Dubai International Private School
DIS, in partnership with parents and community, strives to prepare every student to be digitally literate, a lifelong learner, and a productive citizen.

Dubai International School-Al Quoz
Science Department (Grades 9-12)
Curriculum Annual Plan
Grade: _12_____ Subject: _Honor Chemistry ____2024-2025

TERM-I

NGSS Standards and EMSAT requirements	Unit	Topics	Learning Objectives	Week No. & Date	No. of Lessons
	Diagnostic Test + General Basic Science	Diagnostic Revision + Scientific Methods	-Examine the steps of scientific methods theoretically by applying them using a specific experiment.	W1: 26/8 TILL 30/8	4
NGSS: **HS-PS2-6** **Emsat:** Chemical bond 6a.Students know the atoms and molecules in liquids move in a random pattern relative to one another because	Chapter 11: Solutions **Book** Introduction to Chemistry Richard Bauer, 5e	11.1 The Composition of Solutions 11.2 The Solution Process 11.3 Factors That Affect Solubility	**-Distinguish** between solute and solvent **-Distinguish** between electrolyte and non electrolyte solution **-Discover** the rules used to predict the solubility of ionic salts	W2: 2/9 TILL 6/9	4

the intermolecular forces are too weak to hold the atoms or molecules in a solid form. -Chemical Thermodynamics 7b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.			-**Distinguish** between miscible and non miscible liquids -**Explain** hydration Process -**Discuss** and explain the factors that affect solubility		
NGSS: **HS-PS2-5** **EMSAT** Chemical Bonds 2d. Students know the atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular	Chapter 11: Solutions **Book** Introduction to Chemistry Richard Bauer, 5e	11.4 Measuring Concentrations of Solutions	-**Calculate** solubility **-Distinguish** between unsaturated , saturated and supersaturated solution -**Calculate** percent by mass, by volume -**Calculate** Density -**Calculate** molarity and molality and distinguish between these 2 terms	W3: 9/9 TILL 13/9	4

forces are too weak to hold the atoms or molecules in a solid form.					
NGSS: **HS-PS2-5** **EMSAT** Chemical Thermodynamics 7b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.	Chapter 11: Solutions **Book** Introduction to Chemistry Richard Bauer, 5e	11.5 Quantities for Reactions That Occur in Aqueous Solution	**-Explain and discover** the reactions that conduct to precipitation formation -**Explain** the neutralization reaction -**Calculate** the concentration of the unknown substance	W4: 16/9 TILL 20/9	4
NGSS: **HS-PS2-6** **EMSAT :** Investigation and Experimentation g. Recognize the usefulness and limitations of models and	**Chapter 11: Solutions** **Book** Introduction to Chemistry Richard Bauer, 5e	11.6 Colligative Properties	**-Explain** the concept of colligative properties -**Analyze** the concept of osmotic pressure -**Explain and discuss** these points , lowering vapor pressure ,boiling point elevation , freezing point depression	W5: 23/9 TILL 27/9	4

theories as scientific representations of reality. k. Recognize the cumulative nature of scientific evidence. Atomic and Molecular Structure e. Students know the nucleus of the atom is much smaller than the atom yet contains most of its mass. h.* Students know the experimental basis for Thomson's discovery of the electron, Rutherford's nuclear atom, Millikan's oil drop experiment, and Einstein's explanation of the photoelectric effect. i.* Students know					

the experimental basis for the development of the quantum theory of atomic structure and the historical importance of the Bohr model of the atom					
NGSS: **HS-PS2-6** **EMSAT:** j.* Students know that spectral lines are the result of transitions of electrons between energy levels and that these lines correspond to photons with a frequency related to the energy spacing between levels by using Planck's	Chapter 12: Reaction Rates and Chemical Equilibrium **Book** Introduction to Chemistry Richard Bauer, 5e	• 12.1 Reaction Rates • 12.2 Collision Theory	**-Explain** the idea of Reaction rate -**Discover** the necessary conditions for a good collision -**Distinguish** between exothermic and endothermic reaction	W6: 30/9 TILL 4/10	4

