



Switched-On
SCHOOLHOUSE

Course Catalog

Biology

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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.

Upon completion of the course, students should be able to do the following:

- Classify different animals using taxonomy.
- Demonstrate a knowledge of molecular structure as it relates to organic compounds.
- Use a microscope to study microscopic organisms.
- Describe cells, their different parts, and the function of a cell.
- Discuss the different parts of a plant.
- Describe and explain the function of each system in the human body.
- Perform Punnett square functions to determine probability of inheritance.
- Differentiate between mitosis and meiosis and between asexual and sexual reproduction.
- Understand the impact man has on the environment.

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

UNIT 2: CHEMISTRY OF LIFE

Assignment Titles

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

Assignment Titles

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

UNIT 4: CELL DIVISION AND REPRODUCTION

Assignment Titles

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

Assignment Titles

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

UNIT 6: MICROBIOLOGY

Assignment Titles

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

UNIT 7: PLANTS: GREEN FACTORIES

Assignment Titles

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

UNIT 8: HUMAN ANATOMY AND PHYSIOLOGY

Assignment Titles

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				
Assignment Titles				
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				
Assignment Titles				
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 alternate assignment