



مدرسة القديسة مريم الكاثوليكية الثانوية – دبي
ST. MARY'S CATHOLIC HIGH SCHOOL, DUBAI

Lesson Plan – YEAR 9

Subject	Chemistry
Class/ Section	Yr 9
Week	Week 2 : 5th Sept to 9th September
Work send to students by	Google classroom
Total number of lessons per week	3
Unit/Topic	SC1a. States of matter
Key Vocabulary	Atoms and molecules, intermolecular attraction, sublimation, deposition, melting point and boiling point
<u>Specific Learning objectives and learning outcomes</u>	<p><u>Lesson 1 and 2 :</u> Particle model and change of states</p> <p><u>Specific Learning objectives:</u> Describe the arrangement, movement and the relative energy of particles in each of the three states of matter: solid, liquid and gas. Recall the names used for the interconversions between the three states of matter, recognising that these are physical changes. Explain the changes in arrangement, movement and energy of particles during these interconversions.</p> <p><u>Specific Intended Learning Outcomes:</u></p> <ul style="list-style-type: none">▪ Distinguish between the three states of matter in terms of the arrangement of particles, movement and relative energy of particles▪ Define the terms melting, freezing, boiling, evaporating, condensing, subliming and deposition .▪ Explain how solids change into liquids and liquids into gases in terms of arrangement , movement and relative energy of particles

<p><u>Tasks</u></p>	<p><u>Tasks:</u></p> <ol style="list-style-type: none"> <u>Review :</u> Three states of matter, atoms and molecules, particle model <u>Card sort activity (Pair work) –:</u> Tabulate the differences in the arrangements and movement of particles in solids, liquids and gases. <u>Blend space activity:</u> Complete the blend space diagram by writing the terms melting, freezing, boiling, condensing, subliming and deposition and define melting point, boiling point, sublimation and deposition (Note book work) <u>Group activity: Watch video and complete the worksheet SC1a.3</u> Complete the questions (1-3) (pg 2&3) assigned from the students book , in the notebook.
<p><u>Assessment Criteria/ Essential questions:</u></p>	<p>Support: Tabulate the differences between solid liquid and gases in terms of the arrangements and movement of particles Provide scaffolding to describe what happens to the particles during state changes</p> <p>Stretch: Challenge them by asking following questions. Describe what happens to the movement and arrangement of particles during sublimation and deposition and explain what this tells you about the strength of the attractive forces between their particles.</p> <p>Extend : What is plasma state?</p>
<p><u>Resources:</u></p>	<p>Edexcel GCSE (9-1) students book , worksheets SC1a.1 and 3 for class work A power point to display learning objectives, tasks and images</p>
	<p><u>Lesson 3</u></p> <p><u>Specific Learning objectives:</u></p> <p>The three states of matter (solids, liquids and gases), and the changes that occur during changes of state.</p> <p><u>Specific Intended Learning Outcomes:</u></p> <ul style="list-style-type: none"> ▪ Distinguish between the three states of matter in terms of the arrangement of particles, movement and relative energy of particles ▪ Explain how solids change into liquids and liquids into gases in terms of arrangement , movement and relative energy of particles

	<p><u>Tasks:</u></p> <p>Complete the worksheet –SC1a (mixed) and Exam style questions</p> <p><u>Assessment Criteria/ Essential questions:</u> 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.</p> <p><u>Support:</u> Students could work in pairs to complete this activity.</p> <p>Stretch : Ask students to complete the Extra Challenge question on the worksheet.</p> <p><u>Resources:</u> Exam style questions worksheet (Differentiated)</p>
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مدرسة القديسة مريم الكاثوليكية الثانوية – دبي
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Lesson Plan- YEAR 10

Subject	Chemistry
Class/ Section	Year 10
Week	Week 2 : 5th Sept – 9th September, 2021
Work send to students by	Google classroom
Total number of lessons per week	4
Unit/Topic	Calculations involving masses
Key Vocabulary	Molecular formula, empirical formula, relative formula mass

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 & 2: Masses and empirical formulae

Specific Learning objectives

- Calculate relative formula mass given relative atomic masses.
- Understand the difference between empirical and molecular formula.
- Deduce the empirical formula of a compound from the formula of its molecule
- Deduce the molecular formula of a compound from its empirical formula and its relative molecular mass.