relationship (E=hv) Conservation of Matter and Stoichiometry 3 b. Students know the quantity one mole is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams. c. Students know one mole equals 6.02x1023 particles (atoms or molecules).					
NGSS: **HS-PS1-1.** **EMSAT:** Atomic and Molecular Structure 1. a. Students know how to relate the position of an element in the	Chapter 12: Reaction Rates and Chemical Equilibrium **Book** Introduction to Chemistry Richard Bauer, 5e	12.3 Conditions That Affect Reaction Rates	-**Explain** the concept of activation energy and activated complex -**Analyze** energetic diagram -**Discover** the conditions that affect reaction rates -**Write** rate law	W7: 7/10 TILL 11/10	

periodic table to its atomic number and atomic mass. b. Students know how to use the periodic table to identify metals, semimetals, nonmetals, and halogens. c. Students know how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electro-negativity, and the relative sizes of ions and atoms. d. Students know how to use the periodic table to determine the number of electrons available for bonding. e.			-		

Students know the nucleus of the atom is much smaller than the atom yet contains most of its mass.					
NGSS: **HS-PS1-2.** **EMSAT :** Students know how to use the periodic table to identify the lanthanide, actinide, and transactinide elements and know that the transuranium elements were synthesized and identified in laboratory experiments through the use of nuclear accelerators. g.* Students know how to relate the	Chapter 12: Reaction Rates and Chemical Equilibrium **Book** Introduction to Chemistry Richard Bauer, 5e	• 12.4 Chemical Equilibrium	**Explain** the concept of chemical equilibrium **-Distinguish** between the rate of forward and reverse reactions	W8: 14/10 TILL 18/10	

position of an element in the periodic table to its quantum electron configuration and to its reactivity with other elements in the table. 2. g.* Students know how electronegativity and ionization energy relate to bond formation					
NGSS: **HS-PS1-2.** **EMSAT :** know that the transuranium elements were synthesized and identified in laboratory experiments through the use of nuclear accelerators. g.* Students know	Chapter 12: Reaction Rates and Chemical Equilibrium **Book** Introduction to Chemistry Richard Bauer, 5e	12.5 The Equilibrium Constant	-**Write** the equilibrium constant expression **-Calculate** equilibrium constant for different reactions **-Use** equilibrium constant to predict the direction of the reaction **-Calculate** K for heterogeneous equilibrium	W9: 21/10 TILL 25/10	

how to relate the position of an element in the periodic table to its quantum electron configuration and to its reactivity with other elements					
		END OF QUARTER 1			
NGSS: **HS-PS1-4** **EMSAT :** 1 d. Students know how to use the periodic table to determine the number of electrons available for bonding. g.* Students know how to relate the position of an element in the periodic table to its quantum electron configuration	Chapter 12: Reaction Rates and Chemical Equilibrium **Book** Introduction to Chemistry Richard Bauer, 5e	12.6 Le Chatelier's Principle	**-Explain** Le Chatelier principle **-Discover** the factors that make system under stress **-Discover** the different ways used to relieve the stress of the system	W10: 28/10 TILL 1/11	4

and to its reactivity with other elements in the table.					

NGSS Standards and EMSAT requirements	Unit	Topic	Learning Objectives	Week No. & Date	No. of Lessons
NGSS: **HS-PS1-4** **EMSAT:** 2a. Students know atoms combine to form molecules by sharing electrons to form covalent	Chapter 13: Acids and Bases **Book** Introduction to Chemistry Richard Bauer, 5e	13.1 What Are Acids and Bases?	**-Distinguish** between acid and base substances **-Explain** the different theories used to distinguish between acid and base **-Discover** the conjugate acid -base of different substances	W11: 4/11 TILL 8/11	4

