مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan- YEAR 9

Subject	**Chemistry**
Class/ Section	**Year 9**
Week	**Week 4 - 19th September to 23rd September**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**SC2b Filtration and Crystallisation**
Key Vocabulary	**Crystallisation, Saturated solution**
Specific Learning objectives **and Specific Intended Learning Outcomes**	**Lesson 1 and 2 . Filtration and crystallisation** **Specific Learning objectives** Explain the experimental techniques for separation of mixtures by: (a) filtration. (b) crystallisation. Evaluate the hazards and risks when separating mixtures by filtration and crystallisation. **Specific Intended Learning Outcomes** Explain how mixtures are separated by filtration. Explain the formation of crystals during crystallisation. Explain ways of reducing risk when separating mixtures by filtration and crystallisation.

Tasks	**<u>Tasks</u>** 1. Identify the apparatus required for filtration and the how can we separate insoluble substances from a mixture. 2. Watch **ALDS** video *Sea salt production* and answer the questions given in the video 3. Explain the step by step method for the separation of soluble salt by crystallisation method 4. Explain why large and small crystals are formed (Q. 5and 6 in the text book) 5. Tabulate the hazards , harm and the precautions needed to reduce the risk during filtration and crystallisation 6. . Exam style questions (difference between risk and hazards)
Assessment Criteria/ Essential questions	**Support**: Identify the apparatus set up used for the separation of spilled sand and salt mixture by filtration and crystallisation **Stretch:** Explain step by step method for the separation of the spilled sand and salt mixture. Explain the science behind each step and explain the safety procedures in your method. **Extend:** During the spillage and recovery of sand and salt other soluble salts may have been mixed with the 'pure' soluble salt. How can we show that the recovered salt is a pure substance?
Resources	Edexcel GCSE (9-1) students book , Doddle interactive power point A power point to display learning objectives, tasks and images
	Lesson 3 **<u>Specific Learning objectives</u>** Recall the experimental techniques used for the separation of mixtures by filtration and crystallisation Recall ways of reducing risk when separating mixtures by filtration and crystallisation
	<u>Specific Intended Learning Outcomes</u> Apply students' previous knowledge on filtration and

	crystallisation in different level of questions By the end of the lesson, pupils will be able to answer the scientific enquiry based and application level questions
	Task Complete the worksheet –SC2b 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 hazards and risks. **Extend** : Application of filtration and crystallisation in our day today life
	Resources worksheets SC2 b

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan –YEAR 10

Subject	**Chemistry**
Class/ Section	**Year 10**
Week	**Week 4 : 19th Sept – 23rd 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** **Resources**	**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:** 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.
	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.
Assessment Criteria/ Essential questions	**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. $2Mg + O_2 \rightarrow 2MgO$
Resources	Edexcel GCSE (9-1)Chemistry textbook. Power point, Video.

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 11

Subject	**Chemistry**
Class/ Section	**Year 11**
Week	**Week 4 : 19th – 23rd September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**5**
Unit/Topic	**Quantitative analysis and Hydrocarbons**
Key Vocabulary	**Hydrocarbon , alkanes , saturated**
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.** **Assessment Criteria/ Essential questions** **Resources**	**Lesson 1 and 2** **Specific Learning objectives** •To reinforce the concept of atom economy, percentage yield , titration calculations. **Specific Intended Learning Outcomes** Solve the problems based on atom economy , percentage yield , concentration and titration calculations. **Tasks:** Students will do challenging questions from past papers. **Support:** Solve the problems of atom economy and percentage yield **Stretch:** Solve questions on standard solutions and procedure of titration. **Extend:** Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.