Specific Intended Learning Outcomes

- Calculate the relative formula mass.
- Define the terms empirical and molecular formulae.
- Differentiate between empirical and molecular formulae.
- Deduce the empirical formula and molecular formula.

Tasks:

1. Recap of the terms formula and relative atomic mass.
2. Explain how to calculate relative formula mass (M_r) from relative atomic masses with examples (Q2 from text bk pg no. 72)
3. Introduce the terms molecular formula and empirical formula and give examples to differentiate between the two.
4. Explain the method to deduce empirical formula from molecular formula and molecular formula from empirical formula.
5. Answer Q1 and Q4 from text bk page no. 72-73, in the text bk.

Support: Calculate the relative formula mass (M_r) of
a) potassium bromide, KBr
b) calcium carbonate, CaCO_3

Stretch: Calculate the relative formula mass (M_r) of
a) magnesium nitrate, $\text{Mg}(\text{NO}_3)_2$
b) aluminium sulfate, $\text{Al}_2(\text{SO}_4)_3$

Extend:

1. Write the empirical formula of a) C_6H_{12} b) $\text{C}_4\text{H}_8\text{O}$
2. Work out the molecular formula of ethanoic acid with empirical formula CH_2O and $M_r = 60$.

Edexcel GCSE (9-1) Chemistry textbook. Power point.

Lesson 3 & 4: Masses and empirical formulae (contd)

Specific Learning objectives

- Calculate the formulae of simple compounds from reacting masses and understand that these are empirical formulae
- Describe an experiment to determine the empirical formula of a simple compound such as magnesium oxide.

Specific Intended Learning Outcomes

- Calculate the empirical formula of a compound from the masses of the elements it contains.
- Describe an experiment to determine the empirical formula for a compound..

Tasks:

- 1.Recap of empirical and molecular formula.
- 2.Explain the method to find empirical formula from the masses of the elements it contains.
3. Students to answer Q3 from text bk pg. 73.
4. Students to discuss in groups and write a plan to find the empirical formula of magnesium oxide.
5. Students share their plans with the rest of the class.
6. The possible hazards, risks, sources of errors and the ways to minimise these are discussed. Students then watch a video.
7. Answer Q5 from text bk page no.73, in the notebook.

Support: Calculate the empirical formula of a compound with 19.05 g of copper, 9.60 g of sulfur and 19.20 g of oxygen.

Stretch: A compound contains 8.57 g of carbon and 1.43 g of hydrogen. The relative formula mass is 70. Calculate:
a) the empirical formula of the compound
b) the molecular formula of the compound.

Extend: 14.8 g of a compound contains 2.8 g of lithium, 2.4 g of carbon and the remainder is oxygen. Calculate the empirical formula of the compound.

**Assessment Criteria/
Essential questions**

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 2 : 5 th Sept – 9 th Sept
Work send to students by	Google classroom
Total number of lessons per week	5
Unit/Topic	Quantitative analysis
Key Vocabulary	Yield, theoretical yield, actual yield, atom economy , concentration
<p>Lessons 1,2,3,4,5–Live Zoom lesson along with face to face instruction for students present on a particular day</p> <p>Work will be assigned in google classroom which will be matched to the students ability.</p>	<p><u>Lesson 1: Yields</u></p> <p><u>Specific Learning objectives</u></p> <ul style="list-style-type: none"> • Recall the terms actual yield and theoretical yield. • Calculate the percentage yield of a reaction. <p><u>Specific Intended Learning Outcomes</u></p> <ul style="list-style-type: none"> • Understand the term yield. • Define theoretical yield. • Differentiate between theoretical and actual yield. • Applies the equation $\text{percentage yield} = \frac{\text{Actual yield}}{\text{theoretical yield}} \times 100$ • Solve some problems related to percentage yield. <p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1.Revise how to calculate percentage. 2.Introduce the terms actual yield and theoretical yield 3.Revise how to calculate the mass of a product using a balanced equation,and emphasise that this is the theoretical yield of a reaction. 4.Discuss the students' ideas and focus on the calculation of percentage yield. 5.Calculate the percentage yield of a reaction from the actual yield and theoretical yield 6.Answer the questions from textbook page No.108 in the notebook.

