

Honors Biology Curriculum Overview

Description:

This honors Biology course is designed for students who display an advanced knowledge of science. All levels of life are studied including cells, tissues, organs, species and populations. The course topics are directly correlated to the "Massachusetts Curriculum Framework in Science." As such, the students will be prepared to take the Biology MCAS exam. In addition, the curriculum prepares students for most SAT II Biology topics. Laboratory work is used to enhance the learning objectives. There are significantly higher academic expectations of students in honors level courses. Students are required to complete daily homework assignments and are expected to be more independent and highly motivated.

Learning Experiences:

- Students make observations, raise questions, and formulate hypotheses.
- Students conduct scientific investigations: observing cells with microscopes, chromatography, cellular respiration, gel electrophoresis, etc.
- Students analyze and interpret results of scientific investigations: collect data with Vernier probeware and graph using Microsoft Excel.
- Students communicate and apply the results of scientific investigations: completion of formal lab reports.
- Students independently read and comprehend science text: note taking and summarizing.
- Students follow a complex multi-step procedure carrying out a scientific investigation.
- Students write informative content specific essays using appropriate vocabulary: Osmosis, Meiosis/Mitosis, Hardy Weinberg Principle, Food Webs.

Content Outline:

Term 1

Biological Principles: The Science of Life, Scientific Process, Chemistry and Biochemistry

Cells: Cell Transport and Homeostasis, Photosynthesis

Term 2

Cells (cont.): Cellular Respiration, Cell Reproduction

Genetics: Fundamentals of Genetics, Nucleic Acids, Replication, Transcription, Protein Synthesis

Term 3

Genetics (cont.): Gene Expression, Inheritance Patterns and Human Genetics, DNA Technology

Evolution: The Origin of Life, Evidence and Theory, The Evolution of Populations and Speciation

Term 4

Evolution (cont.): Classification

Human Anatomy: Skeletal System, Muscular System, Integumentary System, Circulatory System, Respiratory System, Digestive System, Excretory System, Nervous System, Endocrine System

Ecology: Ecological Principles, Population and Community Ecology, Ecosystems and the Biosphere

Resources Used:

- Towle, Modern Biology. Holt, Rinehart and Winston, 1999.
- Laboratory Techniques and Experimental Design, Holt, Rinehart, and Winston, 1999
- Vernier Data Collection Laboratory Systems and Probeware
- Kaskel, Huumer, Kennedy, and Oram, Laboratory Biology, Investigating Living Systems, Merrill
- Massachusetts Department of Education, Massachusetts Science and Technology/Engineering Curriculum Frameworks, October 2006

