Life Science – MS/Part A

COURSE DESCRIPTION: The Life Science program invites students to investigate the world of living things—at levels both large and small—by reading, observing, and experimenting with aspects of life on Earth. Students explore an amazing variety of organisms, the complex workings of the cell and cell biology, the relationship between living things and their environments, and discoveries in the world of modern genetics. Students tackle such topics as ecology, microorganisms, animals, plants, cells, animals, species, adaptation, heredity, genetics, and the history of life on Earth. Lesson activities and assignments help students discover how scientists investigate the living world.

COURSE OBJECTIVES:

- Describe through hands-on and virtual exploration the many aspects of the world of living things and life on Earth.
- Utilize tools and concepts to think critically about the vast variety of organisms on Earth, the complex workings of the cell and cell biology, the relationship between living things and their environments, and discoveries in the world of modern genetics.
- Explain the key concepts of ecology, microorganisms, animals, plants, cells, animals, species, adaptation, heredity, genetics, and the history of life on Earth.
- Research and apply key ideas about the living world.

PREREQUISITES: None

COURSE LENGTH: One Semester

REQUIRED TEXT: No required textbook for this course.

REQUIRED MATERIALS LIST

COURSE OUTLINE:

Module 1: Organisms

- Lesson 1: Organisms
- Lesson 2: Diversity of Life
- Lesson 3: Design a Madagascar Organism
- Lesson 4: Challenges of Life
- Lesson 5: Investigation 1

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- Lesson 6: Characteristics of Life
- Lesson 7: You Are an Organism
- Lesson 8: Living Things Classification
- Lesson 9: Make a Dichotomous Key
- Lesson 10: Domains of Life
- Lesson 11: Classifying Organisms
- Lesson 12: Chemistry of Life
- Lesson 13: Collage of Compounds
- Lesson 14: Single-celled Organisms
- Lesson 15: Investigation 2
- Lesson 16: Multicellular Organisms
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 2: Matter

- Lesson 1: Cells
- Lesson 2: Cell Exploration
- Lesson 3: Cell Size
- Lesson 4: Differing Cells
- Lesson 5: Investigation 3
- Lesson 6: The Plasma Membrane
- Lesson 7: Investigation 4
- Lesson 8: Cell Organelles
- Lesson 9: If You Were an Organelle
- Lesson 10: Cell Origami Review Tool
- Lesson 11: Looking at Cells
- Lesson 12: Cell Analogy
- Lesson 13: Plant and Animal Cells
- Lesson 14: Investigation 5
- Lesson 15: Cell Communication
- Lesson 16: How Cells Communicate
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 3: Cells and Energy

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- Lesson 1: Cells and Energy
- Lesson 2: Photosynthesis
- Lesson 3: Investigation 6
- Lesson 4: Phases of Photosynthesis
- Lesson 5: Modeling the Calvin Cycle
- Lesson 6: Breaking Down Glucose
- Lesson 7: The Breakdown of Glucose
- Lesson 8: Making ATP
- Lesson 9: How ATP Works in the Cell
- Lesson 10: ATP, ADP and AMP
- Lesson 11: Investigation 7
- Lesson 12: Diffusion and Osmosis
- Lesson 13: Investigation 8
- Lesson 14: Cell Division
- Lesson 15: Mitosis
- Lesson 16: The Meaning of Mitosis
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 4: Living Systems

- Lesson 1: Living Systems
- Lesson 2: Levels of an Organ System
- Lesson 3: Muscular and Skeletal Systems
- Lesson 4: Investigation 9
- Lesson 5: Chicken Wing Anatomy
- Lesson 6: Respiratory System
- Lesson 7: Circulatory System
- Lesson 8: How the Blood and Air Flow
- Lesson 9: Digestive and Excretory Systems
- Lesson 10: Digestive Journey
- Lesson 11: Nervous System
- Lesson 12: Paralysis and the CNS
- Lesson 13: Immune and Lymphatic Systems
- Lesson 14: The Immune Response

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- Lesson 15: Endocrine and Integumentary
- Lesson 16: How Systems Work Together
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 5: Animals and Species

- Lesson 1: Animals and Species
- Lesson 2: Cnidarians and Roundworms
- Lesson 3: Annelids and Arthropods
- Lesson 4: Fish and Amphibians
- Lesson 5: Amphibians
- Lesson 6: Reptiles and Birds and Mammals
- Lesson 7: The West Nile Virus
- Lesson 8: Distinguishing Phyla
- Lesson 9: Comparison within Species
- Lesson 10: Characteristic Comparisons
- Lesson 11: Continuation of Species
- Lesson 12: Cells for Reproduction
- Lesson 13: Sexual and Asexual Reproduction
- Lesson 14: Life Cycles
- Lesson 15: Combining Life Cycles
- Lesson 16: Module Review
- Lesson 17: Module Exam
- Lesson 18: Portfolio

Course Asset Credits

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Life Science – MS/Part B

COURSE DESCRIPTION: The Life Science program invites students to investigate the world of living things—at levels both large and small—by reading, observing, and experimenting with aspects of life on Earth. Students explore an amazing variety of organisms, the complex workings of the cell and cell biology, the relationship between living things and their environments, and discoveries in the world of modern genetics. Students tackle such topics as ecology, microorganisms, animals, plants, cells, animals, species, adaptation, heredity, genetics, and the history of life on Earth. Lesson activities and assignments help students discover how scientists investigate the living world.

