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| IB DP Chemistry | | **Standards-Based Education Priority Standards** |
| **12th Grade** | | |
| *Atoms and Bonds* | | |
| 1.1 | Physical and chemical properties depend on the ways in which different atoms combine. | |
| 1.2/1.3 | The mole makes it possible to correlate the number of particles with the mass that can be measured. Mole ratios in chemical equations can be used to calculate reacting ratios by mass and gas volume. | |
| 2.1/2.2 | The mass of an atom is concentrated in its minute, positively charged nucleus. The electron configuration of an atom can be deduced from its atomic number. | |
| 3.1/3.2 | The arrangement of elements in the periodic table helps to predict their electron configuration. Elements show trends in their physical and chemical properties across periods and down groups. | |
| 4.1/4.2/4.5 | Ionic compounds consist of ions held together in lattice structures by ionic bonds. Covalent compounds form by the sharing of electrons. Metallic bonds involve a lattice of cations with delocalized electrons. | |
| 4.3/4.4 | Lewis (electron dot) structures show the electron domains in the valence shell and are used to predict molecular shape. The physical properties of molecular substances result from different types of forces between their molecules. | |
| *Thermochemistry* | | |
| 5.1/5.2 | In chemical transformations energy can neither be created nor destroyed (the first law of thermodynamics). The enthalpy changes from chemical reactions can be calculated from their effect on the temperature of their surroundings. | |
| 5.3 | Energy is absorbed when bonds are broken and is released when bonds are formed. | |
| 6.1 | The greater the probability that molecules will collide with sufficient energy and proper orientation, the higher the rate of reaction. | |
| *Types of Reactions* | | |
| 7.1 | Many reactions are reversible. These reactions will reach a state of equilibrium when the rates of the forward and reverse reaction are equal. The position of equilibrium can be controlled by changing the conditions. | |
| 8.1/8.2 | Many reactions involve the transfer of a proton from an acid to a base. The characterization of an acid depends of empirical evidence such as the production of gases in reactions with metals, the color changes of indicators or the release of heat in reactions with metal oxides and hydroxides. | |
| 8.3/8.4/8.5 | The pH scale is an artificial scale used to distinguish between acid, neutral, and basic/alkaline solutions. The pH depends on the concentration of the solution. The strength of acids or bases depends on the extent to which they dissociate in aqueous solutions. | |
| 9.1/9.2 | Redox (reduction-oxidation) reactions play a key role in many chemical and biochemical processes. Voltaic cells convert chemical energy to electrical energy and electrolytic cells convert electrical energy to chemical energy. | |
| *Lab Techniques* | | |
| 11.1 | All measurement has a limit of precision and accuracy, and this must be taken into account when evaluating experimental results. | |
| 11.2 | PS14: Graphs are visual representations of trends in data. | |
| 11.3 | PS15: Analytical techniques can be used to determine the structure of a compound, analyze the composition of a substance or determine the purity of a compound. Spectroscopic techniques are used in the structural identification of organic and inorganic compounds. | |
| *Communication* | | |
| 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.2 | Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. | |
| 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.WHST.1 | Write arguments focused on discipline-specific content. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and Revised 08/25/2014 Page 4 evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented. | |
| 11-12.WHST.4 | Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. | |
| 11-12.WHST.8 | Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. | |