مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – Year 9

Subject	**Chemistry**
Class/ Section	**Year 9 A - F**
Week	**Week 3 : 12th September to 16th September**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Mixtures**
Key Vocabulary	**Pure substances , Mixtures, fineness scale, Carat**
	Lesson 1-2 **Specific Learning objectives** Explain the differences between the use of 'pure' in chemistry compared with its everyday use and the differences in chemistry between a pure substance and a mixture. Interpret melting point data to distinguish between pure substances, which have a sharp melting point, and mixtures, which melt over a range of temperatures. **Specific Intended Learning Outcomes** Recall what are elements and compounds. Understand that elements and compounds are pure substances because they have a constant or uniform composition throughout.

	Differentiate between pure substances and mixtures Explain how you can use melting point data or a heating curve to identify whether a substance is pure or a mixture. Explain why a pure substance has a fixed melting point and a mixture melts over a range of temperatures. Describe what the fineness scale for gold is What is the difference between 22carat and 24 carat gold.
Tasks	**Tasks** **Lesson 1** 1. Lists few names of elements and compounds 2. **Watch ALDS** video *SC2a Pure substances and mixtures first part* **i)** answer questions 1 -4 in the students book. ii) List the difference between pure substances and mixtures **Lesson 2** 3. **ALDS** video *SC2a Pure substances and mixtures last part* **Interpret the heating curve and the table** given students book page 5 and answer questions 5, 6 and exam style question 4. Research what is fineness scale of gold and answer E1 in students book 5. Read the paragraph given in worksheet 2a.2 and answer the questions on purity of gold
Assessment Criteria/ Essential questions	**Support:** List the difference between pure substance and mixtures . Worksheet SC2a. 3 provide scaffolding to complete this questions **Stretch:** Explain why a pure substance has a fixed melting point and a mixture melts over a range of temperatures. **Extend :** Research fineness of gold What is the difference between 22 and 24 carat gold.
Resources	Edexcel GCSE (9-1) students book , worksheets SC2a.2 and 3 for class work A power point to display learning objectives, tasks and images

	Lesson 3 **Specific Learning objectives** Explain the differences between the use of 'pure' in chemistry compared with its everyday use and the differences in chemistry between a pure substance and a mixture. **Specific Intended Learning Outcomes** Recall the difference between a pure substance and a mixture. Recall what happens to its particles when a solid melts? Describe how do melting points allow you to spot the differences between pure substances and mixture Calculate the percentage composition of gold in a 22 carat gold
Task	**Task** Complete the worksheet –SC2a. Exam style questions
	Assessment Criteria/ Essential questions: When students have completed the worksheet questions, check which students have difficulty with which questions and use the level of problem to identify any areas for revisiting before moving on to the next topic. **Support:** Students could work in pairs to complete this activity. **Stretch :** Ask students to complete the Extra Challenge question on difference in melting range of soft solder and hard solder. **Extend** : What is the mass of gold in a 2.5 g ring made of 18 carat gold?

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 10

Subject	**Chemistry**
Class/ Section	**Year 10 A - F**
Week	**Week 3 : 12th Sept – 16th September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**4**
Unit/Topic	**Calculations involving masses**
Key Vocabulary	**solute, solvent, solution, concentration, closed system, non-enclosed system**
Lessons 1,2,3,4–Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in Google classroom which will be matched to the student's ability.** **Assessment Criteria/ Essential questions**	**Lesson 1 : Conservation of mass** **Specific Learning objectives** Calculate the concentration of solutions in g dm^{-3} **Specific Intended Learning Outcomes** • Define concentration of solutions. • Use the formula C= m/V to calculate the concentration in g/dm^3 **Tasks:** 1.Recap of the terms solute, solvent and solution. 2.Ask students to read the label on the mineral water bottle and find the units for concentration of the ions. 3.Ask students to frame the definition of concentration and deduce the formula for finding concentration (based on the units). Guide them where necessary. 4. Explain how to calculate concentration with examples. Emphasize that the mass should be in grams and volume should be in dm^3 5. Answer Q1 from text bk page no. 74, in the text bk. **Support:** Calculation the concentration of solution Volume = 0.250 dm^3 mass = 2.5g **Stretch:** 50 cm^3 of a solution of potassium chloride contained 0.6 g of dissolved solid. Calculate the concentration of the solution in g dm^{-3}. **Extend:**

