



monarch

2018 - 2019 Curriculum Catalog

Biology

Table of Contents

BIOLOGY COURSE OVERVIEW	1
UNIT 1: TAXONOMY: KEY TO ORGANIZATION	1
UNIT 2: CHEMISTRY OF LIFE	2
UNIT 3: CELLS.....	2
UNIT 4: CELL DIVISION AND REPRODUCTION.....	2
UNIT 5: GENETICS: GOD'S PLAN OF INHERITANCE	3
UNIT 6: MICROBIOLOGY	3
UNIT 7: PLANTS: GREEN FACTORIES	3
UNIT 8: HUMAN ANATOMY AND PHYSIOLOGY	4
UNIT 9: ECOLOGY, POLLUTION, AND ENERGY	4
UNIT 10: PRINCIPLES AND APPLICATIONS OF BIOLOGY.....	4

Biology Course Overview

Biology is intended to expose students to the designs and patterns of living organisms that have been created by God. In preceding years, students should have developed a foundational understanding of life sciences. This biology course will expand upon that knowledge and incorporate more abstract knowledge. The student's understanding should encompass both the micro and macro aspects of life and this biology course includes both. The major concepts covered are taxonomy, the chemical basis of life, cellular structure and function, genetics, microbiology, botany, human anatomy and physiology, and ecological principles.

Students at this level should show development in their ability and understanding of scientific inquiry. The units contain experiments and projects that seek to develop a deeper conceptual meaning for the student and actively engage the student. The continued exposure of science concepts and scientific inquiry will serve to improve the student's skill and understanding. Biology should be preceded or accompanied by an Algebra I course.

- **Taxonomy:** Key to Organization: Students will explore the history of taxonomy and describe and differentiate between the Artificial and Natural Systems of Taxonomy.
- **Chemistry of Life:** Students will demonstrate a knowledge of molecular structure as it relates to organic compounds.
- **Cells:** Students will describe cells, their different parts, and the function of a cell.
- **Cell Division and Reproduction:** Students will describe the processes of cell division and distinguish between asexual and sexual reproduction.
- **Genetics:** God's Plan of Inheritance: Students will discuss the importance of Mendel's work and results that led to the principle of segregation and the principle of dominance and recessiveness.
- **Microbiology:** Students will explore the six-kingdom classification system and identify which kingdoms are composed of prokaryotes and which are made up of eukaryotes.
- **Plants:** Green Factories: Students will describe the make-up of plant cells and the process of photosynthesis and respiration.
- **Human Anatomy and Physiology:** Students will describe the human body systems.
- **Ecology, Pollution, and Energy:** Students will discuss ecological relationships, pollution, and energy sources.
- **Principles and Applications of Biology:** Students will study the principles of life and the applications of biology.

Unit 1: Taxonomy: Key to Organization	
Assignments	
Biology	1. Course Overview
	2. The History of Taxonomy
	3. Quiz 1
	4. Binomial Nomenclature
	5. Concept of Species
	6. Quiz 2
	7. Plant and Animal Classification
	8. Experiment: Fruit
	9. Activity: Keying Plants*
	10. Activity: Keying Animals*
	11. Search For A System
12. Quiz 3	
13. Taxonomy and Origins	
14. Models of Origin	
15. Project: Research	
16. Project: Origins*	
17. Quiz 4	
18. Special Project*	
19. Test	
20. Alternate Test*	
21. Reference	

Unit 2: Chemistry of Life		
Assignments		
Biology	1. Molecular Basis of Life	14. Carbohydrates
	2. Quiz 1	15. Experiment: Starch*
	3. Properties of Compounds	16. Lipids
	4. Experiment: Static Electricity	17. Nucleic Acids
	5. Covalent Bonding	18. Quiz 4
	6. Experiment: Temperature Control*	19. Enzymes
	7. Importance of Inorganic Compounds	20. Experiment: Digestion*
	8. Experiment: Water Properties	21. Quiz 5
	9. Experiment: Indicators*	22. Special Project*
	10. Quiz 2	23. Test
	11. Chemical Reactions	24. Alternate Test*
	12. Quiz 3	25. Reference
	13. Organic Compounds	

Unit 3: Cells		
Assignments		
Biology	1. The Cell - An Introduction	11. Organelles
	2. The Microscope	12. Production of Needed Material
	3. Experiment: Introducing the Microscope	13. Quiz 2
	4. Experiment: Plant, Animal, and Algae Cells	14. Cells in Organisms
	5. Experiment: Onion Cells*	15. Experiment: Tissues*
	6. Quiz 1	16. Quiz 3
	7. Cell Design	17. Special Project*
	8. Cell Membrane Function	18. Test
	9. Project: Virtual Lab - Osmosis	19. Alternate Test*
	10. Experiment: Osmosis	20. Reference

