

IB Chemistry X

- PS 1 Evaluate the implications of scientific developments and their applications to a specific problem or issues in local or global contexts. Discuss the effectiveness of science and its application in solving the problem or issue along with the various issues (moral, ethical, social, economic, political, cultural and environmental) from the use of science.
- PS 2 Effectively communicate scientific ideas, theories, findings and arguments in science correctly using different and appropriate communication modes, including verbal (oral, written) and visual (graphic, symbolic), and formats (laboratory reports, essays, and multimedia presentations). Properly acknowledge the work of others and the sources of information used by documenting them using a recognized referencing system.
- PS 3 Apply scientific knowledge to construct scientific explanations, solve problems, and formulate scientifically supported arguments for both familiar and unfamiliar situations. Critically analyze and evaluate information to make judgments supported by scientific understanding.
- PS 4 Identify a focused problem or research question to be tested by a scientific investigation. Formulate a testable hypothesis and explain it using scientific reasoning. Design and carry out scientific investigations that include variables and controls, material and/or equipment needed, a method to be followed, and the way in which the data is to be collected and processed.
- PS 5 Develop analytical thinking skills to evaluate the method and hypothesis of a scientific investigation and explain possible improvements to the method of inquiry.
- PS 6 Organize data using units of measurement as appropriate. Organize, transform, and present data using numerical and visual forms. Analyze and interpret quantitative and qualitative data from which consistent conclusions will be drawn.
- PS 7 Develop safe, responsible, and collaborative working practices when carrying out experimental work in science.
- PS 8 Atoms are composed of protons, neutrons, and electrons. Draw, label and describe the relative charge, mass, and location of the protons, electrons and neutrons in an atom of an element (e.g., Bohr Model, electron configuration, energy levels). Predict the chemical properties of atoms with known number and arrangement of electrons (valence electrons). Draw and label a model of an isotope's atomic structure (number of protons, neutrons and electrons) given the atomic number and atomic mass number of the isotope.
- PS 9 When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This Periodic Table is a consequence of the repeating pattern of outermost electrons. Predict the properties of elements in the periodic table, based on their position in a group and period. Predict periodic table trends (e.g., electronegativity, reactivity, electron affinity, atomic radius, ionic radius).
- PS 10 Explain how ions and ionic bonds are formed when atoms or molecules lose or gain electrons, thereby gaining a positive or negative electrical charge. Molecular compounds are composed of two or more elements bonded together in a fixed proportion by sharing electrons between atoms, forming covalent bonds. Diagram covalently bonded molecules (e.g., Lewis dot structures, dot and cross, structural formulas). Distinguish among ionic, molecular, and metallic substances given their properties, and predict the chemical formula based upon the proportions of ions and atoms.
- PS 11 Chemical Reactions change the arrangement of atoms in the molecules of substances. Chemical reactions release or acquire energy from their surroundings and result in the formation of new substances. Identify 5 types of chemical reactions and predict the products of each type of reaction. Write and balance chemical equations.
- PS 12 Solutions are mixtures in which particles of one substance are evenly distributed through another substance. Provide examples of common solutions and compare and contrast dissolving, melting, and reacting. Liquids are limited in the amount of dissolved solid or gas that they can contain. Predict how the concentration of a solution is influenced by the addition of a substance. Aqueous solutions can be described by relative quantities of the dissolved substances and acidity or alkalinity (pH). Predict how the pH of a solution is influenced by the addition of hydrogen and/or hydroxide ions in an aqueous solution.
- PS 13 Use the mole in describing chemical quantities by count, mass and volume. Define Avogadro's number as it relates to a mole of a substance and how to convert between the various chemical quantities. Identify the

volume of a quantity of gas at STP.

- PS 14 Use a balanced equation to predict the quantities of reactants and products that are required or produced in a chemical reaction. Identify the limiting reagent and determine the theoretical yield of a reaction and percent yield.
- PS 15 Apply the kinetic molecular theory to states of matter. Compare and contrast the arrangement, movement, and energy in solids, liquids, and gases. Describe the relationships among the temperature, pressure, and volume of a gas by using the combined gas law and ideal gas law.
- PS 19 9-10.RST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- PS 20 9-10.RST.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- PS 21 9-10.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- 9-10.WHST.1 Write arguments focused on discipline-specific content.
- PS 22 a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
c. Use words, phrases, and clauses 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.
- PS 23 9-10.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.