

A-LEVEL CHEMISTRY

Introduction

Why have you chosen A-Level Chemistry?



Why Study A-Level Chemistry?

Skill Development

Research and analytical skills, problem solving, time management, organisation, numeracy, administration, logical reasoning, teamwork, communication skills.

Career Opportunities

Medicine, general practitioner, medical illustrator, meteorologist, food scientist, environmental science, engineering, pharmaceuticals, teaching, veterinarian, software development, toxicology, dentistry, geology, radiographer, veterinary surgeon, biochemistry, physiotherapy, dietetics.

How is A-Level Chemistry different to GCSE Chemistry?

ALKENE	CARBON NUMBER	FORMULA	STRUCTURE
ETHENE	2	C ₂ H ₄	$ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{C} = \text{C} \\ \quad \\ \text{H} \quad \text{H} \end{array} $
PROPENE	3	C ₃ H ₆	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{C} = \text{C} - \text{C} - \text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array} $
BUTENE	4	C ₄ H ₈	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{C} = \text{C} - \text{C} - \text{C} - \text{H} \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $
PENTENE	5	C ₅ H ₁₀	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{C} = \text{C} - \text{C} - \text{C} - \text{C} - \text{H} \\ \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $
HEXENE	6	C ₆ H ₁₂	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \quad \\ \text{C} = \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{H} \\ \quad \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $

- Bonding and structure of alkenes
- Physical properties of alkenes
- Reactivity and reaction mechanisms of alkenes
- Isomerism in alkenes
- Polymerisation of alkenes

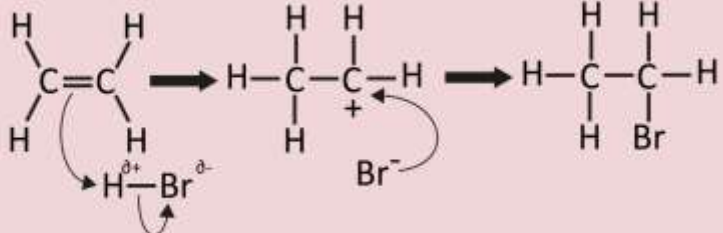
What do A-Level Chemistry lessons look like?

Electrophilic Addition	
Last Lesson: The Equilibrium Constant	Practice Question: Bonding
<p>Methanol can be manufactured in a reversible reaction as shown by the equation</p> $\text{CO(g)} + 2\text{H}_2\text{(g)} \rightleftharpoons \text{CH}_3\text{OH(g)}$ <p>(a) State and explain the effect of using a catalyst on the yield of methanol in this equilibrium.</p>	<p>Explain how permanent dipole-dipole forces arise between hydrogen chloride molecules.</p>
Key Words: Electrophile, Carbocation.	

Learning Objectives	
3.3.4.2 Addition reactions of alkenes	
Content	Opportunities for skills development
Electrophilic addition reactions of alkenes with HBr, H ₂ SO ₄ and Br ₂	AT d and k
The use of bromine to test for unsaturation.	PS 4.1
The formation of major and minor products in addition reactions of unsymmetrical alkenes.	Students could test organic compounds for unsaturation using bromine water and record their observations.
Students should be able to:	
<ul style="list-style-type: none">outline the mechanisms for these reactionsexplain the formation of major and minor products by reference to the relative stabilities of primary, secondary and tertiary carbocation intermediates.	

- Starter activity – usually retrieval practice.

- Main body of the lesson – topic content and practice questions.

Electrophilic addition reactions involving hydrogen bromide
<p>Alkenes react with hydrogen bromide in the cold. The double bond breaks and a hydrogen atom ends up attached to one of the carbons and a bromine atom to the other.</p>


Recommended Further Reading
<ul style="list-style-type: none">■ https://www.savemyexams.co.uk/notes/as-chemistry-cie-until-2021/3-organic-chemistry-as-pre/3-2-hydrocarbons-as-pre/3-2-8-markovnikovs-rule-as-pre/■ https://www.chemguide.co.uk/mechanisms/eladd/carbonium.html#top■ https://www.chemguide.co.uk/mechanisms/eladd/menu.html#top

- Ending activity – summary questions/signpost to further reading.

