

West Linn–Wilsonville School District

Science Department – Course Statement

<u>Course Title: Advanced Placement (AP) Biology</u> Length of Course: Year Number of Credits: 2 Grade Level: 11, 12 Prerequisites: Biology, Chemistry, and consent of instructor based on application CIM Work Samples Offered in Course: Determined by student needs Date of Description/Revision: 2002	
Course Overview	
This course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. The course is designed to meet the specifications of the National College Board and to help students to successfully complete the Advanced Placement Biology Exam.	
Essential Questions	Concepts providing focus for student learning
• How does science ask and answer questions? • How is structure related to emergent function? • What are the mechanisms of change and stability in living systems and how are they related to molecular and historical study? • How are unity and diversity integrated within and among living systems? • In what way are living things interconnected with their environment?	
Proficiency Statements	
Upon completion of course, students will be able to: • Describe the role of carbon in the molecular diversity of life. • Explain how the structures of biologically important molecules account for their functions. • Describe how cells synthesize and break down macromolecules. • Show how enzymes regulate the rate of chemical reactions and how that activity is regulated. • Analyze the similarities, differences and evolutionary relationships between prokaryotic and eukaryotic cells. • Discuss the current model of molecular architecture and functional variations in cell membranes. • Explain the mechanisms by which substances are recognized and transported across the cell membrane. • Show how the structures of various sub-cellular organelles are related to their functions and how, when combined together, new functions arise.	

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- Discuss the role of chemiosmosis and ATP in bioenergetics.
- Show the relationships between energy, biomolecules and sub-cellular structures that are involved in cellular respiration, and photosynthesis.
- Explain how mitosis, meiosis, DNA, replication and synthesis of proteins each play a role in the continuity of life.
- Analyze the structure and function of DNA, its role in information storage and protein synthesis, gene regulation, and mutation.
- Discuss biotechnology and its implications for society.
- Explain the evolution and origins of life, from protobiont to modern organisms.
- Describe the key components of natural selection and explain its role in evolution.
- Explain how and why mechanisms of adaptation result in biodiversity.
- Analyze how structure is related to function in cells, tissues, organs and organ systems of plants and animals.
- Analyze the various roles of living things in the cycling of matter and the flow of energy in natural systems.

General Course Topics/Units & Timeframes

Semester 1

- A. Ecology
- B. Biochemistry
- C. Cell Structure
- D. Cellular Energetics
- E. Heredity
- F. Molecular Genetics
- G. Evolutionary Biology

Semester 2

- A. Diversity of Organisms
- B. Structure and Function of Plants
- C. Structure and Function of Animals

Resources

- Text: *Biology: The Unity and Diversity of Life, 9th Ed.*, Brooks/Cole, 2001