COURSE OBJECTIVES:

- Describe through hands-on and virtual exploration the many aspects of the world of living things and life on Earth.
- Utilize tools and concepts to think critically about the vast variety of organisms on Earth, the complex workings of the cell and cell biology, the relationship between living things and their environments, and discoveries in the world of modern genetics.
- Explain the key concepts of ecology, microorganisms, animals, plants, cells, animals, species, adaptation, heredity, genetics, and the history of life on Earth.
- Research and apply key ideas about the living world.

PREREQUISITES: None

COURSE LENGTH: One Semester

REQUIRED TEXT: No required textbook for this course.

REQUIRED MATERIALS LIST

COURSE OUTLINE:

Module 6: Interdependence of Life

- Lesson 1: Organisms and Their Needs
- Lesson 2: Staying Balanced
- Lesson 3: Responses
- Lesson 4: Aquarium Ecosystem

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- Lesson 5: Population Limits
- Lesson 6: Populations
- Lesson 7: Cycles in Nature
- Lesson 8: Energy Flow in Ecosystems
- Lesson 9: Food Chains
- Lesson 10: A Decomposer Food Chain
- Lesson 11: Food Webs
- Lesson 12: Making a Desert Food Web
- Lesson 13: A New Organism in the Food Web
- Lesson 14: Competitive Relationships
- Lesson 15: Cooperative Relationships
- Lesson 16: Symbiotic Partners
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 7: Adaptation and Change

- Lesson 1: Change over Time
- Lesson 2: Galapagos Island Changes
- Lesson 3: Structural Adaptations
- Lesson 4: Organisms and Biomes
- Lesson 5: Behavioral Adaptations
- Lesson 6: Extinct or Endangered
- Lesson 7: Meet an Endangered Species
- Lesson 8: Changes in Ecosystems
- Lesson 9: Ecosystems and Decomposition
- Lesson 10: Rates of Environmental Change
- Lesson 11: Mount St. Helens Succession
- Lesson 12: Population Changes
- Lesson 13: Investigation 1
- Lesson 14: The Human Factor Part 1
- Lesson 15: The Human Factor Part 2
- Lesson 16: Investigation 2
- Lesson 17: Module Review
- Lesson 18: Module Exam

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Module 8: Genetics and Heredity

- Lesson 1: Genetics and Heredity
- Lesson 2: Mendel's Pea Plants
- Lesson 3: Genes and Alleles
- Lesson 4: Investigation 3
- Lesson 5: Inheritance
- Lesson 6: Punnett Squares
- Lesson 7: Using Punnett Squares
- Lesson 8: Similarities Among Organisms
- Lesson 9: Chromosomes
- Lesson 10: Meiosis
- Lesson 11: Making a Meiosis Mobile
- Lesson 12: Meiosis and Mitosis
- Lesson 13: Mutations
- Lesson 14: Karyotypes
- Lesson 15: Genetic Engineering
- Lesson 16: Debating Genetic Engineering
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 9: How the Gene Works

- Lesson 1: How the Gene Works
- Lesson 2: Structure of DNA and RNA
- Lesson 3: Making a DNA Model
- Lesson 4: DNA Replication
- Lesson 5: Modeling DNA Replication
- Lesson 6: What is a Gene
- Lesson 7: Understand Exons and Introns
- Lesson 8: DNA Makes RNA Makes Protein
- Lesson 9: Transcription and Translation
- Lesson 10: What Proteins Do

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- Lesson 11: Protein Power
- Lesson 12: Gene Expression
- Lesson 13: Gene Expression Eukaryotes
- Lesson 14: Differentiation in Cells
- Lesson 15: Investigation 4
- Lesson 16: DNA Today
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 10: History of Life on Earth

- Lesson 1: History of Life on Earth
- Lesson 2: Ancient Earth
- Lesson 3: Origins of Life on Earth
- Lesson 4: Redi and Pasteur Experiments
- Lesson 5: Evidence for Change Over Time
- Lesson 6: Finding Fossils
- Lesson 7: The Theory of Evolution
- Lesson 8: Darwin's Journal
- Lesson 9: Natural Selection
- Lesson 10: The Arms of a Sea Star
- Lesson 11: Predator vs. Prey
- Lesson 12: Origin of a New Species
- Lesson 13: Adaptations to New Environments
- Lesson 14: Development of Life
- Lesson 15: Development of Life Timeline
- Lesson 16: Module Review
- Lesson 17: Module Exam
- Lesson 18: Portfolio

Course Asset Credits

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