

**Year Level: 12**

**Subject: Chemistry Unit 3**

**Semester: 1**

<b>Week</b>	<b>Unit</b>	<b>Learning focus</b>
1	Types of fuels	Compare a variety of fossil fuels and biofuels with reference to origin, renewability and environmental impacts related to sourcing and combustion.
2	Energy from fuels	Compare exothermic & endothermic reactions and systems. Calculate the energy of combustion from a variety of fuels.
3	Gases	Explore the properties of gases and relate these to kinetic molecular theory.
4	Combustion of fuels	Perform stoichiometric calculations relating to gases and the energy produced during the combustion of fuels.
5	Redox reactions	Use oxidation numbers to write half and overall equations for redox reactions and to identify conjugate oxidising and reducing agents.
6	Electrochemical series	Describe the common design features of galvanic cells and the energy transformations involved in their operation. Use the electrochemical series to predict the products of redox reactions and to calculate maximum cell voltage under standard conditions.
7	Batteries	Describe how different types of galvanic cells are used as a power source for a range of uses. Describe the factors affecting battery life.
8	Fuel cells	Describe the common design features of fuel cells. Compare fuel cells and galvanic cells in terms of functions, design features, energy transformations, energy efficiencies and applications.
9	Rate of chemical reactions	Explain collision theory and factors that affect the rate a chemical reaction, including the role of catalysts in changing reaction pathways.
10	Extent of chemical reactions	Compare reversible and irreversible chemical reactions and systems. Use an equilibrium law for an equilibrium system to calculate the relative amounts of reactants and products.
11	Le Chatelier's Principle	Use Le Chatelier's Principle to explain the effects of changes on a chemical equilibrium. Describe how the reaction conditions for an industrial process can be adjusted to ensure optimum efficiency.
12	Electrolysis	Understand the construction and operation of simple electrolytic cells. Compare electrolytic cells to galvanic cells.
13	Faraday's Laws of Electrolysis	Apply stoichiometry and Faraday's Laws of Electrolysis to determine amounts of product, current or time for a particular electrolytic process.
14 - 15	Scientific Investigation	Design and undertake a practical investigation related to energy of fuels.
16	Poster of Scientific Investigation	Present the methodologies, findings and conclusions of the practical investigation in a scientific poster.
17 -18	Revision	Revise the Unit 3 concepts and apply them to past papers and trial exams.
19	<b>Unit 4</b> Structure and nomenclature of organic compounds	Explain the diversity of carbon compounds. Know the molecular, structural and semi-structural formulae of a variety of organic compounds. Identify different types of isomers.
20	Structure and nomenclature of organic compounds	Identify the functional groups found in a variety of families of organic compounds. Name a range of organic compounds using systematic nomenclature protocols.

**Year Level:12**

**Subject: Chemistry Unit 4**

**Semester:2**

<b>Week</b>	<b>Topic</b>	<b>Learning Focus</b>
1	Structure and nomenclature of organic compounds	Explain the diversity of carbon compounds. Know the molecular, structural and semi-structural formulae of a variety of organic compounds. Identify different types of isomers.
2	Structure and nomenclature of organic compounds  Chemical Analysis Workshop	Identify the functional groups found in a variety of families of organic compounds. Name a range of organic compounds using systematic nomenclature protocols.  Carry out chemical analyses using spectroscopy and chromatography.
3	Properties and reactions of organic compounds	Explain trends in physical properties of a variety of organic compounds. Describe and write chemical equations for some reactions involving organic compounds.
4	Properties and reactions of organic compounds	Identify organic reaction pathways for the synthesis of a variety of organic compounds including esters. Calculate percentage yield and atom economy for organic reaction pathways.
5	Spectroscopic techniques	Describe the principles and applications of infrared and nuclear magnetic resonance spectroscopy. Make qualitative and quantitative interpretations of data from these procedures.
6	Spectroscopic techniques	Describe the principles and applications of mass spectrometry and make qualitative and quantitative interpretations of mass spectra. Determine molecular structures by utilising a variety of analytical techniques
7	Chromatography	Describe the principles and applications of a variety of types of chromatography. Make qualitative and quantitative interpretations of chromatograms from these procedures.
8	Volumetric analysis	Determine the concentration of organic compounds by volumetric analysis, including acid-base and redox titrations.
9	Structure and bonding in food molecules	Describe the molecular structure, functions and formation of proteins, carbohydrates and lipids. Describe the biological significance, structure and solubility of some vitamins.
10	Metabolism of food in the human body	Describe the metabolism of a variety of foods in the human body. Describe the structure and function of enzymes and co-enzymes.
11	The energy content of food	Compare the energy values of carbohydrates, proteins and lipids, and calculate the energy values of foods. Explain the principles of calorimetry and compare solution and bomb calorimetry.
12 - 13	Revision and past papers	Revise the Unit 3 & 4 concepts and apply them to past exam questions
14	Trial Exam	Complete a Unit ¼ Trial exam under exam conditions. Review the Trial Exam in class.