<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p>Support:Carbon dioxide is formed when calcium carbonate reacts with hydrochloric acid. The theoretical yield for this reaction is 44 g. Calculate the percentage yield of carbon dioxide formed when the actual yield is 32 g.</p> <p>Stretch:Nitrogen reacts with hydrogen to make ammonia. $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ a Calculate the theoretical yield of ammonia, NH_3, that can be made by reacting 90 tonnes of hydrogen with an excess of nitrogen. b The actual yield of ammonia is 120 tonnes. Calculate the percentage yield of ammonia.</p> <p>Extend:A medicine was made in a one-step process with a 60% percentage yield. Another method of obtaining the same medicine involves a two-step process. The first step gives a 65% yield and the second step a 75% yield. Explain whether the two-step process is more or less efficient than the one-step process.</p> <p>Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.</p>
<p>Assessment Criteria/ Essential questions</p>	<p><u>Lesson 2: Yields</u></p> <p><u>Specific Learning objectives</u></p> <ul style="list-style-type: none"> • Calculate the percentage yield of a reaction. • Describe that the actual yield of a reaction is usually less than the theoretical yield and that the causes of this include: a incomplete reactions b practical losses during the experiment c competing, unwanted reactions (side reactions). <p><u>Specific Intended Learning Outcomes</u></p> <ul style="list-style-type: none"> •How do you calculate the percentage yield of a reaction? •Understand that the actual yield is always less than the theoretical yield of a reaction. •Describe some reasons why the actual yield is less than the theoretical yield of a reaction. <p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1.Revise how to calculate percentage yield from theoretical and actual yield. 2.Solve some problems related to percentage yield. 3.Students should do an investigation on why reactions do not give 100% yields. 4.Discuss the students' ideas and focus on why is the yield less than expected? 5.Answer the questions from textbook page No.109 in the notebook. <p>Support: Describe three reasons why the actual yield is less than the theoretical yield in a reaction</p> <p>Stretch: Many medicines produced by the pharmaceutical industry are made up of complex molecules and have to be made in a series of reactions. There are three methods of making a particular medicine. The actual yield for each method is:</p> <ul style="list-style-type: none"> • Method A: 102 g • Method B: 138 g • Method C: 86 g <p>If the theoretical yield for each method is 200 g, calculate the percentage yield for each method.</p>

