

Biology II Performance Standards

Two-Semester Course

Prerequisite: "C" average or better in Biology or consent of instructor

Advanced Biology is a course designed for upperclassmen that want to learn more about the science of life. It will encompass more detailed work, utilizing concepts developed in the introductory Biology course such as cell and molecular biology, physiology and anatomy, genetics, evolution, embryology behavior and ecology. Experimental and research applications of biotechnology will also be pursued. Individual study projects will be required.

A-1 Science as Inquiry and Process

SA Students develop an understanding of the processes and applications of scientific inquiry.

SA 1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

SA 2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

SA 3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local application provide opportunity for understanding scientific concepts and global issues.

The student demonstrates an understanding of the processes of science by:

[11] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, analyzing data, developing models, inferring, and communicating.

[11] SA 1.2 recognizing and analyzing multiple explanations and models, using this information to revise students own explanation or model if necessary

The student demonstrates and understanding of the attitudes and approaches to scientific inquiry by

[11] SA2.1 evaluating the credibility of cited sources when conducting the student's own scientific investigation

B1- Concepts of Physical Science

SB Students develop an understanding of the concepts, models, theories, universal principles, and facts that explain the physical world.

SB2 Students develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved.

The student demonstrates an understanding of the structure and properties of matter by

[11] SB1.1 using the periodic table to describe atoms in terms of their base components (i.e., protons, neutrons, electrons)

The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by

[11] SB2.1 demonstrating energy transfers and transformations by comparing useful energy to total energy (entropy)

The student demonstrates an understanding of the interactions between matter and energy and the effects off these interactions on systems by

[11] SB3.1 predicting how an atom can interact with other atoms based on its electron configuration verifying the results

C1- Concepts of Life Science

SC Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC1 Students develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural science, and biological evolution.

SC2 Student develop and understanding of the structure, function, behavior, development, life cycle, and diversity of living organisms.

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by

[11] SC1.1 relating the structure of DNA to characteristics of an organism

[11] SC1.2 researching how the processes of natural selection cause changes in species over time

The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by

[11] SC2.1 describing the structure-function relationship

E1- Science and Technology

SE Students develop an understanding the relationships among science, technology, and society.

SE1 Students develop and understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, responses to problems and everyday events.

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that leads to exploration of multiple paths that are analyzed using scientific, technological, and social merits.

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

The student demonstrates an understanding that solving problems involves different ways of thinking by

[11] SE2.1 questioning, researching, modeling, simulating, and testing multiple solutions to a problem

G1-History and Nature of Science

SG Students develop an understanding of the history and nature of science

SG 1 Students develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge.

SG2 Students develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world.

SG3 Students develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s).

SG4 Students develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

The student demonstrates an understanding of the bases of the advancement of scientific knowledge by

[11] SG2.1 describing the importance of logical arguments

The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by

[11] SG3.1 investigating instances when scientists' observations were not in accord with prevailing ideas of the time