Resources	Find the mass of copper sulfate dissolved in 250 cm^3 of a solution to obtain a concentration of 20 gdm^{-3}. Edexcel GCSE (9-1) Chemistry textbook. Power point.
Assessment Criteria/ Essential questions **Resources**	**Lesson 2: Conservation of mass (contd)** **Specific Learning objectives** • Explain the law of conservation of mass applied to: (a) a closed system including a precipitation reaction in a closed flask (b) a non-enclosed system including a reaction in an open flask that takes in or gives out a gas. **Specific Intended Learning Outcomes** • State Law of conservation of mass. • Define precipitation reaction. • Differentiate between a closed and non-enclosed system. **Tasks:** 1. Recap of empirical and molecular formula. 2. Students watch a video of a precipitation reaction between lead nitrate and potassium iodide solution and write their observations. 3. Students come up with the definition of precipitation reaction. 4. Students watch another video of the reaction between calcium carbonate and hydrochloric acid and write their observations. 5. Students compare and infer which of these are examples of closed and non-enclosed systems and reason why. 6. Teacher states and explains the law of conservation of mass. 7. Answer Q2 and Q3 from text bk page no.75, in the notebook. **Support:** Sodium chloride solution reacts with silver nitrate solution to form a white solid, silver chloride. State the type of reaction. **Stretch:** Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen gas. Compare with reaction between sodium chloride and silver nitrate and state with reason whether the system is closed or non-enclosed. **Extend:** Calculate the mass of oxygen that combines with 20.4 g of magnesium to form 34.0 g of magnesium oxide. $2Mg + O_2 \rightarrow 2MgO$ Edexcel GCSE (9-1)Chemistry textbook. Power point, Video.

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ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 11

Subject	**Chemistry**
Class/ Section	**Year 11 A - F**
Week	**Week 3 : 12th Sept – 16th September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**5**
Unit/Topic	**Quantitative analysis**
Key Vocabulary	**Concentration, end point, concordant values**
Lessons 1,2,3,4,5–Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students ability.**	**Lesson 1: Concentrations** **Specific Learning objectives** •To reinforce the calculation of the concentrations of solutions in mol dm^{-3} and convertion of concentration in g dm^{-3} into mol dm^{-3} and vice versa. **Specific Intended Learning Outcomes** • Define the term concentration. • Applies the equation Concentration in $gdm^{-3} = \frac{Mass\ of\ solute\ in\ g}{volume\ of\ solution\ in\ dm3}$ • Applies the equation Concentration in $moldm^{-3} = \frac{Number\ of\ moles\ of\ solute}{volume\ of\ solution\ in\ dm3}$ • Convert concentration in g dm^{-3} into concentration in mol dm^{-3} . • Convert concentration in mol dm^{-3} into concentration in g dm^{-3} . **Tasks:** 1. Review how to calculate the concentration in mol/dm^3 and g/dm^3

