

Wyoming Department of Education Required Virtual Education Course Syllabus

Natrona County School District # 1

Program Name	Natrona Virtual Academy	Content Area	SC
Course ID	NCV03051.1	Grade Level	9,10,11,12
Course Name	Biology Sem 1	of Credits	.5
SCED Code	03051G0.5012	Curriculum Type	Odysseyware

COURSE DESCRIPTION

Biology Sem. 1 is intended to expose students to the designs and patterns of living organisms and their interactions with the environment. In preceding years, students should have developed a foundational understanding of life sciences. Expanding on that, this Biology course will incorporate more abstract knowledge. The student's understanding should encompass both the micro and macro aspects of life, and this biology course includes both. The major concepts covered are taxonomy, the chemical basis of life, cellular structure and function, genetics, microbiology, plant structure and function, animal structure and function, and ecology and the environment.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
SC11.1.a	Systems, classification, order, and organization
SC11.1.b	Evidence, models, and explanations
SC11.1.1	The Cell: Explain the processes of life, which necessitates an understanding of relationships between structure and function of the cell and cellular differentiation. Identify activities taking place in an organism related to metabolic activities in cells, including growth, regulation, transport, and homeostasis. Differentiate between asexual and sexual reproduction.
SC11.1.3	Biological Evolution: Explain how species evolve over time. Understand that evolution is the consequence of various interactions, including the genetic variability of offspring due to mutation and recombination of genes, and the ensuing selection by the environment of those offspring better able to survive and leave additional offspring. Discuss natural selection and that its evolutionary consequences provide a scientific explanation for the great diversity of organisms as evidenced by the fossil record. Examine how different species are related by descent from common ancestors. Explain how organisms are classified based on similarities that reflect their evolutionary relationships, with species being the most fundamental unit of classification.
SC11.1.4	Interdependence of Organisms: Investigate the interrelationships and interdependence of organisms, including the ecosystem concept, energy flow, competition for resources, and human effects on the environment.
SC11.1.5	Matter, Energy, and Organization in Living Systems: Describe the need of living systems for a continuous input of energy to maintain chemical and physical stability. Explain the unidirectional flow of energy and organic matter through a series of trophic levels in living systems. Investigate the distribution and abundance of organisms in ecosystems, which are limited by the availability of matter and energy and the ability of the living system to recycle materials.

SC11.1.10	Structure and Properties of Matter: Describe the atomic structure of matter, including subatomic particles, their properties, and interactions. Recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. Explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Describe physical states of matter and phase changes. Differentiate between chemical and physical properties, and chemical and physical changes.
SC11.1.11	Chemical Reactions: Recognize that chemical reactions take place all around us. Realize that chemical reactions may release or consume energy, occur at different rates. Identify the factors that affect reaction rates. and result in the formation of different substances.
SC11.1.13	Energy and Matter: Demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between mass and energy.
SC11.2.1	Students use research scientific information and present findings through appropriate means.
SC11.2.5	Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures.
SC11.2.2.1	Pose problems and identify questions and concepts to design and conduct an investigation.
SC11.2.2.2	Collect, organize, analyze and appropriately represent data.
SC11.3.2.1	Interdisciplinary connections of the sciences and connections to other subject areas and career opportunities.
SC11.3.2.3	The role of science in solving personal, local, national, and global problems.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1: Biology: The Study of Life	SC11.1.a, SC11.1.3, SC11.2.5, SC11.2.2.1, SC11.2.2.2, SC11.3.2.1, SC11.3.2.3	Students will explain that an organism exhibiting all of the characteristics of life is considered to be alive identify biology as the study of life understand that the scientific method is an inquiry process identify taxonomy as the organization of living things into logical groups, and the modern taxonomical groups distinguish between systematic plant and animal classification, identify, use,

		and construct dichotomous keys
Unit 2: Biochemistry	SC11.1.1, SC11.1.10, SC11.1.11,	<p>Students will distinguish among elements, atoms, compounds and molecules, identify subatomic particles, and write molecular formulas</p> <p>identify examples of ionic, covalent, polar covalent and hydrogen bonding</p> <p>identify unique properties of water</p> <p>distinguish among acids, bases, and salts</p> <p>distinguish between carbohydrates and lipids</p> <p>recognize amino acids as the building blocks or proteins and identify enzymes and nucleic acids as types of proteins</p>
Unit 3: Cells	SC11.1.1, SC11.2.5	<p>Students will identify cells as the basic building blocks of life and distinguish between cell theory and organismal theory</p> <p>identify the levels of cellular organization</p> <p>distinguish between interior and exterior cellular structures</p> <p>identify membrane material transportation methods</p> <p>identify mechanisms for maintaining homeostasis at the cellular and system levels</p> <p>distinguish between positive and negative feedback loops</p>
Unit 4: Cell Energy	SC11.1.1, SC11.1.4, SC11.1.5, SC11.1.13,	<p>Students will understand that all living things require and use energy</p> <p>identify oxidation as the primary mechanism of cellular metabolism</p> <p>identify the steps in the photosynthetic process</p> <p>distinguish between aerobic and anaerobic respiration</p> <p>distinguish between food chains and food webs</p>
Unit 5: Cell Division and Reproduction	SC11.1.1	<p>Students will identify the advantages and disadvantages of sexual and asexual reproduction</p> <p>recognize that higher animals and plants undergo both meiosis and mitosis</p> <p>compare budding to binary fission as a means of asexual reproduction</p> <p>list the stages and purposes of mitosis</p> <p>list the stages and purposes of meiosis</p> <p>identify differences in plant and animal</p>

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