Subject Content

Content common to AS and A-level

3.1 Physical chemistry	3.2 Inorganic chemistry	3.3 Organic chemistry
3.1.1 Atomic structure	3.2.1 Periodicity	3.3.1 Introduction to organic chemistry
3.1.2 Amount of substance	3.2.2 Group 2, the alkaline earth metals	3.3.2 Alkanes
3.1.3 Bonding	3.2.3 Group 7(17), the halogens	3.3.3 Halogenoalkanes
3.1.4 Energetics		3.3.4 Alkenes
3.1.5 Kinetics		3.3.5 Alcohols
3.1.6 Chemical equilibrium, Le Chatelier's principle and K_c		3.3.6 Organic analysis
3.1.7 Oxidation, reduction and redox equations		

A-level only content

3.1 Physical chemistry	3.2 Inorganic chemistry	3.3 Organic chemistry
3.1.8 Thermodynamics	3.2.4 Properties of Period 3 elements and their oxides	3.3.7 Optical isomerism
3.1.9 Rates of equations	3.2.5 Transition metals	3.3.8 Aldehydes and ketones
3.1.10 Equilibrium constant K_p for homogeneous systems	3.2.6 Reactions of ions in aqueous solution	3.3.9 Carboxylic acids and derivatives
3.1.11 Electrode potentials and electrochemical cells		3.3.10 Aromatic chemistry
3.1.12 Acids and bases		3.3.11 Amines
		3.3.12 Polymers
		3.3.13 Amino acids, proteins and DNA
		3.3.14 Organic synthesis
		3.3.15 Nuclear magnetic resonance spectroscopy
		3.3.16 Chromatography

Assessment

Three written papers		
Paper 1 Inorganic chemistry + some Physical chemistry	35%	2 hours 105 marks
Paper 2 Organic chemistry + some Physical chemistry	35%	2 hours 105 marks
Paper 3 Practical skills, data handling and synopsis	30%	2 hours 90 marks

Paper 1: Inorganic and Physical chemistry

Content

- Inorganic chemistry
- Relevant practical skills
- Relevant physical chemistry topics eg:
 - Atomic structure
 - Amount of substance
 - Bonding
 - Energetics
 - Equilibria
 - Acids and bases
 - Redox

Question type and marks

- 105 marks, with a mixture of short and long answer questions

Paper 2: Organic and Physical chemistry

Content

- Organic chemistry
- Relevant practical skills
- Relevant physical chemistry topics eg:
 - Amount of substance
 - Bonding
 - Energetics
 - Equilibria
 - Kinetics

Question type and marks

- 105 marks, with a mixture of short and long answer questions

Paper 3: Practical skills, data handling and synopsis

Content

- All content
- All practical skills

Question type and marks

- 40 marks of questions on practical techniques and data analysis
- 20 marks of questions testing across the specification
- 30 marks of multiple choice questions

Practical Assessment

During the course of the two years, you will participate in 12 required practicals. Each practical will focus on a different CPAC skill (Common Practical Assessment Criteria) that you must master before the end of the course and achieve endorsement for your practical skills in order to pass A-Level Chemistry.

What will I be assessed on?

1. Ability to follow written instructions
2. Ability to apply investigative approaches and methods when using instruments and equipment
3. Can safely uses a range of practical equipment and materials
4. Can make and record observations
5. Appropriately research, reference and report

General Expectations

Attend every lesson.

If you are absent, ensure that you liaise with your teacher and catch-up on any work missed – it is your responsibility to action this.

Keep a well organised folder that contains all notes, CPAC tracking sheets, topic assessments, homework etc. We will conduct routine folder inspections.

It is recommended by AQA that for every hour spent in the classroom, you spend a further hour on independent study; completing homework, summarising class notes and reading ahead – this is 4 hours per week.