Assessment Criteria/ Essential questions **Resources**	2. Quick check on how the mass of solute and volume of solution relates to concentration. 3. Teacher would explain how to convert concentration in g dm^{-3} into mol dm^{-3} and concentration in mol dm^{-3}into g dm^{-3} 4. Students will do some challenging questions related to concentration from the worksheet. 6.Answer E1 and E2 questions from textbook page No.113 in the notebook. **Support:** 100 cm^3 of a solution of magnesium sulfate contains 0.26 g of dissolved solid. Calculate the concentration of this solution in g dm^{-3} . **Stretch:** A solution of aluminium sulfate, $Al_2(SO_4)_3$, has a concentration of 0.25 mol dm^{-3} . Calculate the concentration of this solution in g dm^{-3} . **Extend:** A solution of magnesium nitrate, $Mg(NO_3)_2$, has a concentration of 0.025 mol dm^{-3} . a Calculate the number of moles of magnesium nitrate in 50 cm^3 of this solution. b Magnesium nitrate is an ionic compound. Calculate the total number of moles of ions formed from magnesium nitrate in 50 cm^3 of this solution. Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.
	Lesson 2&3: Titrations and calculations **Specific Learning objectives** • To Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator. • To explain how to use titration data to calculate concentration. **Specific Intended Learning Outcomes** • List the steps in carrying out an acid-alkali titration. • Explain qualitatively what is happening in a titration. • Calculate concentration in mol/dm^3 • Identify the method for determining the completion of a neutralisation reaction. • Identify the concordant values. • Define end point. **Tasks:** 1. Review neutralisation reaction and the effects of acids and alkalis on common indicators. 2.Quick quiz on Sc8e alkalis and neutralisation 3. Demonstrate a correct procedure for carrying out an acid–alkali titration and taking accurate measurements. 4. Students will arrange the given titration steps into sequential order. 5. Summarise titration procedure. 6. Discuss the students' ideas and explain how to use titration data to calculate concentration. 7.Answer the questions from textbook page No.114 in the notebook

Assessment Criteria/ Essential questions **Resources**	**Support:** How do you calculate an acid alkali titration? **Stretch:** Identify the concordant values from the given titration data and calculate the mean of concordant values? **Extend:** Calculate the concentration of a solution using the results of an acid-alkali titration. Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.
Assessment Criteria/ Essential questions	**Lesson 4&5: Titrations and calculations** **Specific Learning objectives** • To understand how to calculate concentration from reacting volumes. • To Carry out simple calculations using the results of titrations to calculate an unknown concentration of a solution or an unknown volume of solution required. **Specific Intended Learning Outcomes** • Calculate the number of moles of solute in a given volume of solution. • Deduce the mole ratio of acid to alkali from a balanced equation. • Calculate the concentration of a solution using the results of an acid-alkali titration. • Calculate the volume of solution required in an acid-alkali titration, given the concentrations of both the acid and the alkali. **Tasks:** 1. Revise titration procedure and calculation of concentration in mol/dm^3. 2.Quick check on how to write balanced equations for the reactions between acids and alkalis. 3.Teacher would explain how to calculate the concentration of solution using the results of an acid alkali titration. 4.Students will do titration calculations using the given data. 5.Answer the questions from textbook page no.115 in the notebook. **Support:** Describe how to carry out a titration to find the exact volume of hydrochloric acid needed to neutralise 25.0 cm^3 of a sodium hydroxide solution. **Stretch:** Calculate the volume of 0.0950 mol dm^{-3} potassium hydroxide solution that would be needed to neutralise 25.0 cm^3 of 0.100 mol dm^{-3} nitric acid. **Extend:** Lactic acid makes yogurt sour. A sample of yogurt was tested to find the concentration of lactic acid, using these instructions: ● Place 10.0 cm^3 of yogurt in a volumetric flask and dilute it to 100 cm3 with water. ● Titrate 25.0 cm^3 of the diluted yogurt solution with 0.10 mol dm^{-3} sodium hydroxide solution. The mean volume of 0.100 mol dm^{-3} sodium hydroxide solution required was 10.80 cm^3 .

Resources	lactic acid + sodium hydroxide → sodium lactate + water $C_2H_4OHCOOH(aq) + NaOH(aq) \rightarrow C_2H_4OHCOONa(aq) + H_2O(l)$ a Calculate the concentration, in mol dm^{-3} , of the lactic acid in the diluted yogurt solution. b Calculate the concentration, in g dm^{-3} , of lactic acid in the original yogurt. Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.

