

Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Advanced Placement Biology

Course Number: 00316

Course Prerequisites: Successful completion of Biology-CP, Advanced Biology, Academic Chemistry or permission of the principal.

Course Description: (Include “no final exam” or “final exam required”)

Advanced Placement Biology is offered to students who have completed Biology-College Prep., Advanced Biology, and Chemistry-College Prep. The College Board’s Advanced Placement (AP) program provides able and motivated students with an opportunity to pursue college level biological studies with still in secondary school. This course is a college level laboratory program that enables students to receive college credit by passing a test with appropriate scores in May of the school year. Prerequisite: Successful completion of Biology-CP, Advanced Biology, Academic Chemistry or permission of the principal

Suggested Grade Level: 11-12

Length of Course: One Semester X Two Semesters Other
(Describe)

Units of Credit: 1 (Insert *NONE* if appropriate.)

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certification(s)
(Insert certificate title and CSPG#) Biology

Certification verified by WCSD Human Resources Department:
 X Yes No

Board Approved Textbooks, Software, Materials:

Title:

Publisher:

ISBN #:

Copyright Date:

Date of WCSD Board Approval:

BOARD APPROVAL:

Date Written: September 2009

Date Approved: _____

Implementation Year: _____

Suggested Supplemental Materials: (List or insert **None**)

Course Standards

PA Academic Standards: (List by Number and Description)

3.1 Unifying Themes

- 12A. Evaluate the nature of scientific and technological knowledge.
- 12B. Apply concepts of models as a method to predict and understand science and technology.
- 12C. Assess and apply patterns in science and technology.
- 12D. Analyze scale as a way of relating concepts and ideas to one another by some measure.
- 12E. Evaluate change in nature, physical systems and man made systems.

3.2 Inquiry and Design

- 12A. Evaluate the nature of scientific and technological knowledge.
- 12B. Evaluate experimental information for appropriateness and adherence to relevant science process.

3.3 Biological Sciences

- 12A. Explain the relationship between structure and function at all levels of organization.
- 12B. Analyze the chemical and structural basis of living organisms.
- 12C. Explain gene inheritance and expression at the molecular level.
- 12D. Analyze the theory of evolution.

3.7 Technological Devices

- 12A. Apply advanced tools, materials and techniques to answer complex questions.
- 12 B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.

3.8 Science Technology and Human Endeavors

- 12 A. Synthesize and evaluate the interactions and constraints of science and technology on society.
- 12B. Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- 12C. Evaluate the consequences and impacts of scientific and technological solutions.

WCSD Academic Standards: (List or **None**)

None

Industry or Other Standards: (List, Identify Source or **None**)

None

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction.

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

ASSESSMENTS

PSSA Assessment Anchors Addressed: This course is written to the 12th grade standards. No assessment anchors have been written for this level.

Suggested Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

- Pre-Assessments of prior knowledge (e.g. entrance cards or KWL chart)
- Labs/lab reports
- Bell ringers/Problems of the Day(PODs)
- Discussions
- Teacher observation/Questioning
- Graphic organizers (e.g. Venn diagrams, word mapping, webbing, KWL chart, etc.)
- Summarizing
- Retelling
- Notetaking
- Problem-based learning modules
- Authentic assessment
- Oral presentations
- Outlining
- Journaling
- Student presentations/projects
- Open-ended response
- Quizzes/tests
- Activities
- Classroom Performance System (CPS)
- White boards

Suggested Summative Assessments:

- Essays
- Open-Ended Responses

- Projects
- Quizzes/tests
- Student presentations
- Portfolios
- Lab Practical
- Lab Report

District Approved Assessment Instruments

- PSSA Tests-Grades 4, 8 and 11 only

Differentiated Instructional Assessment Strategies

Portfolio Assessment: _____ Yes X No

District-wide Final Examination Required: _____ Yes X No

Course Challenge Assessment (Describe):

REQUIRED COURSE SEQUENCE AND TIMELINE

(Content must be tied to objectives)

Teachers have individual course syllabi as required and approved by the College Board.

