera • Other Classification Systems • Specific Bacteria • Conditions for Bacterial Growth • Preventing Bacterial Infections • The Microscopic World 	<ul style="list-style-type: none"> • Pond Life: Part A • Pond Life: Part B

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SEMESTER I: QUARTER 1, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 3 <i>Kingdom Protista</i>	2 WEEKS 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"> • Classification in Kingdom Protista • Subkingdom Protozoa • 4 Phylum of Protozoa: Sacodina, Mastigophora, Ciliophora, Sporozoa • Subkingdom Algae • 5 Phylum of Algae: Chlorophyta, Chrysophyta, Pyrrophyta, Phaeophyta, Rhodophyta 	<ul style="list-style-type: none"> • Pond Life: Part C • Subkingdom Protozoa • Subkingdom Algae
MODULE 4 <i>Kingdom Fungi</i>	2 WEEKS 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"> • General Characteristics • Reproduction • Classification • 6 Phylum: Basidiomycota, Ascomycota, Zygomycota, Chtridiomycota, Deuteromycota, Myxomycota • Yeast • Symbiosis 	<ul style="list-style-type: none"> • Phylum Basidiomycota • Yeast and the Fermentation Process • Molds • Imperfect Fungi

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SEMESTER I: QUARTER 2

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 5 <i>The Chemistry of Life</i>	<p style="text-align: center;">2 WEEKS</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"> • Atoms • Elements • Molecules • Changes in Matter: Physical, Chemical • Photosynthesis • Organic Chemistry • Carbohydrates • Organic Acids and Bases • Lipids • Proteins and Enzymes • DNA 	<ul style="list-style-type: none"> • Diffusion • Osmosis • The Fragility of an Enzyme
MODULE 6 <i>The Cell</i>	<p style="text-align: center;">2 WEEKS</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"> • Cellular Functions • Cellular Structure: Cell Wall, Plasma Membrane, Cytoplasm • Cellular Organelles and Their Functions: Mitochondrion, Lysosomes, Ribosomes, Endoplasmic Reticulum, Plastids, Vacuoles and Vesicles, Golgi Bodies, Centrioles, Nucleus, Cytoskeleton • How Substances Travel In and Out of Cells • Cellular Energy • ATP and ADP 	<ul style="list-style-type: none"> • Cell Structure I • Cell Structure II
MODULE 7 <i>Cellular Reproduction and DNA</i>	<p style="text-align: center;">2 WEEKS</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"> • Genes, Chromosomes, and DNA • Protein Synthesis: Transcription and Translation • Mitosis • Diploid and Haploid Cells • Meiosis • Viruses 	<ul style="list-style-type: none"> • DNA Extraction • Mitosis

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SEMESTER I: QUARTER 2, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 8 <i>Mendelian Genetics</i>	<p style="text-align: center;">2 WEEKS</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"> • Gregor Mendel • Mendel's Experiments • Terminology • Punnett Squares • Pedigrees • Sex and Sex-Linked Genetic Traits • Genetic Disorders and Diseases 	<ul style="list-style-type: none"> • Making Your Own Earlobe Pedigree • A Dihybrid Cross • Sex-Linked Genetic Traits • Environmental Factors and Their Effect on Radish Leaf Color

SEMESTER II: QUARTER 3

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 9 <i>Evolution: Part Scientific Theory, Part Unconfirmed Hypothesis</i>	<p style="text-align: center;">2 WEEKS</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"> • History of Charles Darwin • Darwin's theory of evolution • Microevolution • Macroevolution • Using biological facts to prove/disprove evolution 	This module contains no experiments.
MODULE 10 <i>Ecology</i>	<p style="text-align: center;">2 WEEKS</p> Module 10 provides an introduction to ecosystems through exploring the water, oxygen, carbon and nitrogen cycles.	<ul style="list-style-type: none"> • Energy and Ecosystems • Mutualism • The Physical Environment • Water, Oxygen, Carbon, and Nitrogen cycles 	<ul style="list-style-type: none"> • Carbon Dioxide and the Greenhouse Effect
MODULE 11 <i>The Invertebrates of Kingdom Animalia</i>	<p style="text-align: center;">2 WEEKS</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"> • Symmetry • Phylum Porifera, (Sponges), Cnidaria, Annelida, Platyhelminthes, Nematoda, Mollusca • Earthworm Feeding Habits, Respiratory and Circulatory Systems and Reproduction • Other Segmented Worms 	<ul style="list-style-type: none"> • Observations of the Spicules of a Sponge • Observation of a Hydra • Earthworm Dissection • Observation of a Planarian

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SEMESTER II: QUARTER 3, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 12 <i>Phylum Arthropoda</i>	2 WEEKS 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"> • Characteristics of Arthropods • Classes Crustacea, Arachnida, Chilopoda, Diplopoda, and Insecta • Crayfish's Respiratory, Circulatory, Digestive, Nervous and Reproductive Systems • The Spider and Spider Anatomy • Insects: Anatomy, Respiration, Circulation, Feeding Habits, Reproduction and Development • A Few Orders in Class Insecta 	<ul style="list-style-type: none"> • Crayfish Dissection • Insect Classification

SEMESTER II: QUARTER 4

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 13 <i>Phylum Chordata</i>	2 WEEKS 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"> • Subphyla Urochordata, Cephalochordata, Vertebrata • The Endoskeleton • The Circulatory and Nervous Systems • Reproduction • Classes Agnatha, Chondrichthyes, Osteichthyes, Amphibia 	<ul style="list-style-type: none"> • Perch Dissection • Frog Dissection • Alternate Experiment for Module 13: Field Study II
MODULE 14 <i>Kingdom Plantae: Anatomy and Classification</i>	2 WEEKS 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"> • Plant Anatomy • Leaf: Macroscopic Structure and Microscopic Structure • Leaf Color • Roots and Stems • Classification of Plants • Bryophytes • Seedless Vascular Plants • Seed-Making Plants 	<ul style="list-style-type: none"> • Leaf Collection and Identification • How Anthocyanins and pH Help Determine Leaf Color • Cross Sections of Roots, Stems and Leaf

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SEMESTER II: QUARTER 4, continued

Module & Major Themes	Timeline/Summary	Main Themes	Supporting Experiments
MODULE 15 <i>Kingdom Plantae: Physiology and Reproduction</i>	2 WEEKS 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"> • How a Plant Depends on Water • Water Absorption and Transport • Plant Growth • Insectivorous Plants • Reproduction in Plants • Vegetative Reproduction • Sexual Reproduction in Phylum Anthophyta • Seeds and Fruits • Germination and Early Growth 	<ul style="list-style-type: none"> • Flower Anatomy • Fruit Classification
MODULE 16 <i>Reptiles, Birds, and Mammals</i>	2 WEEKS 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"> • Classes Reptilia, Aves and Mammalia • Orders Rhynchocephalia, Squamata, Testudines, and Crocodilia • Lizards, Snakes, Dinosaurs • A Bird's Ability to Fly 	<ul style="list-style-type: none"> • Bird Embryology • Bird Identification

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.