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| AP Chemistry | | **Standards-Based Education Priority Standards** |
| **12th Grade** | | |
| *Scale, Proportion, and Quantity* | | |
| SPQ-1 | The mole allows different units to be compared. | |
| SPQ-2 | Chemical formulas identify substances by their unique combination of atoms. | |
| SPQ-3 | Interactions between intermolecular forces influence the solubility and separation of mixtures. | |
| SPQ-4 | When a substance changes into a new substance, or when its properties change, no mass is lost or gained. | |
| SPQ-5 | The dissolution of a salt is a reversible process that can be influenced by environmental factors such as pH or other dissolved ions. | |
| *Structures and Properties* | | |
| SAP-1 | Atoms and molecules can be identified by their electron distribution and energy. | |
| SAP-2 | The periodic table shows patterns in electronic structure and trends in atomic properties. | |
| SAP-3 | Atoms or ions bond due to interactions between them, forming molecules. | |
| SAP-4 | Molecular compounds are arranged based on Lewis diagrams and Valence Shell Electron Pair Repulsion (VSEPR) theory. | |
| SAP-5 | Intermolecular forces can explain the physical properties of a material. | |
| SAP-6 | Matter exists in three states: solid, liquid, and gas, and their differences are influenced by variances in spacing and motion of the molecules. | |
| SAP-7 | Gas properties are explained macroscopically - using the relationships among pressure, volume, temperature, moles, gas constant - and molecularly by the motion of the gas. | |
| SAP-8 | Spectroscopy can determine the structure and concentration in a mixture of chemical species. | |
| SAP-9 | The chemistry of acids and bases involves reversible proton-transfer reactions, with equilibrium concentrations being related to the strength of the acids and bases involved. | |
| SAP-10 | A buffered solution resists changes to its pH when small amounts of acid or base are added. | |
| *Transformations* | | |
| TRA-1 | A substance that changes its properties, or that changes into a different substance, can be represented by chemical equations. | |
| TRA-2 | A substance can change into another substance through different processes, and the change itself can be classified by the sort of processes that produced it. | |
| TRA-3 | Some reactions happen quickly, while others happen more slowly and depend on reactant concentrations and temperature. | |
| TRA-4 | There is a relationship between the speed of a reaction and the collision frequency of particle collisions. | |
| TRA-5 | Many chemical reactions occur through a series of elementary reactions. These elementary reactions when combined form a chemical equation. | |
| TRA-6 | Some reactions can occur in both forward and reverse directions, sometimes proceeding in each direction simultaneously. | |
| TRA-7 | A system at equilibrium depends on relationships between concentrations, partial pressures of chemical species, and equilibrium constant K. | |
| TRA-8 | Systems at equilibrium respond to external stresses to offset the effect of the stress. | |
| *Energy* | | |
| ENE-1 | The speed at which a reaction occurs can be influenced by a catalyst. | |
| ENE-2 | Changes in a substance's properties or change into a different substance requires an exchange of energy. | |
| ENE-3 | The energy exchanged in a chemical transformation is required to break and form bonds. | |
| ENE-4 | Some chemical or physical processes cannot occur without intervention. | |
| ENE-5 | The relationship between ΔG° and K can be used to determine favorability of a chemical or physical transformation. | |
| ENE-6 | Electrical energy can be generated by chemical reactions. | |
| *Science Practices and Literacy* | | |
| Practice 1 | Models and Representations: Describe models and representations, including across scales. | |
| Practice 2 | Question and Method: Determine scientific questions and methods. | |
| Practice 3 | Representing Data and Phenomena: Create representations of models of chemical phenomena. | |
| Practice 4 | Model Analysis: Analyze and interpret models and representations on a single scale or across multiple scales. | |
| Practice 5 | Mathematical Routines: Solve problems using mathematical relationships. | |
| Practice 6 | Argumentation: Develop an explanation or scientific argument. | |
| 11-12.RST.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. | |
| 11-12.RST.3 | Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. | |
| 11-12.RST.7 | Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. | |
| 11-12.WHST.1 | Write arguments focused on discipline-specific content. | |
| 11-12.WHST.4 | Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. | |