

# YEAR 12 | CHEMISTRY

## The curriculum and assessment of students at this stage of education has been carefully designed to develop students into chemists, focusing on deepening understanding gained at GCSE:

Building on the fundamental concepts taught at KS4, students will begin by revisiting and building on these in module 2. The approach to teaching will be sequential in nature, securing their understanding of 'foundation knowledge' in chemistry. The approach to teaching will then focus on 'periodic table and energy' followed by 'core organic chemistry'. This will allow students to strengthen their foundations in chemistry whilst integrating and applying new skills required for the course. The curriculum will provide students an opportunity to develop and refine practical skills across a range of chemical processes, including utilising apparatus and reagents. By the end of the year students will have acquired the knowledge and skills required to succeed in year 13. Students will gain an understanding of more specialist apparatus and explore routes into a number of careers.

## HALF TERM 1 MODULE 2

### All students will know:

- » Atoms, Ions and Compounds.
- » Amount of Substance.
- » Acids and Redox.
- » Electrons and Bonding.

### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

### Key vocabulary:

Empirical formula, molecular formula, mole, saturated, unsaturated, stoichiometry, concentration, titration, oxidation, reduction, volume, waters of crystallisation, ideal gas, atom economy, percentage yield.

## HALF TERM 2 MODULE 2 / MODULE 3

### All students will know:

- » Shapes of Molecules and Intermolecular forces.
- » Periodicity.
- » Reactivity Trends.
- » Enthalpy.

### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment. In addition, at the end of module 2 an assessment will also be completed.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

### Key vocabulary:

Trigonal planar, square pyramidal, tetrahedral, linear, ionisation energy, electron affinity, hydrocarbon, skeletal, orbital, bond enthalpies, colorimetry, hess' law, combustion, neutralisation.

**STEM club** - KS5 students are invited to act as student leaders for KS3 STEM, OAT LP Days, University visits through the Aimhigher project, private tutoring through mytutor, online tutorials.

### HALF TERM 3 MODULE 3 / MODULE 4

#### All students will know:

- » Rates of Reaction and Equilibrium.
- » Concepts of Organic Chemistry.
- » Alkanes.

#### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

#### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

#### Key vocabulary:

Boltzmann, enthalpy, collision theory, boltzmann, collision theory, frequency, orientation, equilibrium constant, le chatelier.

### HALF TERM 4 MODULE 4

#### All students will know:

- » Alkenes.
- » Alcohols.
- » Haloalkanes.

#### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

#### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

#### Key vocabulary:

Primary, secondary, tertiary, distillation, reflux, quick-fit apparatus, haloalkane, synthesis, orbital overlap.

### HALF TERM 5 MODULE 4

#### All students will know:

- » Organic Synthesis.
- » Spectroscopy.

#### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

#### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

#### Key vocabulary:

Infrared, Mass spectroscopy, mass: charge ratio, wavenumber, synthetic route, conditions.

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## HALF TERM 6 CONSOLIDATION (MODULES 1-4)

### All students will know:

Consolidation term in preparation for end of Year 12 AS Exams.

### All students will be assessed:

AS Mock Exams x 2.

### Reading skills needed for this unit:

- » Extracting information from various parts of a text.
- » Comprehension.
- » Command words.
- » Using Index/Contents.

### Key vocabulary:

Identify, describe, explain, compare, evaluate, analyse, suggest.

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## HOW STUDENTS CAN BE SUPPORTED AT HOME

**Textbooks** - CGP / Pearson 'OCR Chemistry A'

### Websites -

[www.studymind.co.uk](http://www.studymind.co.uk)

[www.chemguide.com](http://www.chemguide.com)

[www.physicsandmathstutor.com](http://www.physicsandmathstutor.com)

[www.tailoredtutors.co.uk](http://www.tailoredtutors.co.uk)

**Other** - Kerboodle.

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## HOW THIS LEARNING WILL BE EMBEDDED ELSEWHERE IN THE CURRICULUM

Links to physics (atomic structure), biology (structure, bonding) and maths (significant figures, rounding, multi-step calculations).