<p>Resources</p>	<p>Extend: A solution containing 3.40 g of silver nitrate was placed in a beaker. Excess sodium chloride solution was added, and a white precipitate of silver chloride was formed. The mixture was filtered and then the precipitate was washed, dried and its mass was measured again. The mass of silver chloride, AgCl, formed was 2.24 g. $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$ Calculate the percentage yield of silver chloride.</p> <p>Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.</p>
<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p>Lesson 3: Atom Economy</p> <p>Specific Learning objectives</p> <ul style="list-style-type: none"> Recall the atom economy of a reaction forming a desired product. Calculate the atom economy of a reaction forming a desired product. <p>Specific Intended Learning Outcomes</p> <ul style="list-style-type: none"> What is meant by atom economy of a reaction? Recall the formula for calculating atom economy. Applies the equation $\text{Atom economy} = \frac{\text{relative formula mass of the useful product}}{\text{sum of relative formula masses of all the reactants}} \times 100$ Solve some problems related to atom economy. <p>Tasks:</p> <ol style="list-style-type: none"> Introduce the term atom economy. Discuss the students' ideas and defines the term atom economy. Revise how to calculate relative formula masses. Calculate the atom economy of a reaction. Complete the questions (pg 110) assigned from the Chemistry text book in the notebook. Students will be put in break out rooms during Zoom lesson to encourage collaborative learning. <p>Support: Nitrogen and hydrogen react to form ammonia, NH₃. Explain, in terms of atoms, why the atom economy of this reaction is 100%.</p> <p>Stretch: Copper nitrate can be made by reacting nitric acid with copper oxide or copper carbonate. Calculate the atom economy for making copper sulfate by each of these methods.</p> <p>a From copper oxide: $\text{CuO} + 2\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O}$</p> <p>b From copper carbonate: $\text{CuCO}_3 + 2\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2$</p> <p>Extend: Sodium carbonate, Na₂CO₃, is made from calcium carbonate. $\text{CaCO}_3 + 2\text{NaCl} \rightarrow \text{Na}_2\text{CO}_3 + \text{CaCl}_2$ A manufacturer starts with 50 tonnes of calcium carbonate and obtains 50 tonnes of sodium carbonate Calculate: a the theoretical yield of sodium carbonate b the percentage yield of sodium carbonate c the atom economy for making sodium carbonate.</p> <p>Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.</p>

Lesson 4: Atom Economy

Specific Learning objectives

- Calculate the atom economy of a reaction forming a desired product.
- Explain why a particular reaction pathway is chosen to produce a specified product, given appropriate data such as atom economy, yield [...] and usefulness of by-products.

Specific Intended Learning Outcomes

- How do you calculate the atom economy of a reaction?
- How is data used to decide on the best way to manufacture a product?
- Explain how atom economy and yield determine the choice of reaction pathway.
- Explain how the usefulness of by-products determines the choice of reaction pathway.
- Appreciate the advantage of high atom economy.

Tasks:

- 1.Revise how to calculate the atom economy of a reaction.
- 2.Research on the manufacture of ethanol by fermentation and by hydration of ethane.
- 3.Compare the manufacture of ethanol by fermentation and by hydration of ethene.
- 4.Evaluate the advantages and disadvantages of each process.
- 5.Answer the questions from textbook page no.111 in the notebook.

Support: Sulfuric acid reacts with sodium hydroxide to form sodium sulfate. $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

Calculate the atom economy for making sodium sulfate, Na_2SO_4 .

Stretch: Explain how atom economy, percentage yield and the usefulness of waste products will affect the choice of reaction pathway for manufacturing a particular product.

Extend: Ibuprofen, $\text{C}_{13}\text{H}_{18}\text{O}_2$, is a painkiller. It used to be made in a six-step process, but now it is made in a three step process.

a The total relative formula mass of the reactants in the six-step process is 514.5. Calculate the atom economy for making ibuprofen by the six-step process.

b The total relative formula mass of the reactants in the three-step process is 266. Calculate the atom economy for making ibuprofen by the three-step process.

c If a reaction takes place in two steps and each step has a percentage yield of 90%, the overall percentage yield is $0.9 \times 0.9 \times 100 = 81\%$.

Assuming that each step in the manufacture of ibuprofen has a 90% yield, calculate the overall percentage yield in:

- i the six-step process
- ii the three-step process.

Edexcel GCSE (9-1)Chemistry textbook. Power point , Video.

**Assessment Criteria/
Essential questions**

Resources

Lesson 5: Concentrations

Specific Learning objectives

- Calculate the concentrations of solutions in mol dm^{-3} and convert concentration in g dm^{-3} into mol dm^{-3} and vice versa.

Specific Intended Learning Outcomes

- State the meaning of the term concentration.
- Calculate concentration in g dm^{-3} .
- Calculate concentration in mol dm^{-3} .
- 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. Demonstrate a procedure for making up a standard solution of sodium carbonate
2. Discuss the students' ideas and explain how the mass of solute and volume of solution relates to concentration.
3. Revise how to carry out calculations involving quantities in moles.
4. Introduce the relationship between the number of moles, volume of solution and concentration.
6. Answer the questions from textbook page No.113 in the notebook.

