

Wyoming Department of Education Required Virtual Education Course Syllabus

Natrona County School District # 1

Program Name	Natrona Virtual Academy	Content Area	SC
Course ID	NCV03101.1	Grade Level	9,10,11,12
Course Name	Chemistry Sem 1	of Credits	.5
SCE Code	03101G0.5012	Curriculum Type	Odysseyware

COURSE DESCRIPTION

Chemistry is intended to provide a more in-depth study of matter and its interactions. In preceding years students should have developed an 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.b	Evidence, models, and explanations
SC11.1.c	Change, constancy, and measurement
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.
SC11.1.8	Origin and Evolution of the Earth System: Investigate geologic time through comparing rock sequences, the fossil record, and decay rates of radioactive isotopes.
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.
SC11.1.12	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.
SC11.1.13	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.
SC11.2.3	Students clearly and accurately communicate the result of their own work as well as information from other sources.
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	<p>Collect, organize, analyze and appropriately represent data.</p> <p>Give priority to evidence in drawing conclusions and making connections to scientific concepts.</p> <p>Clearly and accurately communicate the result of the investigation.</p> <p>The historical misuse of scientific information to make personal, social, economic, and political decisions.</p> <p>Interdisciplinary connections of the sciences and connections to other subject areas and career opportunities.</p> <p>The role of science in solving personal, local, national, and global problems.</p>
SC11.2.2.3	
SC11.2.2.4	
SC11.3.1.2	
SC11.3.2.1	
SC11.3.2.2	

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1: Measurement and Analysis	SC11.1.c, SC11.1.9, SC11.2.5, SC11.3.1.2, SC11.3.2.1, SC11.3.2.2	convert between English and metric units utilizing dimensional analysis d mathematical operations with numbers in scientific notation while maintaining significant figure rules describe the relationship between mass, volume, and density differentiate between hypotheses, theories, and laws differentiate between graphs depicting direct and inverse relationships between variables

		demonstrate an awareness of the many opportunities in the career fields relating to chemistry
Unit 2: Starting the investigation: How to Identify Elements, Compounds, and Mixtures	SC11.1.9, SC11.1.10, SC11.1.12, SC11.2.1, SC11.2.3, SC11.2.2.1, SC11.2.2.2, SC11.2.2.3, SC11.2.2.4, SC11.3.1.2, SC11.3.2.1	differentiate between physical and chemical properties use density measurements to help identify an unknown substance distinguish between chemical and physical properties and changes in compounds relate differences between colloids, suspensions, and solutions, and give examples of each
Unit 3: Exploring Laws for Gases and Conservation of Mass	SC11.1.b, SC11.1.3, SC11.1.4, SC11.1.10, SC11.1.12, SC11.2.1, SC11.2.3, SC11.2.5, SC11.2.2.1, SC11.2.2.1, SC11.2.2.2, SC11.2.2.3, SC11.2.2.4, SC11.3.1.2, SC11.3.2.1, SC11.3.2.2	explain that the random motion of molecules causes the diffusion of gases describe the relationship between average kinetic energy and particle temperature, mass, and speed. solve problems using Boyle's Law solve problems using Charles's Law describe how Charles's Law and Boyle's Law were combined to form the Combined Gas Law calculate the molecular or atomic mass and number of particles in a given mass of a substance and its chemical formula
Unit 4: The Discovery of Atoms: Nature's Building Block	SC11.1.8, SC11.1.10, SC11.1.12, SC11.1.13, SC11.2.1, SC11.2.3, SC11.2.2.1, SC11.2.2.2 , SC11.2.2.4, SC11.3.1.2	discuss the history of the atomic theory relate the position of an element in the periodic table to its atomic number and its atomic mass compare and contrast two different atomic models explain, based on properties of atoms, why periodic trends in ionization energy exist

		realize that the release of energy in a nuclear reaction (fission or fusion) is much larger than in a chemical reaction
Unit 5: Molecular Structure	SC11.1.b, SC11.1.3, SC11.1.10, SC11.1.12, SC11.2.1, SC11.2.3, SC11.2.5, SC11.2.2.1, SC11.2.2.3, SC11.2.2.4	<p>evaluate balanced chemical reaction to determine the yield of a certain product given appropriate information (mass, number moles, number atoms) about the reactants</p> <p>determine how a particular atom will gain stability by gaining or losing valence electrons to obtain the noble gas (octet) structure</p> <p>determine ionic charges based on valence electron structure</p> <p>define ionization energy and electronegativity and relate their trends on the periodic table</p> <p>relate the difference between ionic, covalent, and metallic bonds based on atomic valence electron structure</p> <p>determine if a compound is polar based on symmetry</p>