

Anatomy & Physiology (Honors)

The topics covered in this class are designed to provide a solid background in anatomy and physiology for those anticipating study in the medical health fields or those seeking an upper level health science.

- Identify the 206 bones of the skeleton and their features for muscle attachment and joint structure
- Describe the electrical, chemical and physical events that happen with a muscle contraction
- Identify the tissues of the human body by microscopy and their relation to system function
- Identify etiological factors that contribute to cardiovascular diseases
- Understand the link between neurochemistry and behaviors such as addictions
- Describe the chemical and electrical events that affect neural transmission and distinguish between excitatory and inhibitory potentials
- Distinguish between Type I and Type II diabetes and identify contributory factors
- Identify the origin and insertion of major muscles and describe their actions
- Outline the major enzymatic pathways involved in the digestion of proteins, carbohydrates and lipids
- Measure and explain various parameters of human physiology such as blood pressure, lung volumes, and oxygen saturation

WESTFORD PUBLIC SCHOOLS



CURRICULUM BENCHMARKS

GRADES 9-12 **LIFE SCIENCE**

Westford Academy

Compiled by the
Science Technology and Engineering
Curriculum Task Committee
under the direction of
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“Shaping the future one child at a time”
<http://westford.mec.edu/schools>

Biology

In this course, the basic principles of biology will be discussed with a focus on interactions in the living world.

- Investigate matter and energy as it relates to living things
- Develop an understanding of energy in the ecosystem with a focus on biomass
- Investigate cells, cell structure, and organelles
- Learn to use a compound microscope and a dissecting microscope
- Understand the basic principles of heredity and the inheritance of traits
- Discuss Darwin and the evolutionary process
- Discuss current biological issues
- Gain a better understanding of the science through practical application

CP Biology

In this course, the basic principles of biology will be discussed with a focus on interactions in the living world. Methods of inquiry, design processes, and actual participation in scientific investigation, and data analysis will be incorporated throughout the course content.

- Demonstrate the understanding of structure and function of the four major organic molecular groups from simple hydrocarbons through polymerization
- Compare and contrast cell types, function, and characteristics relating the mechanisms of homeostasis, cellular reproduction, and specialized cell activities
- Demonstrate the understanding of cellular energy processing including photosynthesis and cellular respiration and the connections between them at the organismal level
- Investigate the structure and function of DNA/RNA and the mechanisms through which cells replicate DNA for reproduction and use it as a template for protein synthesis
- Investigate the principles of inheritance; gain an understanding of the transmission of traits through generations, and the effects of mutations
- Recognize the variety of evidence supporting the evolutionary theory, gaining an understanding of genetic variation and natural selection leading to Darwin's theory of evolution
- Collect and interpret demographic data and understand how it can be used to evaluate population changes
- Develop an understanding of how biotic and abiotic factors facilitate the recycling of nutrients in nature and the flow of energy through the ecosystem

Advanced Placement Biology

This course is a second year biology course that seeks to meet the objectives of a first year college level biology course while preparing students for the Advanced Placement (AP) Biology Exam. Juniors and seniors will gain an in-depth study of a variety of biological topics.

- Develop an organic and biochemical background of the cell, tissues, and the structure and function of organisms
- Understand the processing of biochemical energy from fusion through photosynthesis and cellular respiration
- Investigate the principles of inheritance from detailed biochemical aspects through heredity patterns, gene regulation, mutations, and nucleic acid technology
- Discuss topics in evolutionary biology including biogenesis, evidence of evolution, mechanisms, and evolutionary relationships between organisms
- Investigate taxonomic classification of organisms, and the characteristics, diversity, structure, function, reproduction, and development of both plants and animals
- Investigate ecology as it relates to communities and ecosystems, population dynamics, animal behavior, global biological and ecological issues
- Complete of AP biology required labs incorporating biotechnology in the forms of electrophoresis, chromatography, gene splicing, spectrophotometry, fruit fly genetics, and bacterial culturing