

Applied Biology

Course Syllabus



Supervising Teacher

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Course Description:

This course is only open to students by faculty approval. This course meets the graduation requirement for a laboratory science course. Students will investigate many aspects of living organisms from the cell and genetics, to individual species and populations.

Required Textbook:

*PCI Life Science Student Textbook
PCI Life Science Teacher Binder*

Recommended Supplemental Materials or Software:

*PCI Life Science Student Activity Journal
Software downloaded that will allow you to view .swf and .wmv files (I recommend irfanview.)*

Supplies or Equipment:

Small amounts of supplies that are easily obtained will be needed to complete labs. Refer to the teacher binder and the moodle course for specific lists.

Course Evaluation:

A. Semester Examination: 12% of semester grade

A comprehensive semester examination will be given during exam week each semester. Semester examinations will be given by a supervising instructor at a previously agreed upon location, most often a resource center.

B. Home Participation and Portfolio: 60% of grade

Home participation is to be determined by the home teacher. The participation may include, but is not limited to, textbook activities, quizzes, unit tests, projects, oral reports, or research papers. Grades for home participation will be submitted to the contact teacher who will then forward a copy to the supervising instructor for semester grade tabulation. A portfolio of student work which may include copies of some of the laboratories will be presented to the contact teacher once per semester.

C. Laboratory Expectations: 28% of grade

Students are expected to complete four (4) labs per semester as indicated in the moodle course page. All laboratories must be completed only by the student and a full experiment write-up/report must be submitted to the supervising instructor on anchor due dates.

End of Course Assessment:

Since this course is required for high school graduation in the state of Idaho, an assessment piece is required. *A comprehensive examination will be given each semester in addition to required laboratories and the student portfolio.*

Pacing Guide

The topics and standards for this course have been divided between the two semesters.

Semester 1(Fall)	Semester 2 (Spring)
Chapter 1: What is an Organism?	Chapter 6: Bacteria and Viruses
Chapter 2: The Cell	Chapter 7: Protists and Fungi
Chapter 3: Classification	Chapter 8: Plants
Chapter 4: Heredity and Reproduction	Chapter 9: Animals
Chapter 5: Evolution	Chapter 10: The Human Body

Additional Information from the Instructor:

Upon successful completion of biology, the student will be able to:

- *Explain that all organisms are composed of cells whose functions sustain life.*
- *Analyze organisms' responses to external and internal stimuli.*
- *Explain a body's need to maintain homeostasis.*
- *Understand that organisms adapt to their environment.*
- *Describe organisms adapt to their environment.*
- *Describe and compare the characteristics of organisms such as bacteria, viruses, protists, fungi, plants, and animals.*
- *Identify the parts of an animal cell and the parts of a plant cell.*
- *Explain which chemicals are used to carry out various cell activities.*
- *Describe the processes of exocytosis and endocytosis.*
- *Explain the different ways that organisms get and make energy, including photosynthesis.*
- *Understand the difference between eukaryotes and prokaryotes.*
- *Explain how different types of cells divide in different ways, including binary fission, mitosis and meiosis.*
- *Understand that each organism is classified into seven levels of taxonomy.*
- *List the six different kingdoms into which organisms are divided.*
- *Explain that inherited traits are contained in genetic material.*
- *Analyze changes in traits that can occur over several generations.*
- *Explain how dominant and recessive genes influence inherited traits.*
- *Analyze genotypes of parents and make predictions about possible traits passed onto offspring.*
- *Compare reproduce processes and identify organisms that reproduce sexually and asexually.*
- *List the causes of mutation.*
- *Describe the theory of natural selection.*
- *Explain the methods of dating fossils.*
- *Understand that bacteria can be both harmful and helpful.*
- *Identify and describe different types of organisms, including bacteria, viruses, protists, fungi, lichen, plants, and animals.*
- *Compare nonvascular and vascular plants, as well as gymnosperms and angiosperms.*
- *Understand the plant life cycle.*
- *List the parts of a plant and describe their functions.*
- *Describe animals as carnivores, herbivores, and omnivores.*
- *Compare different types of invertebrates and vertebrates.*
- *Explain the difference between radial and bilateral symmetry.*
- *Define "metamorphosis," "molting," migration," and "hibernation."*
- *Describe the difference between cold-blooded and warm-blooded animals.*
- *Explain the difference between innate and learned behaviors.*
- *Define "tissue," "organ," and "organ system."*
- *Describe the various organ systems of a human.*

I-DEA Student Honor Code:

With any form of valid proof of dishonesty with regard to student work or testing, the instructor may elect from a range of actions. Academic dishonesty could lead to a zero grade for the assignment or even failure for the entire course following consultation between the instructor, Secondary Supervisor, and Director.