Unit 4: Cell Division and Reproduction		
Assignments		
Biology	1. Cell Division	16. Quiz 3
	2. Meiosis	17. Sexual Reproduction in Animals
	3. Stages of Mitosis	18. Experiment: Tissue Structure
	4. Experiment: Mitosis	19. Metamorphosis
	5. Quiz 1	20. Quiz 4
	6. Asexual Reproduction	21. Sexual Reproduction in Plants
	7. Experiment: Regeneration*	22. Life Cycles of Ferns and Pines
	8. Plants	23. Experiment: Ferns and Pines*
	9. Experiment: Bulb Structure*	24. Experiment: Flowers*
	10. Practical Applications in Plants	25. Quiz 5
	11. Experiment: Cuttings*	26. Special Project*
	12. Quiz 2	27. Test
	13. Sexual Reproduction	28. Alternate Test*
	14. Fertilization	29. Reference
	15. Experiment: Sexual Reproduction*	

Unit 5: Genetics: God's Plan of Inheritance	
Assignments	
Biology	1. Genetics: God's Plan of Inheritance
	2. Probabilities
	3. Experiment: Probability
	4. Cross Predictions
	5. Application of Mendelian Genetics
	6. Quiz 1
	7. Chromosome Basis of Heredity
	8. Chromosomes in Meiosis
	9. Sex Chromosomes
	10. Quiz 2
	11. Molecular Genetics
	12. Experiment: Molecular Genetics
	13. Quiz 3
	14. Human Genetics
	15. Factors Studied
	16. Inherited Diseases
	17. Quiz 4
	18. Special Project*
	19. Test
	20. Alternate Test*
	21. Reference

Unit 6: Microbiology	
Assignments	
Biology	1. Microbial Taxonomy
	2. Fungi
	3. Experiment: Fungus All Around (Part 1)
	4. Experiment: Fungus All Around (Part 2)
	5. Quiz 1: Microbial Taxonomy and Fungi
	6. Animal-like Protists
	7. Experiment: Protozoan Culture
	8. Quiz 2: Animal-like Protists
	9. Plant-like Protists (Algae)
	10. Fungus-like Protists
	11. Quiz 3: Plant- and Fungus-like Protists
	12. Eubacteria
	13. Activity: Pathogenic Bacteria Report
	14. Archaea
	15. Viruses, Prions, and Viroids
	16. Experiment: Algae Observations
	17. Quiz 4: Eubacteria, Archaea, Viruses, Prions, and Viroids
	18. Special Project*
	19. Test: Microbiology
	20. Alternate Test*: Microbiology
	21. Reference

Unit 7: Plants: Green Factories	
Assignments	
Biology	1. How Is a Plant Made?
	2. Parts of the Plant Cell
	3. Anatomy and Morphology
	4. Quiz 1
	5. How do Plants Grow?
	6. Experiment: Seeds
	7. Developmental Anatomy
	8. Quiz 2
	9. How do Plants Work?
	10. Photosynthesis: A Closer Look
	11. Experiment: Terrarium*
	12. Respiration
	13. Quiz 3
	14. How do Plants Help People?
	15. Quiz 4
	16. Special Project*
	17. Test
	18. Alternate Test*
	19. Reference

Unit 8: Human Anatomy and Physiology		
Assignments		
Biology	1. Digestive System	12. Quiz 2
	2. Excretory System	13. Environmental Interactions
	3. Respiratory System	14. Sensory Systems: The Eye
	4. Circulatory System	15. Sensory Systems: Hearing, Taste, Touch
	5. The Heart	16. Endocrine System
	6. Experiment: Heart Rate	17. Immune System and Disease
	7. Quiz 1	18. Quiz 3
	8. Body Framework	19. Special Project*
	9. Muscular System	20. Test
	10. Experiment: Muscle Types*	21. Alternate Test*
	11. Reproductive System	22. Reference

Unit 9: Ecology, Pollution, and Energy		
Assignments		
Biology	1. Principles of Ecology	12. Pollution Affects Ecology
	2. Environmental Factors	13. Pollution Problems
	3. Food Chains	14. Quiz 3
	4. Quiz 1	15. Energy Affects Ecology
	5. Ecological Relationships	16. Essay: Stewardship
	6. Communities and Habitats	17. Quiz 4
	7. Experiment: Habitats	18. Special Project*
	8. Experiment: Biomes*	19. Test
	9. Experiment: Quadrats*	20. Alternate Test*
	10. Experiment: Inventory*	21. Reference
	11. Quiz 2	

Unit 10: Principles and Applications of Biology		
Assignments		
Biology	1. Study of Life	8. Applications of Biology
	2. Definition of Life	9. Green Revolution
	3. Quiz 1	10. Quiz 3
	4. Basic Principles of Life	11. Special Project*
	5. Control System	12. Test
	6. Environment of Life	13. Alternate Test*
	7. Quiz 2	14. Reference

(*) Indicates alternative assignment