Chemistry – 1st Semester Final - Study Outline

Atomic and Molecular Structure	
Standard	*Important Supporting Concepts*
1a. *Students know* how to relate the position of an element in the periodic table to its atomic number and atomic mass.	
1b. *Students know* how to use the periodic table to identify metals, semimetals, non-metals, and halogens.	
1c. *Students know* how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electronegativity, and the relative sizes of ions and atoms.	
1d. *Students know* how to use the periodic table to determine the number of electrons available for bonding.	
1e. *Students know* the nucleus of the atom is much smaller than the atom yet contains most of its mass.	

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Nuclear Processes	
Standard	*Important Supporting Concepts*
11a. *Students know* protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.	
11b. *Students know* the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by $E = mc^2$) is small but significant in nuclear reactions.	
11c. *Students know* some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions.	
11d. *Students know* the three most common forms of radioactive decay (alpha, beta, and gamma) and know how the nucleus changes in each type of decay.	

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Chemical Bonds	
Standard	*Important Supporting Concepts*
2a. *Students know* atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.	
2b. *Students know* chemical bonds between atoms in molecules such as H_2, CH_4, NH_3, H_2CCH_2, N_2, Cl_2, and many large biological molecules are covalent.	
2c. *Students know* salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.	
2e. *Students know* how to draw Lewis dot structures.	

Chemistry – 1st Semester Final - Study Outline

Organic Chemistry and Biochemistry

Standard	*Important Supporting Concepts*
10a *Students know* large molecules (polymers), such as proteins, nucleic acids, and starch, are formed by repetitive combinations of simple subunits.	
10b. *Students know* the bonding characteristics of carbon that result in the formation of a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.	
10c. *Students know* amino acids are the building blocks of proteins.	

Conservation of Matter & Stoichiometry

Standard	*Important Supporting Concepts*
3a. *Students know* how to describe chemical reactions by writing balanced equations.	