Year 10 Chemistry Learning Outcomes

Unit 5: Energy Changes

- Define exothermic and endothermic reactions.
- Evaluate the applications of exothermic and endothermic reactions.
- Explain how energy changes when bonds are broken and made.
- Calculate the overall energy change of a reaction using bond energies, including the correct units.
- Explain why non-rechargeable batteries stop working.
- Evaluate the use of hydrogen fuel cells.

Unit 6: Rates of Reaction

- Plot and use a graph to calculate the gradient to measure the initial rate of reaction.
- Explain how to use collision theory to explain the effect of surface area on reaction rate.
- Explain how altering the temperature affects the rate of reaction using collision theory.
- Explain, using collision theory, how changing concentration or pressure alters the rate of reaction.
- Explain, using collision theory, how adding a catalyst alters the rate of reaction.
- Predict the observations of a familiar reversible reaction when the conditions are changed.
- Predict the effect on the rate of forward and reverse reactions by applying the Le Chatelier's Principle when the conditions of a dynamic equilibrium are changed.
- Predict the effect on yield of changing temperature, concentration, or pressure in a given equilibrium system.

Unit 7: Organic Chemistry

Unit 7.1: Crude Oil and Fuels

- Describe the composition of crude oil.
- Explain how fractional distillation is used to separate fractions in crude oil.
- Link the size of the molecule to the boiling point, viscosity and flammability.
- Describe how cracking takes place and compare the products obtained.

Unit 7.2: Organic Reactions

- Predict the word and balanced symbol equations to describe reactions between alkenes and hydrogen, water (steam), or a halogen.
- Predict the structure for primary alcohols and carboxylic acids when the number of carbon atoms is given.
- Explain why solutions of ethanol have a pH of 7 using word and balanced symbol equations for the reactions of alcohols.

- To describe how carboxylic acids react with carbonates and alcohols.

Unit 7.3: Polymers

- Explain why monomers for addition polymers must be unsaturated and explain the process of addition polymerisation in detail, including using balanced symbol equations and the concept of atom economy.
- Compare and contrast in detail, giving appropriate examples, the two methods of polymerisation.
- Explain in detail the process of condensation polymerisation with natural monomers, including using equations.
- Demonstrate and apply knowledge and understanding to explain how nucleotide form DNA.

Unit 8: Chemical Analysis

- Distinguish a pure substance from an impure substance using melting point data
- To describe how chromatography works to separates mixtures
- To identify gases chlorine, oxygen, carbon dioxide and hydrogen from their chemical tests.
- To identify the positive ions in a compound using flame tests and other chemical tests
- Describe the chemical tests for some negative ions and their results.
- Describe how instruments can be used to identify elements and compounds.

Unit 9: Earth's Atmosphere

- Describe how oxygen was formed in the development of the atmosphere.
- Explain, using word equations, how gases were formed in the atmosphere and how oceans were formed.
- Explain why the composition of the Earth's atmosphere has not changed much for 200 million years.
- Explain how greenhouse gases increase the temperature of the atmosphere.
- Explain the possible effects of global climate change and why they are difficult to predict.
- Describe how carbon monoxide and soot (carbon) can be made from the incomplete combustion of fossil fuels.

Unit 10: The Earth's Resources

Unit 10.1: The Earth's Resources

- Explain the use of natural, sustainable, and finite resources.
- List the key processes to make drinking water.
- Explain reasons for filtration and sterilisation in water treatment.
- Describe the main processes in sewage treatment.
- Describe the processes of phytomining and bioleaching.
- Carry out Life Cycle Assessments s for different products when data is supplied.
- Evaluate the environmental, economic, and social impacts of reusing and recycling products.

Unit 10.2: Using Materials

- Compare how different conditions affect rusting.
- Evaluate the composition and uses of alloys.
- Link the structure of the polymers to their uses.

- Compare the properties of ceramics, polymers, composites and metals.
- Explain how the Haber process works.
- Explain the trade-off between the rate of production and the position of equilibrium in the Haber process.
- Compare the industrial and laboratory production of fertilisers.