

NFC ACADEMY



BIOLOGY HONORS

COURSE OVERVIEW

Biology Honors 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.

OBJECTIVES

- **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.

CURRICULUM CONTENT & SKILL FOCUS

UNIT 1: TAXONOMY: KEY TO ORGANIZATION

- Discuss the history of taxonomy
- List the seven levels of classification
- Differentiate between the two meanings of species
- Develop an understanding of the use of a dichotomous taxonomic key
- Evaluate the Creation model and the Evolution model using evidence

UNIT 2: CHEMISTRY OF LIFE

- Distinguish between molecules, diatomic molecules, compounds, and mixtures
- Explain covalent bonding and differentiate between intramolecular bonds and intermolecular bonds (forces)
- Describe the actions of acids, bases, and salts when dissolved in water
- Describe the make-up and purpose of carbohydrates, lipids, nucleic acids, and enzymes

UNIT 3: CELLS

- Recognize cells as basic building blocks of life and note the differences between plant and animal cells
- Differentiate and describe the five methods of transport into and out of the cell
- Understand the process of glycolysis and the Krebs' cycle for the production of ATP
- Explain the structure and function of the parts of cells
- List, in order, the five levels of cellular organization

UNIT 4: CELL DIVISION AND REPRODUCTION

- Identify the result and purpose of mitosis and meiosis
- Describe the different means of, and advantages of asexual and sexual reproduction
- Describe and provide examples of methods used to grow plants
- Describe internal and external fertilization
- Describe and differentiate between complete and incomplete metamorphosis and examples of animals that undergo metamorphosis

UNIT 5: GENETICS: GOD'S PLAN OF INHERITANCE

- Distinguish between phenotype and genotype and between heterozygous, homozygous, and alleles
- Recognize the relationship between random events and probability
- State Sutton's chromosome theory
- Distinguish between transcription and translation in DNA and RNA

- Analyze the problems associated with studying human genetics
- List common traits that are known to be inherited

UNIT 6: MICROBIOLOGY

- Discuss what characteristics set organisms of particular kingdom apart from members of other kingdoms
- Discuss the economic and environmental impact of some common animal-like protists
- Discuss the economic and environmental impact of algae
- Discuss the economic and environmental impact of eubacteria
- Discuss the economic and environmental impact of viruses, prions, and viroids

UNIT 7: PLANTS: GREEN FACTORIES

- Distinguish how plant cells are similar and different from other cells
- Review the structure and function of the organelles found in the cytoplasm
- Describe the special tissues in a plant
- Discuss the differentiation of the plant cells
- Distinguish between the light and dark reaction of photosynthesis
- List and describe the changes that take place in the three stages of respiration

UNIT 8: HUMAN ANATOMY AND PHYSIOLOGY

- Identify and describe the function of the organs of the digestive system, excretory system, respiratory system
- Identify the functions of the circulatory system
- Distinguish between the structures of the heart involved in pulmonary circulation and systemic circulation
- Compare and contrast the movement of the skeletal muscles and the smooth muscles
- Identify and describe the functions of the reproductive system, sensory systems, the endocrine system, and the immune system

UNIT 9: ECOLOGY, POLLUTION, AND ENERGY

- Recognize what parts make an ecosystem
- Recognize that the variety of habitats on earth are directly related to the variety of living things
- State the principles of ecology using the balance of nature concept
- Understand the causes and effects of pollution in the environment
- Understand the importance of energy conservation

UNIT 10: ECOLOGY AND THE ENVIRONMENT

- State and describe the steps of the scientific method and its limitations
- Name common characteristics of living organisms
- Define and describe the term homeostasis
- Describe ways that we can be good stewards of the earth
- Name three types of immunity
- Discuss how the world is addressing world hunger

ADDITIONAL RESOURCES

All of the activities in this course can be completed with online resources. All Biology labs in this online course can be completed online using our virtual lab partner. Biology also includes extra alternate assignments, experiment/projects and tests for use in enhancing instruction or addressing individual needs when the instructor believes they will enhance instruction.

Students in any honors course should expect to complete more extensive research and writing for the successful completion of the course in addition to the basic course program for the course. Science honor's course would require additional labs in addition to the research and writing component of an honor's course.

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GRADING INFORMATION

GRADING COMPONENTS *(Honors)*

Lessons	30%
Quizzes	25%
Projects	15% <i>(includes labs)</i>
Tests	30%

GRADING SCALE

100-90	A
89-80	B
79-70	C
69-60	D
Below 60	F