	Lesson 3&4: Alkanes **Specific Learning objectives** Recall that hydrocarbons are compounds that contain carbon and hydrogen only Describe crude oil as: a a complex mixture of hydrocarbons b containing molecules in which carbon atoms are in chains or rings (names, formulae and structures of specific ring molecules not required) c an important source of useful substances (fuels and feedstock for the petrochemical industry) d a finite resource **Specific Intended Learning Outcomes** Describe that the chemicals obtained from crude oil are called hydrocarbons and that a hydrocarbon is a molecule consisting of carbon and hydrogen atoms only. Understand the terms fossil fuel, renewable resource and non-renewable resource. Recall that crude oil is a liquid mixture of hydrocarbons that includes dissolved gases and solids. **Tasks:** Research about crude oil formation. Teacher shows the animation of formation of crude oil. Collect the key points and discuss with the peers and understand the formation of crude oil. Discuss the problems of using fossil fuels. **Support:** Suggest examples of fossil fuels. **Stretch:** Explain the formation of crude oil. **Extend:** Find the reason why diesel oil is categorized as non renewable fossil fuel.
Assessment Criteria/ Essential questions	
Resources	Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.

	Lesson 5: **Specific Learning objectives** Describe and explain the separation of crude oil into simpler, more useful mixtures by the process of fractional distillation **Specific Intended Learning Outcomes** Know that each compound vaporises and condenses at different temperatures, and so they are separated. Explain the process of fractional distillation to separate the crude oil into useful fractions. **Tasks:** Students watch the video of fractional distillation. Discuss the procedure and principles in fractional distillation in groups
Assessment Criteria/ Essential questions **Resources**	**Support:** Define fractional distillation **Stretch:** Explain the procedure for fractional distillation. **Extend:** Compare the advantages of using fractional distillation over simple distillation. Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 12

Subject	**Chemistry**
Class/ Section	**Year 12** **Batch 1 and 2**
Week	**Week 4 – 19th Sept – 23rd Sept, 2021**
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 – Reactions** **Specific Learning objectives** Write balanced full and ionic equations, including state symbols, for chemical reactions. **Specific Intended Learning Outcomes** Write balanced symbol equations from word equations for the reaction like displacement reactions, NaOH test, reactions of Calcium Carbonate with water. Predicts and use the state symbols for the **some** reactions. **Tasks** Recall the different reactions. Write the equations for each reaction. Assessment Criteria/ Essential questions Support: Write the word equation for the reaction Stretch: Write the balanced equation for the reaction. Extend: Write the ionic equation for the reaction. **Lesson 2 and 3 -** **Specific Learning objectives** Calculate amounts of substances (in mol) in reactions involving mass, volume of gas, volume of solution and concentration. **Specific Intended Learning Outcomes** Calculate moles and masses from chemical equations using moles=mass/molar mass Calculate the masses of **few** substance using moles and balanced chemical equations. Use the fact that one mole of any gas occupies the same volume at room temperature and pressure – $24dm^3$ Do **some** simple calculations to work out equation with mol = vol /24 dm^3 **Tasks:** Discuss about Avogadro's law of gaseous volumes. Solve problems related to gaseous volumes.

Resources	**Assessment Criteria/ Essential questions** Support: Solve the questions related to moles from volumes Stretch: Find the masses of reactants and products from the equations Extend: Plan and investigation to find the volume of 1 mole of any gas. Edexcel A level Chemistry 2 Textbook Interactive power point from Board works

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan

Subject	**Chemistry**
Class/ Section	**Yr 12 – Batch A/B**
Week	**Week 4: 19th Sept to 23rd September, 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	Periodicity, ionisation energy, emission spectrum, successive ionisation energies, melting point and boiling point.
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'**	**Lesson 1 :** • **Specific Learning objectives:** ● Identify what is meant by first ionisation energy and successive ionisation energies ● Understand the ideas of shell and sub shell based IE data . ● Understand the big jump in ionisation energies over a period change. ● Explain the exceptional trends in ionisation energy across a period in the Periodic Table from group 2 to group 3 and from group 5 to 6. **Specific Intended Learning Outcomes:** **Students will be able to:** • understand periodicity in terms of a repeating pattern across

ability.	different periods, • Give evidence for existence of sub shells from ionisation energy data. • Locate big jump in ionisation energy to name the group number of the element, • Predict the value of successive ionisation energy to make various ions. **Tasks:** 1. Review structure of atom and successive ionisation energies. 2. Identify period number from experimental data on IE 3. Complete IE of pair of elements. 4. Draw a sketch for $\log_{10}$ IE against successive **ionisation energies**. **Support** – Draw a sketch for $\log_{10}$ IE against successive of sodium. **Stretch -** Sketch graphs of the first ionisation energies across Periods 2 and 3 showing the anomalies occur in the graphs. **Extend –** Research the trends in ionisation energies for d block elements.
Assessment Criteria/ Essential questions:	Draw a sketch for $\log_{10}$ IE against successive IE of aluminium. Solve question 4 and 5 page 23 text book. Explain IE of He is higher than H.
Resources:	Edexcel AS/A level chemistry 1 Textbook Interactive power point Video