Support: How to use the mass of sodium carbonate to determine the concentration of the solution in g dm^{-3} and then mol dm^{-3} . **Stretch:** A student makes up 250 cm^3 of a solution of sodium carbonate. Her measurements are:

mass of weighing bottle + sodium carbonate, $\text{Na}_2\text{CO}_3 = 21.246 \text{ g}$ mass of weighing bottle = 18.664 g .

Calculate the concentration, in mol dm^{-3} , of the sodium carbonate solution.

Extend: Glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, is a covalent compound. 25 cm^3 of a solution of glucose contained 1.204×10^{21} molecules of glucose. Calculate the concentration of the glucose solution in mol dm^{-3} .

**Assessment Criteria/
Essential questions**

Resources

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 2 – 5th Sept – 9th 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	Empirical formula, molecular formula , Ideal gas equation
<p>Lessons 1,2,3 –Live Zoom lesson along with face to face instruction for students present on a particular day</p> <p>Work will be assigned in google classroom which will be matched to the students ability.</p>	<p>Lesson 1 – Empirical Formulae</p> <p><u>Specific Learning objectives</u></p> <p>Explain what is meant by the terms ‘empirical formula’ and ‘molecular formula’ Calculate empirical formula</p> <p><u>Specific Intended Learning Outcomes</u></p> <p>Predict the formula of the compound/molecule and gives the ratio in which the atoms are present.</p> <p>Work few examples of calculating empirical formulae and further to calculate molecular formulae</p> <p>Use of same calculation to calculate number of moles of water of crystallisation attached.</p> <p>Tasks</p> <ol style="list-style-type: none"> 1. Students differentiate between empirical and molecular formula. 2. Students solve questions on empirical formulae given by the teacher.

<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p>Support: Define empirical and molecular formulae Stretch: Solve question on empirical formulae with masses and mass percent. Extend: Solve question on empirical formulae with experimental data of combustion analysis</p> <p>Edexcel A level Chemistry 2 Textbook Interactive power point from Board works</p> <p>Lesson 2 and 3 - Molecular Formulae <u>Specific Learning objectives</u></p> <p>use experimental data to calculate molecular formulae including the use of $pV = nRT$ for gases and volatile liquids</p> <p>Determine molecular formula may involve composition by mass or percentage composition by mass data.</p> <p><u>Specific Intended Learning Outcomes</u></p> <p>Solve few examples of calculating empirical formulae and further to calculate molecular formulae.</p> <p>Use the equation $Pv = nRT$ to calculate for gases and volatile liquids.</p> <p>Tasks: Understand the ideal gas equation by doing a little research and discussion within the groups. Solve problems related to molecular formula.</p>
<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p>Support: Differentiate empirical and molecular formulae with examples. Stretch: Solve question on empirical formulae with masses and mass percent. Extend: Solve question on empirical formulae with experimental data of combustion analysis</p> <p>Edexcel A level Chemistry 2 Textbook Interactive power point from Board works</p>



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Lesson Plan – YEAR 12

Subject	Chemistry
Class/ Section	Yr 12 – Batch A/B
Week	Week 2 : 5th Sept – 9th Sept
Work send to students by	Google classroom
Total number of lessons per week	3
Unit/Topic	1 Atomic structure and periodic table
Key Vocabulary	relative mass and relative charge of protons, neutrons and electrons atomic number and mass number
<p>Lesson 1,2 - Live Zoom lesson along with face to face instruction for students present on a particular day</p> <p>Work will be assigned in google classroom which will be matched to the students' ability.</p>	<p><u>Lesson 1:</u></p> <p><u>Specific Learning objectives:</u></p> <ul style="list-style-type: none"> • Know the structure of an atom in terms of electrons, protons and neutrons • Know the relative mass and relative charge of protons, neutrons and electrons • Determine the number of each type of sub-atomic particle in an atom, molecule or ion from the atomic (proton) number and mass number. <p><u>Specific Intended Learning Outcomes:</u></p> <ul style="list-style-type: none"> • Calculates the number of protons, neutrons and electrons in different elements given atomic number and mass number. • Distinguish the relative mass, charge of protons, neutrons and electrons. • Calculate the mass number and atomic number of an element. • Calculate the atomic number and mass number for the given ion and element. • Calculate the number of protons, electrons and neutrons in isotopes of different elements. <p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1. Review structure of atom and subatomic particles. 2. Identify positive and negative ion from given data of subatomic particles. 3. Complete the table to show number of proton neutron and electrons in atoms molecules and ions. 4. Students will do research on the historical developments structure of atom.