# YEAR 13 | A LEVEL CHEMISTRY

## The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of Chemistry and develop students into Chemists:

Students will build on fundamental concepts delivered in Year 12, taking a deeper look into physical chemistry and transition elements (module 5) alongside organic chemistry and analysis (module 6). The teaching approach will be sequential, students will work through organic chemistry in module 6 before completing module 5. Throughout the year, students will be securing and applying their AS knowledge, making clear links and building on their understanding of chemistry. Embedded into the curriculum are opportunities for students to think critically about chemistry processes alongside developing high quality practical skills. Students will gain an understanding of apparatus and explore routes into a number of careers as well as furthering their understanding of chemistry in the real world. By the end of the year, students will have acquired the knowledge and skills needed to sit their A-Level exams.

## HALF TERM 1 MODULE 6

### All students will know:

1. Aromatic Chemistry
2. Carbonyls and Carboxylic Acids
3. Amines, amino acids and proteins

### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

### Reading skills needed for this unit:

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

### Key vocabulary:

Kekule, halogenation, chlorination, acylation, electrophilic substitution, nucleophilic addition, hydrolysis.

### All students will know:

1. Organic Synthesis
2. Chromatography and Spectroscopy

### All students will be assessed:

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.
- » A mock paper will be completed based on content covered in modules 1, 2, 3 and 5.

### Reading skills needed for this unit:

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

### Key vocabulary:

Amines, aliphatic, optical isomers, chirality, condensation, nitriles, mass spectrometry, gas chromatography, thin layer chromatography, reagents, distillation, reflux.

Ongoing discussion beyond the scope of the course, online tutorials with university lecturers.

### HALF TERM 3 MODULE 5

**All students will know:**

1. Rates of Reaction
2. Equilibrium
3. Acids, bases and pH

**All students will be assessed:**

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.

**Reading skills needed for this unit:**

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

**Key vocabulary:**

orders of reaction, rate equation, continuous monitoring method, half-life, initial rates, rate determining step, arrhenius,  $K_p$ ,  $K_a$ ,  $pK_a$ .

### HALF TERM 4 MODULE 5

**All students will know:**

1. Buffers and Neutralisation
2. Enthalpy and Entropy
3. Redox and Electrode Potentials

**All students will be assessed:**

- » Students will be formatively assessed throughout the teaching of each topic using past exam questions, homework activities and quizzes.
- » At the end of each topic, students will sit a summative assessment.
- » Practical Skills (PAGs) - students will be assessed against specified skills and techniques provided by OCR to show competency across a range of activities.
- » A mock paper will be completed based on content covered in modules 1, 2, 4 and 6.

**Reading skills needed for this unit:**

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

**Key vocabulary:**

Titration curve, born-haber, lattice enthalpies, electron affinity, ionic size, entropy, feasible, redox, oxidation numbers, half-cell, standard electrode potential, gibbs free energy, stereoisomers.

### HALF TERM 5 ALL MODULES

**All students will know:**

1. Transition Elements
2. Unifying Concepts

**All students will be assessed:**

- » Students will complete OCR past papers to prepare for their examinations, as well as studying success criteria and mark schemes.
- » Focus will be on students making links between modules taught.

**Reading skills needed for this unit:**

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

**Key vocabulary:**

Ligand substitution.

## ENRICHMENT OPPORTUNITIES

Ongoing discussion beyond the scope of the course, online tutorials with university lecturers.

### HALF TERM 6 REVISION + EXAMS

#### All students will know:

This half term is used for reconsolidation of AS Level Chemistry using feedback from end of topic assessments, mock data and student reflection to guide the topics which are most pertinent before the A2 exams begin.

#### All students will be assessed:

A2 Summer Examinations.

#### Reading skills needed for this unit:

- » Command words.
- » Use of an index/contents.
- » Scanning and skimming of scientific journals.

#### Key vocabulary:

Identify,  
describe,  
explain,  
compare,  
analyse,  
evaluate,  
calculate,  
suggest.

### HOW STUDENTS CAN BE SUPPORTED AT HOME

#### Websites -

[www.chemguide.com](http://www.chemguide.com)

[www.physicsandmathstutor.com](http://www.physicsandmathstutor.com)

[www.tailoredtutors.co.uk](http://www.tailoredtutors.co.uk)

#### Textbooks -

CGP / Pearson 'OCR Chemistry A'.

#### Other -

Physics and maths tutor, OCR Past Paper Finder.

### HOW THIS LEARNING WILL BE EMBEDDED ELSEWHERE IN THE CURRICULUM

**Biology** - understanding of bonding in biological molecules + separation techniques.

**Maths** - Percentage changes, multi-step calculations, standard form, decimal places.