Content Sequence	Dates
I. Molecules and Cells	4 weeks
A. Basic Biological Chemistry	
1. Atoms, molecules, bonding, pH, water	
2. Carbon, functional groups	
3. Carbohydrates, lipids	
4. Chemical reactions, free-energy changes, equilibrium	
5. Enzymes, rates of activity, regulation	
B. Cells	4 weeks
1. Prokaryotic and eukaryotic cells	
2. Plant and animal cells	
3. Transport and the cell membrane	
4. Cellular organelles and the cytoskeleton	
5. Cell cycle—mitosis and meiosis	
C. Energy Transformations	4 weeks
1. ATP, energy transfer, chemiosmosis	
2. Photosynthesis	
3. Cellular respiration	
II. Genetics and Evolution	4 weeks
A. Molecular Genetics	
1. DNA: Structure and replication	
2. RNA: Transcription and translation	
3. Regulations of gene expression	

- 4. Mutations
- 5. Recombinant DNA, gel electrophoresis
- 6. Viruses
- B. Heredity **4 weeks**
 - 1. Mendel's laws and probability
 - 2. Inheritance patterns
 - 3. Human genetic defects
- C. Evolution **4 weeks**
 - 1. Evidence for evolution
 - 2. Natural selection
 - 3. Hardy-Weinberg principle
 - 4. Population changes
 - 5. Patterns of evolution
- III. *Organism and Biodiversity (Content is required for the AP exam, but is taught in Advanced Biology.)*
 - A. *Principals of taxonomy and systematics*
 - B. *Survey of bacteria, protists and fungi*
 - C. *Plants*
 - 1. *Diversity and classification*
 - 2. *Alternation of generations life cycle*
 - 3. *Structure and physiology of vascular plants*
 - 4. *Seed formation, germination, and growth in seed plants*
 - 5. *Hormonal regulation of plant growth*
 - 6. *Plant responses*
 - D. *Animals*
 - 1. *Diversity and classification*
 - 2. *Survey of invertebrate phyla*
 - 3. *Survey of vertebrate phyla*
- IV. Animal Systems **10 weeks**
 - A. Nutrition and digestion
 - B. Gas Exchange
 - C. Circulation
 - D. Immune response
 - E. Internal control system
 - F. Reproduction and development
 - G. Nervous system
 - H. Movement
- V. *Ecology (Content is required for the AP exam, but is taught in Advanced Biology.)*
 - A. *Populations*
 - B. *Communities*
 - C. *Ecosystems*
 - D. *Biogeochemical cycles*
 - E. *Animal behavior*
- VI. Review for AP Exam **2 weeks**

Special Requirements: Most college biology courses have a laboratory component taken by both majors and nonmajors. In order to reflect this, students in AP Biology will be required to perform the following labs and maintain a laboratory notebook:

- 1. Diffusion and Osmosis
- 2. Enzyme Catalyst

3. Mitosis and Meiosis
4. Plant Pigments
5. Cell Respiration
6. Molecular Biology—Restriction Analysis and Bacterial Transformation
7. Genetics of Organisms
8. Population Genetics and Evolution

9. Physiology of the Circulatory System
 10. Transpiration*
 11. Animal Behavior*
 12. Dissolved Oxygen and Aquatic Primary Productivity*
- * These required labs are completed in Advanced Biology

Objectives:

1. Describe how atoms combine together to form molecules.
2. Explain how the properties of water make life on earth possible.
3. Explain how the laws of thermodynamics relate to the biochemical processes that provide energy to living systems.
4. Describe the role of carbon in the molecular diversity of life.
5. Explain how enzymes regulate the rate of chemical reactions.
6. Identify chemical properties of macromolecules.
7. Describe several properties of prokaryotic and eukaryotic cells.
8. Explain how the cell membrane helps maintain homeostasis.
9. Explain how cells divide.
10. Analyze how cells obtain and use energy.
11. Explain the light and dark reactions of photosynthesis and describe how some plants have adapted these processes to varying climates.
12. Explain how proteins are made from DNA.
13. Analyze how DNA technology has influences the quality of human life.
14. Describe the life cycle of viruses.
15. Explain how genes are inherited and how defects can occur.
16. Explain how populations change over time.
17. Describe characteristics of the major groups of living things.
18. Describe the patterns of reproduction, growth, and development
19. Explain how the major animal systems function.

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WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? ☒ Yes ☐ No
2. Does this course issue a mark/grade for the report card?
☒ Yes ☐ No
3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No
4. Is the course mark/grade part of the GPA calculation?
☒ Yes ☐ No
5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No
6. What is the academic weight of the course?
☐ No weight/Non credit ☐ Standard weight
☒ Enhanced weight (Describe) As per current school board policy