<p><u>Assessment Criteria/ Essential questions:</u></p>	<p>Support – calculate the number of subatomic particles in atoms and ions. Stretch - calculate the number of subatomic particles in molecules. Extend – Investigate the existence of isotopes.</p>
<p><u>Resources:</u></p>	<p>Edexcel AS/A level chemistry 1 Textbook Interactive power point from Board works Video</p>
	<p><u>Lesson 2:</u></p> <p><u>Specific Learning objectives:</u></p> <ul style="list-style-type: none"> • Understand the term ‘isotopes’ • Be able to define the terms ‘relative isotopic mass’ and ‘relative atomic mass’, based on the 12C scale • Understand the terms ‘relative molecular mass’ and ‘relative formula mass’, including calculating these values from relative atomic masses <p><u>Specific Intended Learning Outcomes:</u></p> <ul style="list-style-type: none"> • Define mass and atomic number and use to calculate p,e and n. • Define relative atomic mass and relative molecular mass and suggests why compared to C-12. • Define relative molecular mass and suggests why compared to C-12. • Calculate the relative molecular mass of a compound from the relative atomic masses of an element. <p><u>Tasks:</u></p> <p>1.Revise how to calculate percentage number of subatomic particles in ions 2.Solve problem number 4 page 32 student text book 1. 3.On the basis of number of subatomic particles identify the isotopes and tabulate similarities and differences between isotopes of an element.</p>
<p><u>Assessment Criteria/ Essential questions:</u></p>	<p>Support – define relative atomic mass. Stretch - differentiate the term relative atomic mass and relative isotopic mass. Extend – Investigate the history of selection reference material for relative atomic mass.</p>
<p><u>Resources:</u></p>	<p>Edexcel AS/A level chemistry 1 Textbook Interactive power point from Board works Video</p>

Lesson 3:

Specific Learning objectives:

- define the terms ‘relative atomic mass’ and ‘relative isotopic mass’ based on the ^{12}C scale
- analyse and interpret data from mass spectrometry to calculate the relative atomic mass from the relative abundance of isotopes and vice versa
- predict the mass spectra for diatomic molecules, for example chlorine
- understand how mass spectrometry can be used to determine the relative molecular mass of a molecule
- understand how to use the terms ‘relative molecular mass’ and ‘relative formula mass’ and how to calculate these values from relative atomic masses.

Specific Intended Learning Outcomes:

Definition of relative atomic mass and relative isotopic mass

Calculating relative formula mass and relative molecular mass from relative atomic masses

Calculating relative atomic mass and relative molecular mass from mass spectrometry

Why Chlorine’s mean mass would be 36 but its weighted mean mass is 35.5 ?

Tasks:

1. Isotopes of europium have differences and similarities.

(i) In terms of protons, neutrons and electrons, how is an atom of ^{151}Eu **different** from an atom of ^{153}Eu ?

(ii) In terms of protons, neutrons and electrons, how is an atom of ^{151}Eu **similar** to an atom of ^{153}Eu ?

2. Using the table above, calculate the relative atomic mass of the europium sample. Give your answer to **two** decimal places.

(worksheet will be shared with students)

Assessment Criteria/ Essential questions:

Support – Using given data, students calculate the relative atomic masses of various elements from the relative abundances of their isotopes and vice versa

Stretch - Students make notes on the data obtained from a mass spectrometer.

