



2012 Curriculum 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.

Additional Resources

Some assignments in this course require the use of resources that must be supplied by the user. A list of these outside resources is available from the link below.

UNIT 1: TAXONOMY: KEY TO ORGANIZATION
Assignment Titles

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|------------------------------------|--------------------------|
| 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

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|--------------------------------------|---------------------------|
| 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

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|-----------------------------|-----------------------------------|
| 1. The Cell-An Introduction | 11. Production of Needed Material |
| 2. The Microscope | 12. Quiz 2 |
| 3. Experiment: Microscope | 13. Cells in Organisms |
| 4. Experiment: Cheek Cells | 14. Experiment: Tissues |
| 5. Experiment: Onion Cells | 15. Quiz 3 |
| 6. Quiz 1 | 16. Special Project |
| 7. Cell Design | 17. Test |
| 8. Cell Membrane Function | 18. Alternate Test |
| 9. Experiment: Osmosis | 19. Reference |
| 10. Organelles | |

UNIT 4: CELL DIVISION AND REPRODUCTION
Assignment Titles

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|--------------------------------------|------------------------------------|
| 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

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|--|------------------------------------|
| 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

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|---|---|
| 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

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|-----------------------------------|--------------------------------|
| 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

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|------------------------------|--|
| 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

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|-----------------------------|-------------------------------|
| 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

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|-----------------------------|----------------------------|
| 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 |