

Fayette R-III

FHS- Curriculum Guide for Biology

Fayette R-III Mission: To educate all students to be ethical, successful citizens.

The Biology Learning Goals are based on the Missouri Learning Standards. The Missouri Learning Standards define the knowledge and skills students need to succeed in college, other postsecondary training and careers. This document is designed to make clear what each child should know and be able to do at the end of the course in Biology.

Course Description: Biology is devoted to the study of living things and their processes. Throughout the year this course provides an opportunity for students to develop scientific process skills, laboratory techniques, and an understanding of the fundamental principles of living organisms. Students will explore biological science as a process, cell structure and function, genetic heredity, evolution and classification, and the diversity of living organisms and their ecological roles. Units of this course include:

1. The Nature of Science and Biological Principles - themes, processes, chemistry, and biochemistry.
2. Cell Structure, Energy, and Division - structures and functions, transport systems, photosynthesis and cellular respiration, nucleic acids, and protein synthesis, chromosomes, mitosis and meiosis.
3. Structure and Function of DNA and Genetics - fundamentals, inheritance patterns, human genetics, gene expression and applied genetics.
4. Natural Selection and Evolution- principles of natural selection
5. Ecology - biosphere and biomes, ecosystem structure and relationships, populations, and future concerns.
6. Biotechnology, Scientific Research, and Ethics in Science- advancement and careers in science

Course Rationale: The Science Department of the Fayette School District believes that science is a diverse subject that encompasses many fields of investigation and interests. The primary goals of Fayette science courses are to equip students with an understanding of scientific concepts and principles, to develop students' critical thinking and problem solving skills in a variety of contexts, and to foster students' clear communication of their knowledge with others. We recognize that it is important to teach students methods of using current technology and outside resources to research information and help them make informed decisions for the purpose of better participation in the world around them. To accomplish these goals, students will participate in a variety of instructional activities and will develop information gathering, reading, writing, comprehension, and problem-solving skills both as individuals and as group members.

Biology Student Learning Goals	Standard Alignment
1- Formulate a testable question and explanation, and select appropriate investigative methods (procedures, variables, etc.) needed to obtain data.	7.1.A.a, 7.1.A.b, 7.1.A.c, 7.1.A.g SC7, 1.1, 1.2, 1.3, 1.4
2- Interpret data and use it to evaluate scientific explanations and principles.	7.1.C.a, 7.1.C.b, 7.1.C.c SC7, 1.8

3- Effectively communicate results of an experiment through data, graphs, writing and research.	7.1.D.a SC7, 1.8, 4.1, 2.1, 2.2
4- Understand the fundamental units of life (cells), their necessary structures (organelles), and functions essential for survival of all living organisms (photosynthesis/cellular respiration).	3.1.C.b, 3.2.A.c, 3.2.B.b, 3.2.B.a SC3, 1.5, 1.6
5- Explain the structures used for maintaining homeostasis in all living things.	3.2.F.c, 3.2.F.a, 3.2.F.b SC3, 1.5, 1.2, 1.6
6- Understand the structure (nucleotides, nucleic acids, double helix) and function (proteins synthesis) of genetic material (DNA) in all living organisms.	3.3.B.a, 3.3.B.b, 3.3.B.e SC3, 1.5, 1.2, 1.6
7- Recognize the heredity of genetic material and explain the process of genetic inheritance through meiosis and sexual reproduction (or mitosis and asexual reproduction), which is essential for the continuation of every species.	3.3.C.a, 3.3.C.c, 3.3.C.b, 3.3.D.a SC3, 1.4, 1.5, 1.10
8- Study the probability of genetics presented by Mendel and explain the pattern of inheritance in genotypic/phenotypic ratios.	3.3.E.a, 3.3.E.b SC3, 3.4, 1.5, 1.6
9- Analyze the relationships that exist between all living organisms and their environment that are essential for the survival and stable balance of life on Earth.	4.1.A.a, 4.1.A.b SC4, 1.6, 1.5, 1.4
10- Predict the impact that natural or human caused changes in the environment (i.e. forest fires, floods, volcanic eruptions, pollution, introduction of exotic or native species) may have on the biodiversity of a community or ecosystem.	4.1.D.a SC4, SC8, 3.1, 3.4, 3.6, 3.7, 3.8, 1.5
11- Represent the flow of energy through individual organisms and trophic levels using food chains and energy pyramids.	4.2.A.c SC4, 1.6, 1.5, 1.4
12- Investigate the process of natural selection and identify adaptations in organisms that may have resulted from favored genetic variations.	4.3.C.c, 4.3.C.a SC3, SC4, 1.2, 1.4, 1.5, 1.6
13- Analyze the roles of science and society as they interact to determine the direction of scientific and technological progress.	8.3.B.a SC8, 3.4, 3.6, 4.3
14- Identify the ethical issues involved in experimentation.	8.3.C.a SC7, SC8, 1.7, 4.4
15- Evaluate a given source for its scientific credibility and explain why accurate record-keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.	8.3.D.a, 8.3.D.b SC7, SC8, 1.7

Resources:

Biology Textbook- Holt McDougal, Online Resources, iPads, Vernier LabQuest and appropriate sensors.

Assessments:

Teacher developed formative and summative assessments, Missouri Biology EOC