Extend – Students 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

Resources:

Edexcel AS/A level chemistry 1 Textbook
Interactive power point from Board works
Video



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Lesson Plan – YEAR 13

Subject	Chemistry
Class/ Section	Year 13
Week	Week 2 : September 5 - 9, 2021
Work send to students by	Google classroom
Total number of lessons per week	3
Unit/Topic	Acid-base equilibria
Key Vocabulary	Conjugate acid base pair, amphoteric substances, pH, Ka
<p>Lessons 1,2,3–Live Zoom lesson along with face to face instruction for students present on a particular day</p> <p>Work will be assigned in google classroom which will be matched to the students ability.</p>	<p><u>Lesson 1:</u> The Bronsted –Lowry theory</p> <p><u>Specific Learning objectives</u></p> <ul style="list-style-type: none">• Know that a Brønsted–Lowry acid is a proton donor and a Brønsted–Lowry base is a proton acceptor.• Know that acid-base reactions involve the transfer of protons.• To identify Brønsted–Lowry conjugate acid-base pairs. <p><u>Specific Intended Learning Outcomes</u></p> <ul style="list-style-type: none">• Describe an acid as a species that can donate a proton and a base as a species that can accept a proton.• Illustrate, using ionic equations, the role of H^+ in the reactions of acids with metals, carbonates, bases and alkalis.• Recognise that acid–base reactions involve the transfer of protons.• Describe the term <i>conjugate acid– base pairs</i>• Identify conjugate acid-base pairs in examples given. <p><u>Tasks:</u></p> <ol style="list-style-type: none">1. Review the properties of acids and bases2. Students will do research on the historical developments of theory of acids and bases3. Teacher would introduce Bronsted-Lowry acids and bases.4. Discuss the students' ideas and explain the transfer of protons in a neutralisation reaction.

<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p>5.Students will identify the conjugate acid-base pairs in examples given. 6.Answer the questions from textbook page No.26</p> <p>Support: For this reaction: $\text{H}_2\text{S} + \text{H}_2\text{O} \rightleftharpoons \text{HS}^- + \text{H}_3\text{O}^+$ Label the following: acid, base,conjugate acid, conjugate base and identify each conjugate pair.</p> <p>Stretch: Write two reactions that show the amphoteric nature of water, one where it is acting as a base and on when it is acting as an acid.</p> <p>Extend: With the use of chemical reactions, deduce if HPO_4^{2-} is an amphoteric substance or not. Research Lewis acids and bases.</p> <p>Edexcel A level Chemistry 2 textbook. Power point , Video.</p>
<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p><u>Lesson 2: Hydrogen ion concentration and pH scale</u></p> <p><u>Specific Learning objectives</u></p> <ul style="list-style-type: none"> • To calculate pH from hydrogen ion concentration. • Calculate the pH of an aqueous solution of a strong acid. <p><u>Specific Intended Learning Outcomes</u></p> <ul style="list-style-type: none"> • Define pH as the negative logarithm of H^+ concentrations. • Given the $[\text{H}^+]$ of different acid solutions, calculate the pH of solutions. • Given the pH of different acid solutions, calculate the $[\text{H}^+]$ of solutions. <p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1.Revise pH and its value in acidic,basic and neutral solutions 2.Introduce the equations $\text{pH} = -\log [\text{H}^+]$ 3.Students will calculate the pH of solutions. 4. Discuss the students' ideas and explain how to calculate the $[\text{H}^+]$ of solutions . 5.Students will calculate the $[\text{H}^+]$ of solutions from pH of solutions. 6.Answer the questions from textbook page No.29 in the notebook. <p>Support:Calculate the pH of 0.150mol dm^{-3} HBr. Stretch: Calculate the pH of a mixture of 20cm^3 of 1.00mol dm^{-3} HCl and 5cm^3 of 1.00mol dm^{-3} NaOH Extend: Research the assumptions that are made when we calculate the pH of weak acids.</p> <p>Edexcel A level Chemistry 2 textbook. Power point , Video.</p>
	<p><u>Lesson 3: Hydrogen ion concentration and pH scale</u></p> <p><u>Specific Learning objectives</u></p> <ul style="list-style-type: none"> • To deduce the expression for the acid dissociation constant, K_a, for a weak acid and carry out relevant calculations. • To calculate the pH of a weak acid making relevant assumptions.

