

# Units 1 & 2 Chemistry

## UNIT 1

Students study the chemical makeup and characteristics of different materials, like covalent compounds, metals, ionic compounds, and polymers. They learn to measure chemical quantities and how innovative manufacturing practices can promote sustainable product development, aiming for a circular economy. Practical experiments cover topics such as metal reactivity, chromatography, identifying ionic compounds, determining empirical formulas, and making polymers. Students use chemistry terminology to discuss their findings and assess chemistry-based claims. They also conduct research on sustainable material production or use, considering green chemistry principles and ways to minimize environmental impact.

### AREA OF STUDY

**Area of Study 1:** How do the chemical structures of materials explain their properties and reactions?

- Explain the formation of carbon compounds, metallic lattices, and ionic compounds by elements.
- Experimentally investigate and model properties of various materials.
- Utilise chromatography for separating components of mixtures.

**Area of Study 2:** How are materials quantified and classified?

- Calculate mole quantities in chemistry.
- Apply systematic nomenclature to name organic compounds.
- Describe the design of polymers for specific purposes.
- Assess the impacts on human health and the environment from organic material and polymer production.

**Area of Study 3:** How can chemical principles be applied to create a more sustainable future?

- Investigate how chemical knowledge contributes to sustainability.
- Explain the application of chemical knowledge in creating a more sustainable future.
- Relate chemical knowledge to the production or usage of a chosen material for sustainability purposes.

## UNIT 2

Students explore the analysis of materials vital to daily life, investigating dissolved substances in water and gases from chemical reactions. They study practical applications of acid-base and redox reactions in society. Practical experiments cover water's properties, acid-base and redox reactions, solubility, gas volume, and calibration curves. Throughout, students use chemistry terms to interpret data and conduct their own investigations related to gas production, acid-base or redox reactions, or water analysis, building on previous knowledge.

### AREA OF STUDY

**Area of Study 1:** How do chemicals interact with water?

- Explain water properties based on its structure and bonding.
- Experimentally investigate and analyze the practical applications of acid-base reactions in society.
- Experimentally investigate and analyze the practical applications of redox reactions in society.

**Area of Study 2:** How are chemicals measured and analysed?

- Calculate solution concentrations and predict solubilities.
- Utilise volumetric analysis and instrumental techniques to analyse acids, bases, and salts.
- Apply stoichiometry to calculate chemical quantities.

**Area of Study 3:** How do quantitative scientific investigations develop our understanding of chemical reactions?

- Draw evidence-based conclusions from primary data derived from a student-adapted or student-designed scientific investigation.
- Investigate topics related to the production of gases, acid-base reactions, redox reactions, or substance analysis in water.
- Utilise scientific methods to analyse and interpret data for drawing conclusions.