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Lesson Plan – YEAR 12

Subject	**Chemistry**
Class/ Section	**Year 12** **Batch 1 and 2**
Week	**Week 3 – 12th Sept – 16th Sept**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Topic 5 – Formulae , equations and amount of substance**
Key Vocabulary	**Moles , Relative Atomic mass , parts per million**
Lessons 1,2,3 –Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students ability.**	**Lesson 1 – Calculations using moles** **Specific Learning objectives** Know that the mole (mol) is the unit for amount of a substance. Use the Avogadro constant, L, (6.02×10^{23} mol^{-1}) in calculations. **Specific Intended Learning Outcomes** Define mole. Relate mole to Relative molecular mass. Review that 1mol of any substance contains $6.02x10^{23}$ atoms/molecules/ions Solve calculations based on simple conversion of moles into masses and vice versa

	Tasks 1. Students discuss and define mole. 2. Students solve questions on mole concept. Assessment Criteria/ Essential questions Support: Calculate the amount of substance in different substances Stretch: State the number of in different types of substances Extend: Write equations with state symbols to represent the different reactions **Lesson 2 and 3 - Calculations using reacting masses** **Specific Learning objectives** Know that the molar mass of a substance is the mass per mole of the substance in g mol^{-1} **Specific Intended Learning Outcomes** Define: relative atomic mass, molar mass Predict the use of parts per million in finding out carbon dioxide emissions in parts per million. Solve calculations based on simple conversion of moles into masses and vice versa **Tasks:** Discuss the idea behind different units of concentration. Solve questions on mole and mass concept. **Assessment Criteria/ Essential questions** Support: Write balanced equation for the reaction. Stretch: Calculate mass of product formed in a reaction Extend: Identify the limiting reactant
Resources	Edexcel A level Chemistry 2 Textbook Interactive power point from Board works

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Lesson Plan –YEAR 12

Subject	**Chemistry**
Class/ Section	**Yr 12 – Batch A/B**
Week	**Week 3 : 12th Sept - 16th Sept, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**1 Atomic structure and periodic table**
Key Vocabulary	Mass spectrum, peak height, quantum shells, subshell and orbitals Hund's rule Pauli Exclusion Principle
Lesson 1,2 - Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students' ability.**	**Lesson 1and 2 :** • **Specific Learning objectives:** • analyse and interpret data from mass spectrometry to calculate the relative atomic mass from the relative abundance of isotopes and vice versa • understand how mass spectrometry can be used to determine the relative molecular mass of a molecule • explain the working of various parts of spectrometer.. • Calculate peak ratio. • analyses the given mass spectrum of various elements **Specific Intended Learning Outcomes:** • explain working of various part of mass spectrometry • Calculating relative ratio for peak heights of various particles. • predict the mass spectra, including relative peak heights, for diatomic molecules, including chlorine and bromine. • Calculating relative atomic mass and relative molecular mass and atomic mass from mass spectrometry graphs analyses. • Understand how mass spectrometry can be used to determine the relativemolecular mass of a molecule *Limited to the m/z value for the molecular ion, M^+, giving the relative molecular mass of the molecule.* **Tasks:** Page 15 edexcel textbook 1 - Question 3,4 &5 Based on data analyses and Calculations of relative atomic mass determine *M*r values using the mass-to-charge ratio (m/z) of the molecular ion (M+) peak and predict the mass spectrum for diatomic molecules.

