Alignment Document

State of Connecticut
And
Aventa Learning Chemistry

Chemistry
2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
C	Chemistry		
C.1	Atomic and Molecular Structure		
C.1.1	The periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure.	Atoms/Periodic Table	Trends in the Periodic Table
C.1.1.1	The nucleus of the atom is much smaller than the atom, yet contains most of its mass.	Atoms/Periodic Table	Atom
C.1.1.2	The quantum model of the atom is based on experiments and analyses by many scientists, including Dalton, Thomson, Bohr, Rutherford, Millikan and Einstein.	Atoms/Periodic Table	Atom
C.1.1.3	The position of an element in the periodic table is related to its atomic number.	Atoms/Periodic Table	History of the Periodic Table
C.1.1.4	The periodic table can be used to identify metals, semimetals, non-metals and halogens.	Atoms/Periodic Table	History of the Periodic Table, Group Names
C.1.1.5	The periodic table can be used to identify trends in ionization energy, electronegativity, the relative sizes of ions and atoms, and the number of electrons available for bonding.	Atoms/Periodic Table	Trends in the Periodic Table
C.1.1.6	The electronic configuration of elements and their reactivity can be identified based on their position in the periodic table.	Atoms/Periodic Table	Quantum Theory
C.2	Chemical Bonds		

C.2.1	Biological, chemical and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.1	Atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.2	Chemical bonds between atoms in molecules such as H2, CH4, NH3, H2CCH2, N2, Cl2, and many large biological molecules are covalent.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.3	Salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.4	The atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form.	Solids, Liquids, Gases	Changes of State
C.2.1.5	Lewis dot structures can provide models of atoms and molecules.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.6	The shape of simple molecules and their polarity can be predicted from Lewis dot structures.		
C.2.1.7	Electronegativity and ionization energy are related to bond formation.	Ionic and Covalent Compounds	Ionic and Covalent Compounds
C.2.1.8	Solids and liquids held together by Van der Waals forces or hydrogen bonds are affected by volatility and boiling/melting point temperatures.		
C.3	Conservation of Matter and Stoichiometry		
C.3.1	The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants.	Chemical Reactions	What is a Chemical Reaction?
C.3.1.1	Chemical reactions can be described by writing balanced equations.	Chemical Reactions	What is a Chemical Reaction?
C.3.1.2	The quantity one mole is set by defining one mole of carbon; 12 atoms to have a mass of exactly 12 grams.	Mole/Chemical Composition	The Mole and Chemical Composition
C.3.1.3	One mole equals 6.02.x 1023 particles (atoms or molecules).	Mole/Chemical Composition	The Mole and Chemical Composition

C.3.1.4	The molar mass of a molecule can be determined from its chemical formula and a table of atomic masses.	Mole/Chemical Composition	The Mole and Chemical Composition
C.3.1.5	The mass of a molecular substance can be converted to moles, number of particles, or volume of gas at standard temperature and pressure.	Mole/Chemical Composition	The Mole and Chemical Composition
C.3.1.6	Hess's law is used to calculate enthalpy change in a reaction.		
C.4	Reaction Rates		
C.4.1	Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules.	Reaction Rates and Equilibrium	Reaction Rates and Collision Theory
C.4.1.1	The rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time.	Reaction Rates and Equilibrium	Kinetics
C.4.1.2	Reaction rates depend on factors such as concentration, temperature and pressure.	Reaction Rates and Equilibrium	Kinetics
C.4.1.3	Equilibrium is established when forward and reverse reaction rates are equal.		
C.4.1.4	Catalysts play a role in increasing the reaction rate by changing the activation energy in a chemical reaction.	Reaction Rates and Equilibrium	Kinetics
C.5	Organic Chemistry and Biochemistry		
C.5.1	The bonding characteristics of carbon allow the formation of many different organic molecules of varied sizes, shapes and chemical properties, and provide the biochemical basis of life.		
C.5.1.1	Large molecules (polymers), such as proteins, nucleic acids and starch, are formed by repetitive combinations of organic monomers.	Atoms/Periodic Table	Polymers are Everywhere Lab
C.5.1.2	The bonding characteristics of carbon result in the formation of a large variety of structures, ranging from simple hydrocarbons to complex biological molecules and synthetic polymers.		
C.5.1.3	Amino acids are the building blocks of proteins.		