All students must adhere to the **Honor Code**:

“On my honor, I will maintain the highest possible standards of honesty, integrity and personal responsibility. This means I will not lie, cheat or steal, and as a member of this academic community, I am committed to creating an environment of respect and mutual trust.”

IDAHO CONTENT STANDARDS: BIOLOGY

Standard 1: Nature of Science

Goals:	Objectives						
Goal 1.1: Understand Systems, Order, and Organization	B.1.1.1 Explain the scientific meaning of system, order, and organization.			B.1.1.2 Apply the concepts of order and organization to a given system.			
Goal 1.2: Understand Concepts and Processes of Evidence, Models, and Explanations	B.1.2.1 Use observations and data as evidence on which to base scientific explanations.		B.1.2.2 Develop models to explain concepts or systems.		B.1.2.3 Develop scientific explanations based on knowledge, logic and analysis.		
Goal 1.3: Understand Constancy, Change, and Measurement	B.1.3.1 Measure changes that can occur in and among systems.		B.1.3.2 Analyze changes that can occur in and among systems.		B.1.3.3 Measure and calculate using the metric system.		
Goal 1.4: Understand the Theory that Evolution is a Process that Relates to the Gradual Changes in the Universe and of Equilibrium as a Physical State	B.3.1.1 Describe how natural selection explains species change over time.						
Goal 1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills	B.1.6.1 Identify questions and concepts that guide scientific investigations.	B.1.6.2 Utilize the components of scientific problem solving to design, conduct, and communicate results of investigations.	B.1.6.3 Use appropriate technology and mathematics to make investigations.	B.1.6.4 Formulate scientific explanations and models using logic and evidence.	B.1.6.5 Analyze alternative explanations and models.	B.1.6.6 Communicate and defend a scientific argument.	B.1.6.7 Explain the differences among observations, hypotheses, and theories.
Goal 1.8: Understand Technical Communication	B.1.8.1 Analyze technical writing, graphs, charts, and diagrams.						

Standard 2: Physical Science

Goals:	Objectives		
Goal 2.3: Understand the Total Energy in the Universe is Constant	B.2.3.1 Explain that energy can be transformed but cannot be created nor destroyed.		B.2.3.2 Classify energy as potential and/or kinetic and as energy contained in a field.
Goal 2.4: Understand the Structure of Atoms	B.2.4.1 Describe the properties, function, and location of protons, neutrons, and electrons.		B.2.4.2 Describe the characteristics of isotopes.
Goal 2.5: Understand Chemical Reactions	B.2.5.1 Explain how chemical reactions may release or consume energy while the quantity of matter remains constant.		

Standard 3: Biology

Goals:	Objectives				
Goal 3.1: Understand the Theory of Biological Evolution	B.3.1.1 Use the theory of evolution to explain how species change over time.		B.3.1.2 Explain how evolution is the consequence of interactions among the potential of a species to increase its numbers, genetic variability, a finite supply of resources, and the selection by the environment of those offspring better able to survive and reproduce.		
Goal 3.2: Understand the Relationship between Matter and Energy in Living Systems	B.3.2.1 Explain how matter tends toward more disorganized states (entropy).	B.3.2.2 Explain how organisms use the continuous input of energy and matter to maintain their chemical and physical organization.	B.3.2.3 Show how the energy for life is primarily derived from the Sun through photosynthesis.	B.3.2.4 Describe cellular respiration and the synthesis of macromolecules.	B.3.2.5 Show how matter cycles and energy flows through the different levels of organization of living systems (cells, organs, organisms, communities and their environment).
Goal 3.3: Understand the Cell is the Basis of Form and Function for All Living Things	B.3.3.1 Identify the particular structures that underlie the cellular functions.	B.3.3.2 Explain cell functions involving chemical reactions.	B.3.3.3 Explain how cells use DNA to store and use information for cell functions.	B.3.3.4 Explain how selective expression of genes can produce specialized cells from a single cell.	

Standard 4: Earth and Space Systems

Goals:	Objectives
Goal 4.1: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems	B.4.1.1 Show how interactions among solid earth, oceans, atmosphere, and organisms have changed the earth system over time.
Goal 4.2: Understand the Geo-chemical Cycles and Energy in the Earth System	B.4.2.1 Explain the internal and external energy sources of the earth.

Standard 5: Personal and Social Perspectives; Technology

Goals:	Objectives		
Goal 5.1: Understand Common Environmental Quality Issues, Both Natural and Human Induced	B.5.1.1 Analyze environmental issues such as water and air quality, hazardous waste, forest health, and agricultural production.		
Goal 5.2: Understand the Relationship between Science and Technology	B.5.2.1 Explain how science advances technology.	B.5.2.2 Explain how technology advances science.	B.5.2.3 Explain how science and technology are pursued for different purposes.
Goal 5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them	B.5.3.1 Describe the difference between renewable and nonrenewable resources.		