



## Chemistry

### Advanced General Certificate of Education

The science courses offered here at Health Futures UTC are designed to offer academic and vocational experiences to prepare students for both higher education and health-centred careers. We also offer unique opportunities to work with local universities and health professionals as part of our contribution to the extra-curricular programme.

#### Course details:

Awarding body: Edexcel 2015 specification (9CH0)

#### Content:

You will study ten topics in the first year and a further nine in the second year:

#### Year 1 topics

Topic 1: Atomic Structure and the Periodic Table

Topic 2: Bonding and Structure

Topic 3: Redox I

These first three topics are an important bridge into AS and A Level Chemistry from the study of chemistry within science courses at GCSE level. They ensure that students have a secure understanding of the fundamental ideas in A-level chemistry such as atomic structure, formation of chemical bonds, properties of substances, transfer of electrons in reactions, and oxidation numbers.

Topic 4: Inorganic Chemistry and the Periodic Table

In this topic students will learn about periodic groups and properties, studying in depth groups 1, 2, and 7 and how these elements and their compounds can be applied in modern society.

Topic 5: Formulae, Equations and Amounts of Substance

This topic covers quantitative chemistry with calculations such as molar masses, percentage yield, empirical formulae, and calculations involving concentrations or gases.

Topic 6: Organic Chemistry I



## Topic 7: Modern Analytical Techniques I

These topics introduce organic chemistry and its important applications to everyday life, including current environmental concerns associated with sustainability. Students will learn about nomenclature, functional groups, organic reactions, aliphatic hydrocarbons, alcohols and halogenoalkanes and instrumental analytical techniques.

## Topic 8: Energetics I

## Topic 9: Kinetics I

## Topic 10: Equilibrium I

The focus of the final topics of year one is inorganic and physical chemistry, the applications of energy use to everyday life and industrial processes, and current environmental concerns associated with sustainability. Students will learn about enthalpy changes and their determination, rates of reaction, reversible reactions and chemical equilibrium and consideration of energy and yield in improving sustainability.

### **Year 2 topics:**

## Topic 11: Equilibrium II

## Topic 12: Acid-base Equilibria

## Topic 13: Energetics II

## Topic 14: Redox II

## Topic 15: Transition Metals

## Topic 16: Kinetics II

These topics extend the study of energy, reaction rates and equilibria, and the periodic table from year one of the course. Students will learn about rate equations, equilibrium constants,  $K_c$  and  $K_p$ , acid–base equilibria, lattice enthalpy and Born–Haber cycles, entropy and free energy, electrochemical cells, redox chemistry and transition elements.

## Topic 17: Organic Chemistry II

## Topic 18: Organic Chemistry III

## Topic 19: Modern Analytical Techniques II

These final topics build on the foundation of organic chemistry introduced in year one. Students are introduced to several new functional groups and emphasises the importance of organic synthesis. This module also adds NMR spectroscopy to the instrumentation techniques used in organic and forensic analysis. Students will learn about aromatic compounds, carboxylic acids and esters, organic nitrogen compounds: amines and amino acids, polymerisation, synthetic organic chemistry and the importance of modern analytical techniques in organic analysis.



## Assessment overview

External examinations will take place at the end of year 2 and will consist of three written papers:

Paper 1: Advanced Inorganic & Physical Chemistry; 1 hr 45 mins 30% of total qualification

Paper 2: Advanced Organic & Physical Chemistry; 1 hr 45 mins 30% of total qualification

Paper 3: General & Practical Principles in Chemistry; 2 hrs, 30 mins 40% of total qualification

Practical endorsement in chemistry – (not examined) reported separately.

## Specific Entry Requirements:

5 GCSEs (Grades 9-4) including grade 6 in chemistry or combined science, grade 5 in English language and grade 6 in mathematics