	Lesson 2 and 3 : • **Specific Learning objectives:** • Understand reasons for the trends in the following properties of the elements from periods 2 and 3 of the Periodic Table: i the melting and boiling temperatures of the elements, based on given data, in terms of structure and bonding ii ionisation energy based on given data or recall of the plots of ionisation energy versus atomic number • Illustrate periodicity using data, including electronic configurations, atomic radii, melting and boiling temperatures and first ionisation energies **Specific Intended Learning Outcomes:** **Students will be able to:** • Analyse the trends in the melting and boiling points for elements in period 2, period 3 based on the structure and bonding. • Analyse the trends in ionization energy for period 2,3. • Define periodicity. • Analyse and compare the periodicity for group 2 and 3 elements across the period. **Tasks:** 1. understand periodicity in terms of a repeating pattern across different periods 2.understand reasons for the trends in the melting and boiling temperatures and the first ionisation energies of the elements from Periods 2 and 3 of the Periodic Table 3.recall how to illustrate periodicity using data, for example electronic configurations, atomic radii, melting and boiling temperatures, and first ionisation energies. Answer the exam-style questions for Topic 1 in the Student Book.
Assessment Criteria/ Essential questions:	**Support** – Students explain the graphs of atomic radii, melting temperatures, boiling temperatures and first ionisation energies across Periods 2 and 3. **Stretch -** Students practise sketching the graphs of atomic radii, melting temperatures, boiling temperatures and first ionisation energies across Periods 2 and 3. **Extend –** Research the trends in atomic radius and melting and boiling temperatures down Groups 1 or 2. ● Boron and aluminium are both in Group 3 and both have giant lattice structures, yet one has covalent bonding and the other has metallic bonding. What are the differences in their physical and chemical properties? ● Oxygen is in Period 2 and sulfur is in Period 3, both have higher boiling temperatures than the two elements either side of them even though they all exist as simple covalent molecules. Find out why this is.
Resources:	Edexcel AS/A level chemistry 1 Textbook Interactive power point Video

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan –YEAR 13

Subject	**Chemistry**
Class/ Section	**Year 13**
Week	**Week 4 : 19th September to 23rd September, 2021**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Acid-base equilibria**
Key Vocabulary	**Buffer solution**
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&2 Buffer solutions** **Specific Learning objectives** • Understand what is meant by the term 'buffer solution' • Understand the action of a buffer solution • Calculate the pH of a buffer solution given appropriate data • Calculate the concentrations of solutions required to prepare a buffer solution of a given pH • Understand the roles of carbonic acid molecules and hydrogencarbonate ions in controlling the pH of blood. • Explain the buffering action during the titration of a weak acid–strong base. **Specific Intended Learning Outcomes.** • Define the term buffer solution • Explain the uses of buffer solutions • Explain how a buffer solution works • Calculate the pH of buffer solutions • Describe how a buffer solution can be made up for a given pH • Explain the buffer system in the blood.

Assessment Criteria/ Essential questions **Resources**	**Tasks:** 1.Research the everyday uses of buffers 2.Discuss the principles behind making an acidic or a basic buffer solution. Explain how buffers resist small changes in pH. 3.Write the equations to show buffer action for an acidic buffer $CH_3COOH/CH_3COO^-Na^+$ system and the alkaline buffer NH_3/NH_4^+ system. 4. Explain the buffering action during a weak acid–strong base titration. 5.Answer the questions from textbook page no.42 **Support**: Define buffer solutions with examples **Stretch**: Explain how buffer solutions work with relevant equations. **Extended**: Solve numericals to find the pH of buffer solutions, changes in pH when small amounts of acids or alkalis are added to buffer solutions. Edexcel A level Chemistry 2 textbook. Power point , Video

