

CHEMISTRY

Unit 1

How Can the Diversity of Materials be Explained?

COURSE OUTLINE:

In this unit students investigate the chemical properties of a range of materials from metals and salts to polymers and nanomaterials. Using their knowledge of elements and atomic structure students explore and explain the relationships between properties, structure and bonding forces within and between particles that vary in size from the visible, through nanoparticles, to molecules and atoms.

AREAS OF STUDY:

- How do the chemical structures of materials explain their properties and reactions?
- How are materials quantified and classified?
- Research investigation - creating a more sustainable future

OUTCOMES:

On completion of this unit, students should be able to:

1. Explain how elements form carbon compounds, metallic lattices and ionic materials. Conduct investigations to determine properties of materials and use chromatographic techniques.
2. Calculate mole quantities, use systematic nomenclature to name organic molecules and explain how polymers are designed for a purpose. Students will investigate the effects on human health and the environment of organic materials and polymers.
3. Investigate and explain how chemical knowledge is used to create a more sustainable future in relation to the production or use of a selected material.

ASSESSMENT:

- Practical reports
- Oral, poster and multimedia presentations
- Chapter and homework assignments
- Modelling activities
- Data analysis
- Tests

S or N based on the demonstrated achievement of the outcomes specified for the unit.

Unit 2

How do Chemical Reactions Shape the Natural World?

COURSE OUTLINE:

In this unit students examine the polar nature of a water molecule, its specific heat and solubility. Acid base and redox reactions in society are explored. Students conduct investigations to measure relationships between these reactions and the physical and chemical properties of water. In this context students investigate solubility, concentration, PH, volumetric analysis and calibration curves. Students represent and explain data from their own observations and evaluate the chemistry based claims of others.

AREAS OF STUDY:

- How do chemicals interact with water?
- How are chemicals measured and analysed?
- Practical investigation

OUTCOMES:

On completion of this unit, students should be able to:

1. Relate the properties of water to its structure and bonding, and experimentally investigate and analyse applications of acid base and redox reactions in society.
2. Measure amounts of dissolved substances in water and predict solubilities. Use volumetric and instrumental procedures to test for acids, salts and apply stoichiometry to calculate chemical quantities.
3. Design and undertake a quantitative laboratory investigation related to gases, acid base or redox reactions.

ASSESSMENT:

- Practical work
- Chapter and homework assignments
- Modelling
- Tests
- A report of a student-designed quantitative laboratory investigation

S or N based on the demonstrated achievement of the outcomes specified for the unit.