or metallic bonds or by exchanging electrons to form ionic bonds. c. Students know salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction. g.* Students know how electronegativity and ionization energy relate to bond formation.					
NGSS: **HS-PS1-3.** **EMSAT :** 1c. Students know how to	Chapter 13: Acids and Bases **Book** Introduction to Chemistry Richard Bauer, 5e	13.2 Strong and Weak Acids and Bases	**-Distinguish** between weak and strong acid ionization **-Distinguish** between weak and strong base ionization	W12: 11/11 TILL 15/11	4

use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electronegativity, and the relative sizes of ions and atoms. 2 a. Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds. b. Students know chemical bonds between					

atoms in molecules such as H2 , CH4 , NH3 , HCCH2 , N2 , Cl2 , and many large biological molecules are covalent Students know how to draw Lewis dot structures.					
NGSS: **HS-PS1-5.** **HS-PS1-7** **EMSAT** Investigation and Experimentation e. Solve scientific problems by using quadratic equations and simple trigonometric, exponential,	Chapter 13: Acids and Bases **Book** Introduction to Chemistry Richard Bauer, 5e	13.3 Relative Strengths of Weak Acids	-**Explain** the significance of acid ionization constant **-Discover** the properties of polyprotic acids -**Analyze** the behavior of polyprotic acids in water	W13: 18/11 TILL 22/11	4

and logarithmic functions. 3 b. Students know the quantity one mole is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams. c. Students know one mole equals 6.02x1023 particles (atoms or molecules). d. Students know how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular					

substance to moles, number of particles, or volume of gas at standard temperature and pressure					
	Chapter 13: Acids and Bases **Book** Introduction to Chemistry Richard Bauer, 5e	13.4 Acidic, Basic, and Neutral Solutions 13.5 The pH Scale	-**Explain** the significance of ion- product constant of water **-Use** ion product constant of water to distinguish between neutral , acidic and basic solution **-Calculate** the concentration of H3O+ and HO- in strong acid and base solution **-Calculate** PH **-Calculate** POH **-Discover** the relation between Ph and POH	W14: 25/11 TILL 29/11	
NGSS: **HS-PS1-5**	Chapter 13: Acids and Bases	• 13.6 Buffered Solutions	**-Explain** the concept of Buffer solution	W15: 4/12 TILL 6/12	4

EMSAT: Students know how to describe chemical reactions by writing balanced equations.	**Book** Introduction to Chemistry Richard Bauer, 5e		**-Discover** how a buffer system works		
Winter Break					
NGSS: **HS-PS1-5** **EMSAT:** Students know how to describe chemical reactions by writing balanced equations. **NGSS:** **HS-PS1-7** **EMSAT :**	Chapter 14: Oxidation-Reduction Reactions **Book** Introduction to Chemistry Richard Bauer, 5e	• 14.1 What Is an Oxidation-Reduction Reaction? • 14.2 Oxidation Numbers • 14.4 Balancing Simple Oxidation-Reduction Equations	**Distinguish** between oxidation and reduction reaction **-Predict** if the reaction is redox or not **-Discover** the rules used to assign oxidation number -**Distinguish** between single element and element in neutral compound or in a polyatomic ion -**Use** oxidation number to identify oxidation-reduction reaction	W16: 9/12 TILL 13/12	4

Students know how to calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses. f.* Students know how to calculate percent yield in a chemical reaction. g.* Students know how to identify reactions that involve oxidation and reduction and how to balance oxidation-reduction reactions.			**Balance** simple and complex redox reactions in acidic and in basic solution		

NGSS: **HS-PS2-5** **EMSAT:** 3 d. Students know how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure. 4 a. Students know the random motion of molecules and their collisions	Chapter 14: Oxidation-Reduction Reactions **Book** Introduction to Chemistry Richard Bauer, 5e	• **4.6 Electrochemistry**	**-Identify and explain** the component of voltaic cells **-Explain** electrolytic cell	W17: 6/1 TILL 10/1	4

with a surface create the observable pressure on that surface. b. Students know the random motion of molecules explains the diffusion of gases					
W18 & W19: Jan 13 TILL Jan 21: The final exam of Term 1 Jan 22: Makeup Exam					4 4
		END OF QUARTER-II			