



North Carolina Essential Standards Draft 3.0 Chemistry

Matter: Properties & Change

	Essential Standard	Clarifying Objectives	
Chm.1.1	Analyze the structure of atoms and ions.	Chm.1.1.1	Analyze the structure of atoms, isotopes, and ions.
		Chm.1.1.2	Analyze an atom in terms of the location of electrons.
		Chm.1.1.3	Explain the emission of electromagnetic radiation in spectral form in terms of the Bohr model.
		Chm.1.1.4	Explain the process of radioactive decay by the use of nuclear equations and half-life.
Chm.1.2	Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.	Chm.1.2.1	Compare (qualitatively) the relative strengths of ionic, covalent, and metallic bonds.
		Chm.1.2.2	Infer the type of bond and chemical formula formed between atoms.
		Chm.1.2.3	Compare inter- and intra- particle forces.
		Chm.1.2.4	Interpret the name and formula of compounds using IUPAC convention.
		Chm.1.2.5	Compare the properties of ionic, covalent, metallic, and network compounds.
Chm.1.3	Understand the physical and chemical properties of atoms based on their position in the Periodic Table.	Chm.1.3.1	Classify the components of a periodic table (period, group, metal, metalloid, nonmetal, transition).
		Chm.1.3.2	Infer the physical properties (atomic radius, metallic and nonmetallic characteristics) of an element based on its position on the Periodic Table.
		Chm.1.3.3	Infer the atomic size, reactivity, electronegativity, and ionization energy of an element from its position in the Periodic Table.

Energy: Conservation & Transfer

	Essential Standard	Clarifying Objectives	
Chm.2.1	Understand the relationship among pressure, temperature, volume, and phase.	Chm.2.1.1	Explain the energetic nature of phase changes.
		Chm.2.1.2	Explain heating and cooling curves (heat of fusion, heat of vaporization, heat, melting point, and boiling point).
		Chm.2.1.3	Interpret the data presented in phase diagrams.
		Chm.2.1.4	Infer simple calorimetric calculations based on the concepts of heat lost equals heat gained and specific heat.
		Chm.2.1.5	Explain the relationships between pressure, temperature, volume, and quantity of gas both qualitative and quantitative.
Chm.2.2	Analyze chemical reactions in terms of quantities, product formation, and energy.	Chm.2.2.1	Explain the energy content of a chemical reaction.
		Chm.2.2.2	Analyze the evidence of chemical change.
		Chm.2.2.3	Analyze the Law of Conservation of Matter and how it applies to various types of chemical equations (synthesis, decomposition, single replacement, double replacement, and combustion).
		Chm.2.2.4	Analyze the stoichiometric relationships inherent in a chemical reaction.
		Chm.2.2.5	Analyze quantitatively the composition of a substance (empirical formula, molecular formula, percent composition, and hydrates).

Interactions of Matter and Energy

	Essential Standard	Clarifying Objectives	
Chm.3.1	Understand the factors affecting rate of reaction and chemical equilibrium.	Chm.3.1.1	Explain the factors that affect the rate of a reaction (temperature, concentration, particle size and presence of a catalyst).
		Chm.3.1.2	Explain the conditions of a system at equilibrium.
		Chm.3.1.3	Infer the shift in equilibrium when a stress is applied to a chemical system (Le Chatelier's Principle).

	Essential Standard	Clarifying Objectives	
Chm.3.2	Understand solutions and the solution process.	Chm.3.2.1	Classify substances using the hydronium and hydroxide ion concentrations.
		Chm.3.2.2	Summarize the properties of acids and bases.
		Chm.3.2.3	Infer the quantitative nature of a solution (molarity, dilution, and titration with a 1:1 molar ratio).
		Chm.3.2.4	Summarize the properties of solutions.
		Chm.3.2.5	Interpret solubility diagrams.
		Chm.3.2.6	Explain the solution process.

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