



VCE CHEMISTRY

INFORMATION GUIDE



120
CELEBRATING 120 YEARS
1904-2024

Kilbreda College

VCE CHEMISTRY

RATIONALE

VCE Chemistry enables students to investigate a range of chemical, biochemical and geophysical phenomena through the exploration of the nature of chemicals and chemical processes. Sustainability principles, concepts and goals are used to consider how useful materials for society may be produced with the least possible adverse effects on human health and the environment. In undertaking this study, students apply chemical principles to explain and quantify the behaviour of matter, as well as undertake practical activities that involve the analysis and synthesis of a variety of materials.

UNIT 1

Area of Study 1

How do the chemical structures of materials explain their properties and reactions?

In this area of study students focus on elements as the building blocks of useful materials. They investigate the structures, properties and reactions of carbon compounds, metals and ionic compounds, and use chromatography to separate the components of mixtures. They use metal recycling as a context to explore the transition in manufacturing processes from a linear economy to a circular economy.

Area of Study 2

How are materials quantified and classified?

In this area of study students focus on the measurement of quantities in chemistry and the structures and properties of organic compounds, including polymers. The selection of learning contexts should allow students to develop practical techniques to quantify amounts of substances and to investigate the chemistry of organic compounds. Students develop their skills in the use of scientific equipment and apparatus.

Area of Study 3

How can chemical principles be applied to create a more sustainable future?

In this area of study students undertake an investigation involving the selection and evaluation of a recent discovery, innovation, advance, case study, issue or challenge linked to the knowledge and skills developed in Unit 1 Area of Study 1 and/or Area of Study 2, including consideration of sustainability concepts (green chemistry principles, sustainable development and the transition towards a circular economy).

UNIT 2

Area of Study 1

How do chemicals interact with water?

In this area of study students focus on understanding the properties of water and investigating acid-base and redox reactions. They explore water's properties, including its density, specific heat capacity and latent heat of vaporisation. They write equations for acid-base and redox reactions, and apply concepts including pH as a measure of acidity. They explore applications of acid-base reactions and redox reactions in society.

Area of Study 2

How are chemicals measured and analysed?

In this area of study students focus on the analysis and quantification of chemical reactions involving acids, bases, salts and gases. They measure the solubility of substances in water, explore the relationship between solubility and temperature using solubility curves, and learn to predict when a solute will dissolve or crystallise out of solution. They quantify amounts in chemistry using volumetric analysis, application of the ideal gas equation, stoichiometry and calibration curves.

Area of Study 3

How do quantitative scientific investigations develop our understanding of chemical reactions?

In this area of study students adapt or design and then conduct a scientific investigation related to chemical equations and/or analysis, which must include the generation of primary data. They develop a research question related to the production of gases, acid-base or redox reactions or the analysis of substances in water, and adapt or design and then conduct a scientific investigation to generate appropriate quantitative data. Students organise and interpret the data and reach a conclusion in response to their research question.

CAREER OPTIONS

- Agricultural Scientist
- Biomedical Scientist
- Chemical Engineer
- Chemist
- Doctor
- Environmental Engineer
- Food Technologist
- Forensic Scientist
- Laboratory Research Assistant
- Laboratory Technician
- Nutritionist
- Osteotherapist
- Pathologist
- Pharmacy Technician
- Physician
- Physiotherapist

UNIT 3

Area of Study 1

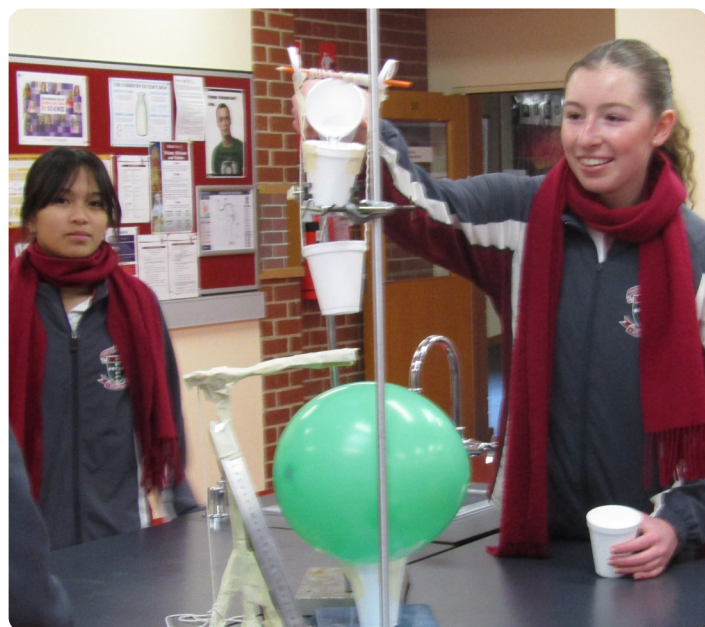
What are the current and future options for supplying energy?

In this area of study students focus on analysing and comparing a range of fossil fuels and biofuels as energy sources for society, and carbohydrates, proteins and lipids as fuel sources for the body. They write balanced thermochemical equations for the combustion of various fuels. The amounts of energy and gases produced in combustion reactions are quantified using stoichiometry. They explore how energy can be sustainably produced from chemicals to meet the needs of society while minimising negative impacts on the environment.

Area of Study 2

How can the yield of a chemical product be optimised?

In this area of study, students explore the factors that affect the rate and yield of equilibrium and electrolytic reactions involved in producing important materials for society. Reactants and products in chemical reactions are treated qualitatively through the application of Le Chatelier's principle and quantified using equilibrium expressions, reaction quotients and Faraday's Laws. Students explore the sustainability of different options for producing useful materials for society.



UNIT 4

Area of Study 1

How are organic compounds categorised and synthesised?

In this area of study students focus on the structure, naming, properties and reactions of organic compounds, including the chemical reactions associated with the metabolism of food. They explore how synthetic organic compounds can be produced more sustainably for use in society.

Area of Study 2

How are organic compounds analysed and used?

In this area of study students focus on laboratory and instrumental analyses of organic compounds, and the function of some organic compounds as medicines. They use distillation to separate mixtures, use volumetric analysis to calculate redox quantities, and explore how instrumental analysis is used to ensure the quality of consumer products. Students explain how some medicines that bind to the active sites of enzymes function by inhibiting the enzymes' mode of action.

Area of Study 3

How is scientific inquiry used to investigate the sustainable production of energy and/or materials?

Students undertake a student-designed scientific investigation in either Unit 3 or Unit 4, or across both Units 3 and 4. The investigation involves the generation of primary data related to the production of energy and/or chemicals and/or the analysis or synthesis of organic compounds, and should be inspired by a contemporary chemical challenge or issue. The investigation draws on knowledge and related key science skills developed across Units 3 and 4 and is undertaken by students in the laboratory and/or in the field.

To find out more information about VCE Chemistry at Kilbreda College, please contact:

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This flyer is correct as of July 2024, however may be subject to change.

