

WRHS Science Curriculum Syllabus

Course Name: Biology

Grade Level: 10 - 12

Course Description:

College Biology is a full-year laboratory science course designed for the college preparatory student. It requires a high reading comprehension and strong mathematics background. This laboratory-based course includes a study of the methods of science as a process of inquiry by including the concepts of cellular structure and function, molecular genetics, heredity, taxonomy, and evolution.

Links to Student Expectations:

- All students will develop skills to utilize technology to gather, to evaluate, to assimilate, and to present information.
- All students will utilize critical thinking skills to identify and to provide resources to solve a problem.
- All students will be able to make decisions and solve problems using logical processes (e.g., scientific method, induction, deduction, syllogism, etc.)
- All students will develop skills to promote a sense of confidence in tackling the rigors of standardized tests such as the required MCAS and optional AP, SAT.

Interdisciplinary Connections:

Biology is a science that utilizes a variety of skills that have direct relationships to other sciences and to mathematics. Furthermore, clear expression of ideas is essential as well as an understanding of the connection of biology to social and political activities.

I. Essential Questions for Course

- Is there a universal method of investigating what happens and what exists in nature?
- How does carbon function as the foundation for the chemistry of living things.
- How does the cell act as a basic structural and functional unit of all living things?
- Is there a cellular mechanism to ensure the continuity of life.
- How is it possible for organisms to change over time?
- How can organisms be categorized?

II. Student Objectives

- Scientific Method & The Nature of Biology
 - To understand the Scientific Method process for performing investigations.
 - To understand the scientific basis of biology.
 - Tools of Science
 - To use a microscope to examine cell parts and make accurate measurements.
 - To explain the functions of the tools of biology.
- Chemistry of Life
 - To explain how atoms bond together to form organic molecules.
 - To describe the composition and functions of the four major categories of organic molecules.
 - To explain the role of enzymes in biochemical reactions.
- Structure and Function of Cells
 - To describe, label and differentiate between organelles of prokaryotic and eukaryotic cells.
 - To distinguish the difference between plant and animal cells.
 - To describe the reactants, products, and general reactions of photosynthesis and cell respiration.
 - To compare the processes of mitosis and meiosis.
 - To explain the processes of cell transport.
- Genetics
 - To describe and discuss the structure of DNA as it relates to the process of protein synthesis.
 - To explain the work of Mendel and its relationship to inheritance.
 - To solve genetics crosses.
- Evolution and Biodiversity
 - To explain how the fossil record, comparative anatomy and other evidence support the theory of evolution.
 - To illustrate how genetic variation is preserved or eliminated from a population through Darwinian Natural Selection resulting in biodiversity.
 - To describe current theories of human origin.
 - To describe how the taxonomic system classifies living things.

III. Suggestions for Instruction

- Lectures
- Discussions
- Textbook reading (Biology -- Prentice/Hall)
- Worksheets
- Individual or small group laboratory experiments
- Videos

- Internet sites

IV. Suggestion for Assessment

- Written assessments with a variety of question types
- Laboratory experiments
- Classroom presentations
- Reports

V. Curriculum

- Scientific Method
- Tools of Science
- Chemistry of Life
- Structure and Function of Cells
- Genetics
- Evolution and Biodiversity

VI. Lesson Extensions

- Independent, year-long research project
- Biotechnology presentations
- Statistical analysis of data
- Mathematical approach to heredity