Republic of the Philippines

Department of Education

DepEd Complex, Meralco Avenue, Pasig City

STRENGTHENED SENIOR HIGH SCHOOL CURRICULUM

CHEMISTRY 1

Grade 11

Course Description:

This course provides learners with essential chemistry concepts and skills. Learners learn how to make accurate measurements, understand the electronic structure of atoms and isotopes, explain the behavior of subatomic particles, calculate percentage composition, and write compound formulas using nomenclature rules. Additionally, learners explore the various properties of chemical bonds and examine how these properties relate to the types of bonds in different compounds. The lessons can be applied in environmental science, community-based issues, and industrial processes, especially relating them to green chemistry and the United Nations' Sustainable Development Goals.

Elective: Academic
Prerequisite: None
Time Allotment: 80 hours for one semester, 4 hours per week
Schedule: First Semester

Quarter 1

Content	**Content Standards** *The learners learn that*	**Learning Competencies** *The learners*
1. Scientific measurement	1. accuracy, precision, and appropriate use of standard units of measurement are fundamental to Chemistry;	1. explain the difference between mass, volume, and density of a solid using the correct and appropriate units; 2. investigate the density of commonly used solids using laboratory equipment, including writing a scientific report; 3. explain that accuracy and precision are important to assess the quality of experimental results; 4. identify sources of error and propose improvements to enhance measurement reliability; 5. apply scientific notation and explain how to determine the proper number of significant figures in calculations;

2. The Quantum Theory and the electronic structure of atoms	2. the contributions of Planck, Bohr, and Schrödinger helped in the development of Quantum Theory, which explains the behavior of subatomic particle; 3. electrons of elements are arranged according to different energy levels, subshells, and orbitals based on the quantum mechanical model; and	6. explain how Mendeleev developed the periodic table of elements; 7. create a diagram of the periodic table to illustrate the relationship between atomic radius and atomic mass of elements across a period and down a group; 8. draw a model of the discrete energy levels of an atom using the 'spdf' notation for the orbitals; 9. write the electronic configuration of common elements following the principles of quantum theory; 10. explain and predict main energy levels, sublevels, and orbitals in relation to the electronic configurations of elements in periods and groups in the periodic table;
4. Isotopes	2. isotopes of elements can be both beneficial and harmful.	11. explain that isotopes of an element have the same number of protons but a different number of neutrons; 12. use secondary resources to identify natural and human-made radioisotopes and their properties in terms of the type of radiation emitted and their half-life; and 13. use secondary sources to describe the use of radioisotopes in medicine.
Performance Standards *By the end of the quarter, learners* make reliable measurements and record data using appropriate laboratory and/or measuring tools. They also apply significant figures, scientific notation, and unit conversion. Using the Quantum Mechanical Model, they describe electrons in levels and write electron configurations for elements. Learners explain what isotopes are and how they may be useful and possibly harmful.		
Suggested Performance Task ● Make a 2-minute video presentation explaining how radioactive isotopes are being used to cure cancer and goiter.		

Quarter 2

Content	**Content Standards** *The learners learn that*	**Learning Competencies** *The learners*
1. Atomic mass	1. the atomic mass of an element can be described as "relative" or "average";	1. explain the difference between relative atomic mass and average atomic mass of an element, and describe their importance;
2. Percentage composition and formula of compounds	2. the percentage composition of elements in a compound can be used to determine empirical and molecular formulas ;	2. calculate the percent composition of a compound, such as calcium carbonate [$CaCO_3$], from its formula; 3. use a table to show similarities and differences between the empirical formula and the molecular formula of a compound; 4. calculate the empirical formula and molecular formula of a given compound;
3. Chemical nomenclature	3. chemical compounds are named using the rules of the International Union of Pure and Applied Chemistry (IUPAC);	5. use the rules of IUPAC nomenclature to name common compounds, such as H_2O, NaCl, NH_3, $NaHCO_3$, H_2SO_4, $ZnSO_4$, MgO, Fe_3O_4, CaO, and $Ca(OH)_2$; 6. write chemical formulas of compounds commonly found in the home, such as sodium chloride, ammonia, sodium fluoride, hydrochloric acid, ethanol, sucrose, acetone, and acetic acid;
4. Chemical bonds and properties of chemical compounds	4. the chemical formula of a compound is a symbolic representation of its chemical composition; and 5. the properties of chemical compounds depend on the type of bond between the elements in a compound.	7. identify that chemical bonds may be ionic or covalent and explain the differences in terms of the electrons involved; 8. use secondary sources to create a table that includes the chemical formula of an ionic compound, such as sodium chloride, and a covalent compound, such as water, to highlight the differences in their physical properties, including their physical state, solubility, melting and boiling points, and electrical conductivity;

		9. draw a Lewis structure of an ionic compound and a covalent compound applying the Octet rule; and 10. predict the polarity of compounds based on electronegativity and molecular geometry.
Performance Standards *By the end of the quarter, learners* explain the difference between relative and average atomic mass, and they correctly name compounds using the IUPAC nomenclature standard. They write formulas particularly for compounds commonly used in everyday life. They differentiate between ionic and covalent bonds and use illustrations and diagrams to explain the Lewis structure of an ionic compound and a covalent compound, applying the octet rule. They write chemical names and formulas for ionic and covalent compounds and describe their properties. Learners predict polarity based on electronegativity and molecular geometry.		
Suggested Performance Task ● Conduct science experiments to investigate the physical properties of ionic and covalent compounds, such as physical state, solubility, melting and boiling point, and conductivity.		