	Lesson 3: Buffer solutions and pH curve **Specific Learning objectives** • Understand how to use a weak acid–strong base titration curve to:(i) demonstrate buffer action (ii) determine *K*a from the point at which half the acid is neutralised. • Understand why there is a difference in the standard enthalpy changes of neutralisation values for strong and weak acids. **Specific Intended Learning Outcomes** • Explain the term equivalence point. • Evaluate Ka, Kb from titration curves of weak acid – strong base titrations. • Compare the enthalpy changes of neutralization values of strong acid- strong base and strong acid – weak base/ strong base – weak acid. • Explain why the values are lower than -57.1kJmol^{-1} **Tasks:** 1. Draw the titration curve on the whiteboard and ask students to suggest where the buffering action occurs. 2.Discussion about what is happening in terms of the removal of a small number of H^+ ions and the logarithmic nature of the pH scale. 3. Explain the buffering action during a weak acid–strong base titration. 4. Discuss half-volume method and determination of p*K*a of a weak acid. **Support:** Explain the buffering action during a weak acid–strong base titration. **Stretch:** Describe half volume method and determination of pKa values. **Extend:** Determine Ka from pH titration curve.
Assessment Criteria/ Essential questions **Resources**	Edexcel A level Chemistry 2 textbook. Power point , Video

مدرسة القديسة مريم الكاثوليكية الثانوية – دبي

ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan –YEAR 13

Subject	**Chemistry**
Class/ Section	**Year 13 -Batch 1 and 2**
Week	**Week 4 – 19th Sept – 23rd September**
Work send to students by	**Google classroom**
Total number of lessons per week	**3**
Unit/Topic	**Topic 15 Transition Metals**
Key Vocabulary	**Ligand substitution**
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 – Ligand substitution reaction** **Specific Learning objectives** Understand that ligand substitution, and an accompanying colour change, occurs in the formation of: i. $[Cu(NH_3)_4(H_2O)_2]^{2+}$ from $[Cu(H_2O)_6]^{2+}$ via $Cu(OH)_2(H2O)_4$ ii. $[CuCl_4]^{2-}$ from $[Cu(H_2O)_6]^{2+}$ iii. $[CoCl_4]^{2-}$ from $[Co(H_2O)_6]^{2+}$. **Specific Intended Learning Outcomes** Explain the colour changes and ligand substitution reactions for the following reactions. i. $[Cu(NH_3)_4(H_2O)_2]^{2+}$ from $[Cu(H_2O)_6]^{2+}$ via $Cu(OH)_2(H_2O)_4$ ii. $[CuCl_4]^{2-}$ from $[Cu(H_2O)_6]^{2+}$ iii. $[CoCl_4]^{2-}$ from $[Co(H_2O)_6]^{2+}$. **Tasks:** Observe the reactions of cobalt Represent the reaction with balanced equation

Assessment Criteria/ Essential questions **Resources**	Support: Identify the colour of reacting species and product in the reaction. Stretch: Write the formula for the species which are responsible for the colour. Extend: Write the balanced equation for the reaction. Edexcel A level Chemistry 2 Textbook Interactive power point from Board works
	Lesson 2 and 3 – Theory of ligand substitution reaction **Specific Learning objectives** Understand that the substitution of small, uncharged ligands (such as H_2O) by larger, charged ligands (such as Cl^-) can lead to a change in coordination number. **Specific Intended Learning Outcomes** Explain how the substitution of small, uncharged ligands (such as H_2O) by larger, charged ligands (such as Cl^-) leads to a change in coordination number and hence the shape of the complex. **Tasks:** Recall the different substitution reactions. Discuss different theories which support the feasibility of substitution reactions.
Assessment Criteria/ Essential questions	Support: Recall the colour change for the ligand substitution reaction Stretch: Write equations to represent substitution reaction Extend: Explain the feasibility of substitution reaction with the help of entropy factor.
Resources	Edexcel A level Chemistry 2 Textbook Interactive power point from Board works