SCANTRON

| AHSAA Homeschool Student Eligibility Exams<br>Chemistry | | |
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| **Standard Reference** | **Standard Text** | **Percentage of Test Items** |
| Matter and Its Interactions Standards 1-5 | | 42% |
| 1 | Obtain and communicate information from historical experiments (e.g., work by Mendeleev and Moseley, Rutherford's gold foil experiment, Thomson's cathode ray experiment, Millikan's oil drop experiment, Bohr's interpretation of bright line spectra) to determine the structure and function of an atom and to analyze the patterns represented in the periodic table. | |
| 2 | Develop and use models of atomic nuclei to explain why the abundance-weighted average of isotopes of an element yields the published atomic mass. | |
| 3 | Use the periodic table as a systematic representation to predict properties of elements based on their valence electron arrangement. | |
| 3.a | Analyze data such as physical properties to explain periodic trends of the elements, including metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity and electron affinity, ionization energy, and atomic-covalent/ionic radii and how they relate to position in the periodic table. | |
| 3.b | Develop and use models (e.g., Lewis dot, 3-D ball-and-stick, space-filling, valence-shell electron-pair repulsion [VSEPR]) to predict the type of bonding and shape of simple compounds. | |
| 3.c | Use the periodic table as a model to derive formulas and names of ionic and covalent compounds. | |
| 4 | Plan and conduct an investigation to classify properties of matter as intensive (e.g., density, viscosity, specific heat, melting point, boiling point) or extensive (e.g., mass, volume, heat) and demonstrate how intensive properties can be used to identify a compound. | |
| 5.a | Use mathematics and computational thinking to represent the ratio of reactants and products in terms of masses, molecules and moles. | |
| 5.b | Use mathematics and computational thinking to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. | |
| Matter and Its Interactions Standards 6-8 | | 38% |
| 6 | Use mathematics and computational thinking to express the concentrations of solutions quantitatively using molarity. | |
| 6.a | Develop and use models to explain how solutes are dissolved in solvents. | |
| 6.b | Analyze and interpret data to explain effects of temperature on the solubility of solid, liquid, and gaseous solutes in a solvent and the effects of pressure on the solubility of gaseous solutes. | |
| 6.c | Design and conduct experiments to test the conductivity of common ionic and covalent substances in a solution. | |

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| 6.d | Use the concept of pH as a model to predict the relative properties of strong, weak, concentrated, and dilute acids and bases (e.g., Arrhenius and Brønsted-Lowry acids and bases). | |
| 7.a | Use mathematics to describe the relationships among pressure, temperature, and volume of an enclosed gas when only the amount of gas is constant. | |
| 7.b | Use mathematical and computational thinking based on the ideal gas law to determine molar quantities. | |
| 8 | Refine the design of a given chemical system to illustrate how LeChâtelier's principle affects a dynamic chemical equilibrium when subjected to an outside stress (e.g., heating and cooling a saturated sugar-water solution). | |
| Motion and Stability: Forces and Interactions; Energy | | 20% |
| 9 | Analyze and interpret data (e.g., melting point, boiling point, solubility, phase-change diagrams) to compare the strength of intermolecular forces and how these forces affect physical properties and changes. | |
| 10 | Plan and conduct experiments that demonstrate how changes in a system (e.g., phase changes, pressure of a gas) validate the kinetic molecular theory. | |
| 10.a | Develop a model to explain the relationship between the average kinetic energy of the particles in a substance and the temperature of the substance (e.g., no kinetic energy equaling absolute zero [0K or -273.15 degrees C]). | |
| 11 | Construct an explanation that describes how the release or absorption of energy from a system depends upon changes in the components of the system. | |
| 11.a | Develop a model to illustrate how the changes in total bond energy determine whether a chemical reaction is endothermic or exothermic. | |
| 11.b | Plan and conduct an investigation that demonstrates the transfer of thermal energy in a closed system (e.g., using heat capacities of two components of differing temperatures). | |