

High School:

Matter: Properties & Change

NCES.Chm.1.1 - Analyze the structure of atoms and ions.

NCES.Chm.1.1.1 - Analyze the structure of atoms, isotopes, and ions.

NCES.Chm.1.1.2 - Analyze an atom in terms of the location of electrons.

NCES.Chm.1.1.3 - Explain the emission of electromagnetic radiation in spectral form in terms of the Bohr model.

NCES.Chm.1.1.4 - Explain the process of radioactive decay by the use of nuclear equations and half-life.

NCES.Chm.1.2 - Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.

NCES.Chm.1.2.1 - Compare (qualitatively) the relative strengths of ionic, covalent, and metallic bonds.

NCES.Chm.1.2.2 - Infer the type of bond and chemical formula formed between atoms.

NCES.Chm.1.2.3 - Compare inter- and intra- particle forces.

NCES.Chm.1.2.4 - Interpret the name and formula of compounds using IUPAC convention.

NCES.Chm.1.2.5 - Compare the properties of ionic, covalent, metallic, and network compounds.

NCES.Chm.1.3 - Understand the physical and chemical properties of atoms based on their position in the Periodic Table.

NCES.Chm.1.3.1 - Classify the components of a periodic table (period, group, metal, metalloid, nonmetal, transition).

NCES.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.

NCES.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

NCES.Chm.2.1 - Understand the relationship among pressure, temperature, volume, and phase.

NCES.Chm.2.1.1 - Explain the energetic nature of phase changes.

NCES.Chm.2.1.2 - Explain heating and cooling curves (heat of fusion, heat of vaporization, heat, melting point, and boiling point).

NCES.Chm.2.1.3 - Interpret the data presented in phase diagrams.

NCES.Chm.2.1.4 - Infer simple calorimetric calculations based on the concepts of heat lost equals heat gained and specific heat.

NCES.Chm.2.1.5 - Explain the relationships between pressure, temperature, volume, and quantity of gas both qualitative and quantitative.

NCES.Chm.2.2 - Analyze chemical reactions in terms of quantities, product formation, and energy.

NCES.Chm.2.2.1 - Explain the energy content of a chemical reaction.

NCES.Chm.2.2.2 - Analyze the evidence of chemical change.

NCES.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).

NCES.Chm.2.2.4 - Analyze the stoichiometric relationships inherent in a chemical reaction.

NCES.Chm.2.2.5 - Analyze quantitatively the composition of a substance (empirical formula, molecular formula, percent composition, and hydrates).

Interactions of Matter and Energy

NCES.Chm.3.1 - Understand the factors affecting rate of reaction and chemical equilibrium.

NCES.Chm.3.1.1 - Explain the factors that affect the rate of a reaction (temperature, concentration, particle size and presence of a catalyst).

NCES.Chm.3.1.2 - Explain the conditions of a system at equilibrium.

NCES.Chm.3.1.3 - Infer the shift in equilibrium when a stress is applied to a chemical system (Le Chatelier's Principle).

NCES.Chm.3.2 - Understand solutions and the solution process.

NCES.Chm.3.2.1 - Classify substances using the hydronium and hydroxide ion concentrations.

NCES.Chm.3.2.2 - Summarize the properties of acids and bases.

NCES.Chm.3.2.3 - Infer the quantitative nature of a solution (molarity, dilution, and titration with a 1:1 molar ratio).

NCES.Chm.3.2.4 - Summarize the properties of solutions.

NCES.Chm.3.2.5 - Interpret solubility diagrams.

NCES.Chm.3.2.6 - Explain the solution process.