<p>Assessment Criteria/ Essential questions</p> <p>Resources</p>	<p><u>Specific Intended Learning Outcomes</u></p> <ul style="list-style-type: none"> • Use the equilibrium equation for weak acids, derive the K_a expression. • Use the K_a expression for calculating the $[H^+]$ of the weak acid. • Use the $[H^+]$ of weak acid to calculate the pH of weak acids. • Define the term pKa <p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1.Review equilibrium constant expression and equation for pH calculation. 2. Discuss the students' ideas about strong and weak acid in terms of degree of dissociation. 3. Teacher would introduce the dissociation constant of weak acid. 4. Students will work out the numericals to calculate K_a for acids 5. Calculate the H^+ concentration and hence pH, when K_a is given 6. Answer the questions from textbook page No.29 <p>Support: Calculate pH when K_a is given Stretch: Calculate the pH of H_2SO_4 Extend: Research how the pH of a tribasic acid such as H_3PO_4 can be measured.</p> <p>Edexcel A level Chemistry 2 textbook. Power point , Video</p>
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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 2 September 5 - 9
Work send to students by	Google classroom
Total number of lessons per week	3
Unit/Topic	Topic 15 Transition Metals
Key Vocabulary	Transition metal , ligand, complex, coordination number

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.

**Assessment Criteria/
Essential questions**

Resources

Lesson 1 – Transition metal electronic configuration

Specific Learning objectives

1. Deduce the electronic configurations of atoms and ions of the *d*-block elements of Period 4 (Sc–Zn), given the atomic number and charge (if any).
2. Know that transition metals are *d*-block elements that form one or more stable ions with incompletely-filled *d*-orbitals.

Specific Intended Learning Outcomes

Write the electronic configuration of atoms and ions formed from the period 4 *d* block elements from Sc to Zn.

Understand why transition metals show variable oxidation number.

Describe the transition metals as those elements which form one or more stable ions which have incompletely filled *d* orbitals.

Illustrate, with appropriate examples the existence of more than one oxidation state for each element in its compounds.

Tasks

1. Recall blocks in the periodic table and connect with the orbitals.
2. Discuss the definition of transition metal and its characteristics
3. Teacher can give 2 or 3 electronic configurations of transition metal and asks students to write the configuration of Manganese.
4. Discuss the formation of ions and students should be able to write the configuration of ions formed by transition metals.
5. Students should find out why copper and chromium shows a different electronic configuration

Support: Define transition metal. Identify the characteristics of transition metals

Stretch: Write the electronic configuration of transition metal

Extend: Understand the difference in the electronic configuration of copper and chromium. Write the electronic configuration of transition metal ions.

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Interactive power point from Board works

Lesson 2 and 3 –Ligands and complexes

Specific Learning objectives

1. Know what is meant by the term ligand.
2. Understand that dative (co-ordinate) bonding is involved in the formation of complex ions.

Specific Intended Learning Outcomes

Explain ligand as atom or ion which has lone pair of electrons to be donated to central metal atom.

Discuss the different terms in the complex ions – ligands, coordination number of the central metal atom, oxidation number of the central metal atom, charge on complex ion, types of ligands.

Tasks:

Teacher uses ppt to discuss about ligands and complexes.

Students draw the structure of different ligands.

Students use the rules to name the transition metal complexes.

Support: Define ligands , complexes and co ordination number

Stretch: Draw the structure of different types of ligands

Extend: Name the different transition metal complexes.

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**Assessment Criteria/
Essential questions**

Resources