LWIS Adma International School

A Learner's World

LEARNING OUTCOMES

CHEMISTRY (G9-G12)

NEASC Founded in 1885

school development consultants

Preparatory Visit – October 2016

Grade 9/Brevet Learning Outcomes

- Illustrate the internal structure of atoms
- Define the mole concept
- Classify elements in the periodic table
- Explain the formation of a chemical bond
- Write a balanced redox reaction
- Label a galvanic cell
- Label an electrochemical cell
- Distinguish between the structures of alkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols and carboxylic acids
- Distinguish between the organic reactions: substitution, addition, condensation, combustion, polymerization and cracking
- Discuss the pollution of air, water and soil

Grade 10 Learning Outcomes

- Use the conversion factor to calculate the number of mol, the mass or the number of atoms of a given atom
- Compare the periodic trends of ionization energy, electron affinity, electronegativity, atomic and ionic radii
- Describe the four quantum numbers of elements with their significance
- Represent the molecular geometry of molecules according to the VSEPR theory
- Identify the molecular formula (molecular, empirical and percent composition) of a chemical compound
- Apply the stoichiometric relation between the reactants and products of a chemical reaction
- Calculate the concentration of a solution (molarity and molality)
- Apply the properties of acids and bases
- Calculate the pH, pOH, $[H_3O^+]$ and $[OH^-]$ and of a strong acid or a strong base
- Demonstrate titration reactions with pH indicators or pH-meters

Grade 11 Learning Outcomes

- Use the combined gas law to calculate volume-temperature pressure changes
- Solve mixed problems about heat of reaction, heat of formation, and heat of combustion
- Relate activation energy to heat of reaction
- Solve mixed problems of chemical equilibrium, gaseous state, rate of chemical reaction, acid-base and organic molecules with functional groups
- Calculate the rate of a chemical reaction (instantaneous or average rate, rate of formation or disappearance)
- Balance redox reactions using the half-reaction method
- Calculate cell potentials based on standard electrode potentials
- Distinguish between the different types of isomers
- Identify organic molecules with functional groups (alcohols, ketones, carboxylic acids and derivatives, amines and amino acids)

Grade 12 Learning Outcomes

- Use significant figures

- Write net ionic equations
- Apply colligative properties of water
- Write nuclear equations for different nuclear reactions (nuclear fusion, nuclear fission, alpha emission, electron capture, beta emission, gamma emission)
- Distinguish between absorption and emission spectrum of light
- Identify the hybridization of an atom in a molecule or ion
- Write the molecular orbital configuration for simple diatomic molecules
- Design buffers with a target pH and buffer capacity

LS/GS Learning Outcomes

- Solve mixed problems of chemical equilibrium, gaseous state, rate of chemical reaction, acid-base and organic molecules with functional groups
- Find the rate of a chemical reaction (instantaneous or average rate, rate of formation or disappearance)
- Identify organic molecules with functional groups (alcohols, ketones, carboxylic acids and derivatives, only for LS: amines and alpha amino acids)
- Write the reactions of organic molecules with functional groups (alcohols, ketones, carboxylic acids and derivatives, only for LS: amines and alpha amino acids)
- Write acid-base reactions in aqueous solutions (strong-strong, weak-weak, strong-weak)
- Analyze acid-base titration curves
- Write the saponification reaction (only for LS)
- Classify the current medicinal drugs (only for LS)
- Explain the use of new materials (only for LS)