MOST ESSENTIAL LEARNING COMPETENCIES (MELC)

GRADE LEVEL : GRADE 12 **SUBJECT: GENERAL CHEMISTRY 2**

Quarter	Content Standard *The learners demonstrate understanding of...*	Performance Standard *The learners should be able to...*	Most Essential Learning Competencies	Duration	K to 12 CG Code
1st	1. the properties of liquids and solids to the nature of forces between particles 2. phase changes in terms of the accompanying changes in energy and forces between particles	Design a simple investigation to determine the effect on boiling point or freezing point when a solid is dissolved in water	Use the kinetic molecular model to explain properties of liquids and solids	Week 1	STEM_GC11IMFIIIa-c-99
			Describe and differentiate the types of intermolecular forces	Week 1	STEM_GC11IMFIIIa-c-100
			Describe the following properties of liquids, and explain the effect of intermolecular forces on these properties: surface tension, viscosity, vapor pressure, boiling point, and molar heat of vaporization	Week 1	STEM_GC11IMFIIIa-c-102
			Explain the properties of water with its molecular structure and intermolecular forces	Week 1	STEM_GC11IMFIIIa-c-103
			Describe the difference in structure of crystalline and amorphous solids	Week 1	STEM_GC11IMFIIIa-c-104
			Interpret the phase diagram of water and carbon dioxide	Week 2	STEM_GC11IMFIIIa-c-107
			Determine and explain the heating and cooling curve of a substance	Week 2	STEM_GC11IMFIIIa-c-109
	properties of solutions, solubility, and the stoichiometry of reactions in solutions		Use different ways of expressing concentration of solutions: percent by mass, mole fraction, molarity, molality, percent by volume, percent by mass, ppm	Week 2	STEM_GC11PPIIId-f-111
			Perform stoichiometric calculations for reactions in solution	Week 2	STEM_GC11PPIIId-f-112
			Describe the effect of concentration on the colligative properties of solutions	Week 2	STEM_GC11PPIIId-f-115

			Differentiate the colligative properties of nonelectrolyte solutions and of electrolyte solutions	Week 3	STEM_GC11PPIIId-f-116
			Calculate boiling point elevation and freezing point depression from the concentration of a solute in a solution	Week 3	STEM_GC11PPIIId-f-117
			Calculate molar mass from colligative property data	Week 3	STEM_GC11PPIIId-f-118
			Describe laboratory procedures in determining concentration of solutions	Week 3	STEM_GC11PPIIId-f-119
	energy changes in chemical reactions		Explain the first law of thermodynamics	Week 3	STEM_GC11TCIIIg-i-124
			Explain enthalpy of a reaction	Week 3	STEM_GC11TCIIIg-i-125
			Calculate the change in enthalpy of a given reaction using Hess Law		STEM_GC11TCIIIg-i-127
	1. the rate of a reaction and the various factors that influence it 2. the collision theory		Describe how various factors influence the rate of a reaction	Week 4	STEM_GC11CKIIIi-j-130
			Differentiate zero, first-, and second-order reactions	Week 4	STEM_GC11CKIIIi-j-132
			Explain reactions qualitatively in terms of molecular collisions	Week 4	STEM_GC11CKIIIi-j-136
			Explain activation energy and how a catalyst affects the reaction rate	Week 4	STEM_GC11CKIIIi-j-137
			Cite and differentiate the types of catalysts	Week 4	STEM_GC11CKIIIi-j-138
2nd	spontaneous change, entropy, and free energy	Prepare a poster on a specific application of one of the following: A. Acid-base equilibrium B. Electrochemistry Include in the poster the concepts, principles, and chemical reactions involved, and diagrams	Predict the spontaneity of a process based on entropy	Week 5	STEM_GC11CTIVa-b-140
			Explain the second law of thermodynamics and its significance	Week 5	STEM_GC11CTIVa-b-142
			Use Gibbs' free energy to determine the direction of a reaction	Week 5	STEM_GC11CTIVa-b-143
	Chemical equilibrium and Le Chatelier's Principle		Explain chemical equilibrium in terms of the reaction rates of the forward and the reverse reaction	Week 5	STEM_GC11CEIVb-e-145

		of processes and other relevant materials	Calculate equilibrium constant and the pressure or concentration of reactants or products in an equilibrium mixture	Week 5	STEM_GC11CEIVb-e-148
			State the Le Chatelier's principle and apply it qualitatively to describe the effect of changes in pressure, concentration and temperature on a system at equilibrium	Week 5	STEM_GC11CEIVb-e-149
	1. acid-base equilibrium and its applications to the pH of solutions and the use of buffer solutions 2. solubility equilibrium and its applications		Define Bronsted acids and bases	Week 6	STEM_GC11ABIVf-g-153
			Discuss the acid-base property of water	Week 6	STEM_GC11ABIVf-g-154
			Calculate ph from the concentration of hydrogen ion or hydroxide ions in aqueous solutions	Week 6	STEM_GC11ABIVf-g-156
			Describe how a buffer solution maintains its ph	Week 6	STEM_GC11ABIVf-g-160
			Calculate the ph of a buffer solution using the Henderson Hasselbalch equation	Week 6	STEM_GC11ABIVf-g-161
	Redox reactions as applied to galvanic and electrolytic cells		Define oxidation and reduction reactions	Week 7	STEM_GC11ABIVf-g-169
			Balance redox reactions using the change in oxidation number method	Week 7	STEM_GC11ABIVf-g-170
			Identify the reaction occurring in the different parts of the cell	Week 8	STEM_GC11ABIVf-g-172
			Define reduction potential, oxidation potential, and cell potential		STEM_GC11ABIVf-g-176
			Calculate the standard cell potential	Week 8	STEM_GC11ABIVf-g-178
			Relate the value of the cell potential to the feasibility of using the cell to generate an electric current	Week 8	STEM_GC11ABIVf-g-179
			Describe the electrochemistry involved in some common batteries: a. Leclanche dry cell b. Button batteries c. Fuel cells	Week 8	STEM_GC11ABIVf-g-180

			d. Lead storage battery		
			Apply electrochemical principles to explain corrosion	Week 8	STEM_GC11ABIVf-g-181
			Explain the electrode reactions during electrolysis	Week 8	STEM_GC11ABIVf-g-182
			Describe the reactions in some commercial electrolytic processes	Week 8	STEM_GC11ABIVf-g-183