Recommended Resources



<https://www.youtube.com/channel/UC8pOYw9kw8z9uOKgAZ7ki8w>



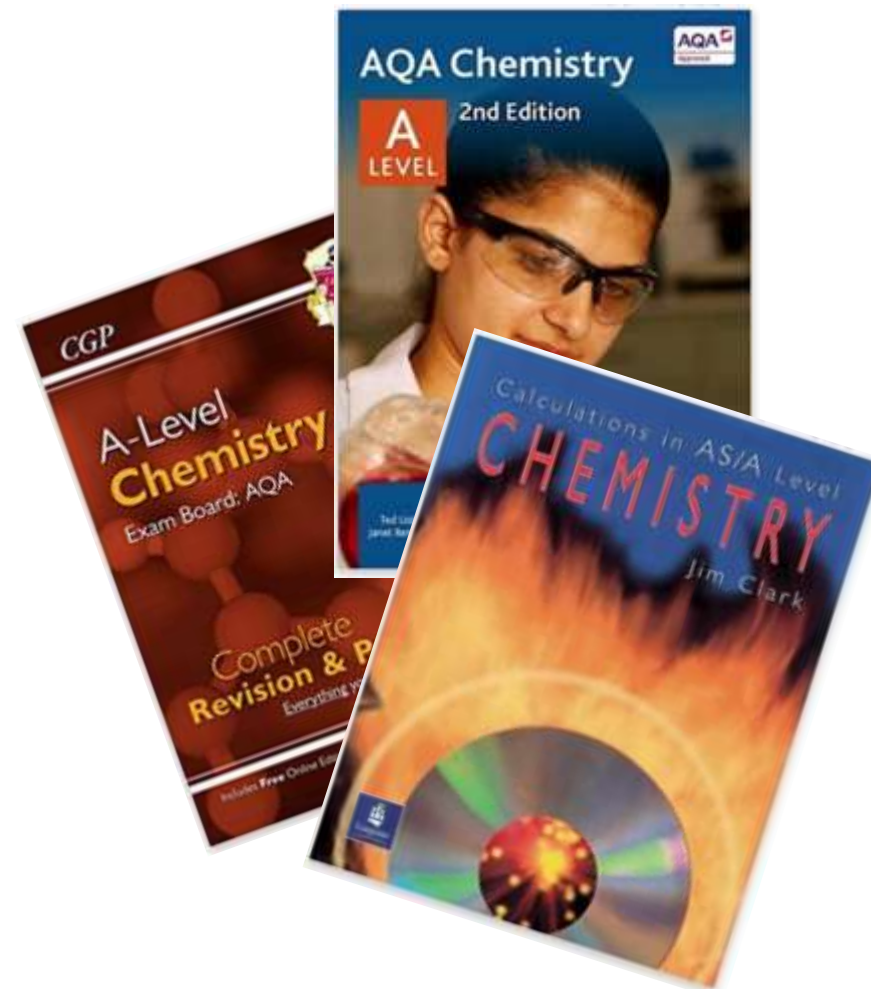
<https://www.youtube.com/channel/UCBgvmal8AR4QIK2e0EfJwaA>



https://www.youtube.com/channel/UCqbOeHaAUXw9II7sBVG3_bw



<https://www.youtube.com/user/MrERintoul>



Before I see you next...

1. Research *Cornell Notes*. How might this benefit you for A-Level Study?
2. Revisit Chemistry Paper 1 content. Identify any topics that you wish to revise at the beginning of A-Level.
https://www.youtube.com/watch?v=CSn6QIYfsT0&ab_channel=ScienceShorts
3. Revisit Chemistry Paper 2 content. Identify any topics that you wish to revise at the beginning of A-Level.
https://www.youtube.com/watch?v=in_ch55kFis&ab_channel=ScienceShorts
4. Begin to read/work through the Induction Booklet and Induction Task Booklet
5. Prepare to feed back in our next session!
6. Want to complete some extra prep work? Check our MaChemGuy's *Prep for A-Level Chemistry* videos:
<https://www.youtube.com/playlist?app=desktop&list=PLi6oabjl6coxUlfu8syK3K0iFXQljwDUM>