Assessment Criteria/ Essential questions:	**Support** – calculate relative atomic mass from data provided. **Stretch -** explain that the *M*r will only equal if $z = 1$. If more than one electron per molecule is removed, $z > 1$ and so *M*r ≠ . For example, the mass spectrometer cannot distinguish between the ions $_{16}O^{+}$ and $_{32}S^{2+}$. **Extend –** Research how the mass spectrometer works. Sector instruments are described in the Student Book. Information about time-of-flight instruments, which measure the times taken for ions to reach the detectors, can be found on the Internet.
Resources:	Edexcel AS/A level chemistry 1 Textbook Interactive power point from Board works, Video
	Lesson 3: • **Specific Learning objectives:** • Identify the number of electrons that can fill the first four quantum shells • identify that an orbital is a region within an atom that can hold up to two electrons with opposite spins • Know the shape of an s-orbital and a p-orbital • state the number of electrons that occupy s-, p- and d-subshells **Specific Intended Learning Outcomes:** Students should be able to recall • that the number of occupied shells or energy levels is equal to the period number. • s-, p- and d-orbitals, The number of electrons in orbitals, subshells and shells • How orbitals are different from orbits? • Distinguish the shapes of electron density plots (or maps) for s and p orbitals **Tasks:** 1. Explain what quantum shells and subshells are and include the number of electrons that can occupy s-, p- and d-subshells. 2.calculate number of electrons occupied in various subshells. 3.solve MCQ problems shared in work sheet.
Assessment Criteria/ Essential questions:	**Support** – identify shell, subshell & orbital. **Stretch -** differentiate the term relative atomic mass and relative isotopic mass. **Extend –** Research the origin of the letters used for orbitals (s, p, d and f), or the work of Niels Bohr.
Resources:	Edexcel AS/A level chemistry 1 Textbook Interactive power point from Board works Video

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ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 13

Subject	**Chemistry**
Class/ Section	**Year 13 -Batch 1 and 2**
Week	**Week 3 – 12th Sept – 16th Sept**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Topic 15 Transition Metals**
Key Vocabulary	**Electromagnetic spectrum , colour wheel , complementary colours**
Lessons 1,2,3 –Live Zoom lesson along with face to face instruction for students present on a particular day **Work will be assigned in google classroom which will be matched to the students ability.**	**Lesson 1 –** **Specific Learning objectives** Understand that the colour of aqueous ions, and other complex ions, results from the splitting of the energy levels of the *d*-orbitals by ligands. Identify that colour changes in *d*-block metal ions may arise as a result of changes in: i. oxidation number ii. ligand iii. coordination number. **Specific Intended Learning Outcomes** Describe the theory of colour of ions based on charge on the ion and the d-d orbital splitting. Discuss the importance of the presence of unpaired electrons in the d orbitals of the ions. Explain with examples, how the colour of complex ions vary in different solutions based on oxidation number of the central metal atom, the ligands present and the coordination number of the central metal atom.

Assessment Criteria/ Essential questions **Resources**	**Tasks** Teacher discuss about colour wheel. Students recall about the reason for colour in flame reason. Support: Why transition complexes are coloured ? Stretch: Draw the colour wheel to explain why Titanium(III) is coloured. Extend: Find the difference flame colours and transition metal complexes colour Edexcel A level Chemistry 2 Textbook Interactive power point from Board works
Assessment Criteria/ Essential questions **Resources**	**Lesson 2 and 3** **Specific Learning objectives** 1. Understand why H_2O, OH^- and NH_3 act as monodentate ligands 2. Explain why complexes with six-fold coordination have an octahedral shape, such as those formed by metal ions with H_2O, Cl^- and NH_3 as ligands **Specific Intended Learning Outcomes** Define coordination number of the central metal atom as the number of ligands around it. Discuss the monodentate nature of H_2O, OH^- and NH_3 as ligands. Explain and applies that complexes with coordination number six have an octahedral shape according to VSEPR theory. **Tasks:** Discuss about different types of ligands Refer textbook and understand the structure Support: Write the difference between three types of ligands. Stretch: Suggest examples for the different types of ligands Extend: Draw the structures of different types of ligands Edexcel A level Chemistry 2 Textbook Interactive power point from Board works