

Wyoming Department of Education Required Virtual Education Course Syllabus

Natrona County School District # 1

Program Name	Natrona Virtual Academy	Content Area	SC
Course ID	03101G0.5022	Grade Level	9,10,11,12
Course Name	Chemistry Sem 2	of Credits	.5
SCED Code	03101G0.5022	Curriculum Type	Odysseyware

COURSE DESCRIPTION

Sem. 2 Chemistry continues to go more in-depth study of matter and its interactions. In preceding years students should have developed a understanding for the macroscopic properties of substances and been introduced to the microstructure of substances. This chemistry course will expand upon that knowledge, further develop the microstructure of substances and teach the symbolic and mathematical world of formulas, equations, and symbols.

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.c	Change, constancy, and measurement
SC11.1.d	Evolution and equilibrium
SC11.1.e	Form and function
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 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.
SC11.1.5	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.
SC11.1.9	Origin and Evolution of the Universe: Examine evidence for the Big Bang Theory and recognize the immense time scale involved in comparison to human-perceived time. Describe the process of star and planet formation, planetary and stellar evolution, including the fusion process, element formation, and dispersion.
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.
SC11.1.12	Conservation of Energy and Increase in Disorder: Demonstrate and understanding of the laws of conservation of mass and energy within the context of physical and chemical changes. Realize the tendency for systems to increase in disorder.
SC11.2.1	Students use research scientific information and present findings through appropriate means.
SC11.2.3	Students clearly and accurately communicate the result of their own work as well as information from other sources.

	Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures.
	Pose problems and identify questions and concepts to design and conduct an investigation.
	Collect, organize, analyze and appropriately represent data.
	Give priority to evidence in drawing conclusions and making connections to scientific concepts.
SC11.2.5	Clearly and accurately communicate the result of the investigation.
SC11.2.2 .1	Interdisciplinary connections of the sciences and connections to other subject areas and career opportunities.
SC11.2.2 .2	The role of science in solving personal, local, national, and global problems.
SC11.2.2 .3	
SC11.2.2 .4	
SC11.3.2 .1	
SC11.3.2 .2	

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
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Unit 8: Chemical Reactions, Rates and Equilibrium	SC11.1.a, SC11.1.b, SC11.1.c, SC11.1.d, SC11.1.e, SC11.1.3, SC11.1.5, SC11.1.11, SC11.2.1, SC11.2.3, SC11.2.5, SC11.2.2.1, SC11.2.2.2, SC11.2.2.3, SC11.2.2.4, SC11.3.2.1, SC11.3.2.2	<p>distinguish between exothermic and endothermic processes given appropriate information in the balanced equation</p> <p>determine if a reaction is exothermic or endothermic based on its enthalpy of reaction</p> <p>use the Gibbs free energy equation to determine if a reaction will be spontaneous</p> <p>determine mole fraction, molarity, molality, and percent solute of a solution</p> <p>determine from the value of an equilibrium constant, whether reactants or products are favored</p> <p>apply LeChatelier's Principle in cases where equilibrium is stressed by concentration, temperature, pressure or volume</p>
Unit 9: Equilibrium Systems	SC11.1.10, SC11.2.1, SC11.2.3, SC11.2.2.1, SC11.2.2.2, SC11.2.2.3, SC11.2.2.4	<p>solve problems concerning moles, gram formula weights, and balanced equations</p> <p>calculate the concentration of the solute in terms of molarity</p> <p>list factors that influence the solubility of a solute in a solvent</p> <p>understand that strong acids/bases fully dissociate while weak acids only partially dissociate</p> <p>perform calculations using the method of titration in determining the concentration of an unknown acid/base</p> <p>determine the oxidized and reduced species and oxidizing and reducing agents in reaction</p>
Unit 10: Carbon Chemistry: Hydrocarbons	SC11.2.2.1,	<p>relate the historical and modern meaning of "organic compound"</p> <p>describe the valence structure of carbon and how this influences its tendency to enter into covalent bonds</p> <p>determine if a bond is likely to be ionic or covalent based on electronegativity differences or valence electron structure</p> <p>explain that saturated hydrocarbons have all carbons</p>

		<p>bonded to 4 other atoms</p> <p>relate that alkanes are chemically fairly unreactive</p> <p>explain that unsaturated hydrocarbons are very reactive with the major reaction being an addition process which occurs at the site of the double or triple bond</p>
Unit 11: Carbon Chemistry: Functional Groups	<p>SC11.1.c, SC11.1.d, SC11.1.5, SC11.1.9, SC11.1.10, SC11.1.11, SC11.1.12, SC11.2.5, SC11.3.2.1, SC11.3.2.2</p>	<p>relate that substitution by halides is the most common reaction of saturated hydrocarbons other than combustion</p> <p>recognize the hydroxyl functional group and explain the basic process by which alcohols are manufactured</p> <p>state the functional groups contained in aldehydes, carboxylic acids, ketones, and esters</p> <p>State that the functional group of amides and explain that amides provide the structural link in proteins</p> <p>Explain that proteins are made by the polymerization of amino acids</p>