



The Gryphon School

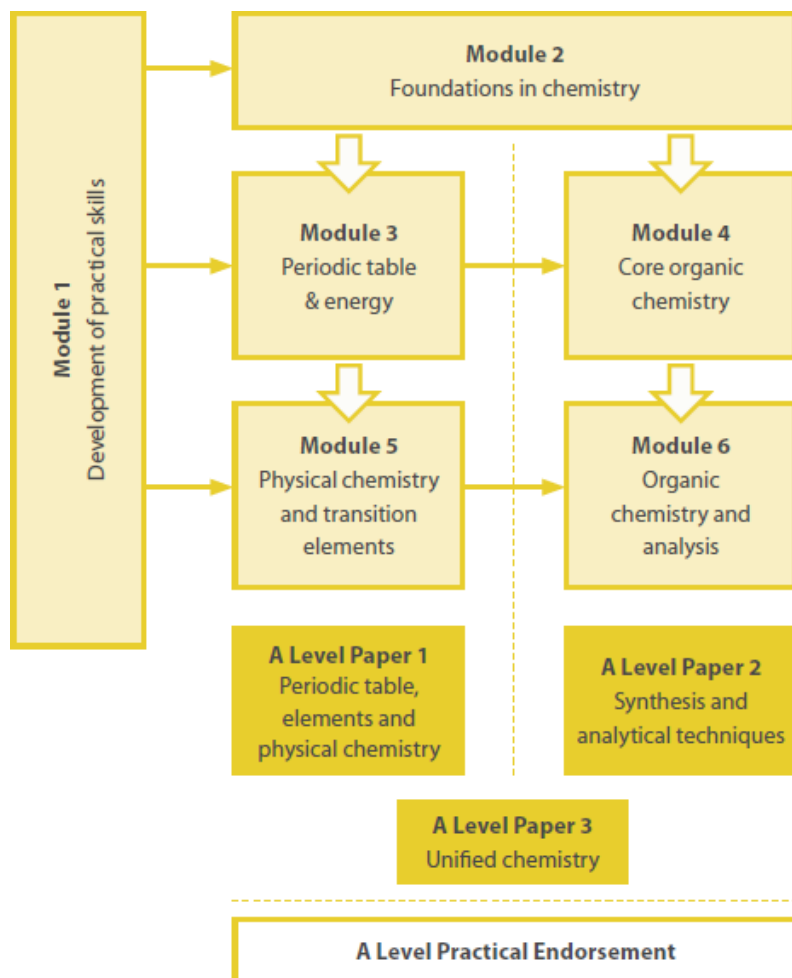
A-Level Chemistry Induction Booklet

This booklet is designed to give you an outline of the A-Level Chemistry course, as well as provide you with a variety of resources and tasks to help you consolidate and build on your GCSE knowledge in preparation for your new learning. This includes transition tasks which should be completed before you start your course in September.

Course outline

Module 1 – Development of practical skills		
Skills of planning, implementing, analysis and evaluation		
Module 2 – Foundations in chemistry		
Includes: • Atoms, compounds, molecules and equations • Amount of substance • Acid–base and redox reactions • Electrons, bonding and structure.		
Module 3 – Periodic table and energy		Module 4 – Core organic chemistry
Includes: • The periodic table and periodicity • Group 2 and the halogens • Qualitative analysis • Enthalpy changes • Reaction rates and equilibrium (qualitative).		Includes: • Basic concepts • Hydrocarbons • Alcohols and haloalkanes • Organic synthesis • Analytical techniques (IR, MS).
Module 5 – Physical chemistry and transition elements		Module 6 – Organic chemistry and analysis
Includes: • Reaction rates and equilibrium (quantitative) • pH and buffers • Enthalpy, entropy and free energy • Redox and electrode potentials • Transition elements.		Includes: • Aromatic compounds • Carbonyl compounds • Carboxylic acids and esters • Nitrogen compounds • Polymers • Organic synthesis • Chromatography and spectroscopy (NMR).

How the course is assessed



Examination Details (At the end of year 2)

ASSESSMENT OVERVIEW					
Paper			Marks	Duration	Weighting
Paper 1	Periodic table, elements and physical chemistry		100	2 hr 15 mins	37%
	Section A	Multiple choice	15		
	Section B	Structured questions and extended response questions covering theory and practical skills	85		
Paper 2	Synthesis and analytical techniques		100	2 hr 15 mins	37%
	Section A	Multiple choice	15		
	Section B	Structured questions and extended response questions covering theory and practical skills	85		
Paper 3	Unified chemistry		70	1 hr 30 mins	26%
	Structured questions and extended response questions covering theory and practical skills		70		

The Syllabus

<https://www.ocr.org.uk/images/171720-specification-accredited-a-level-gce-chemistry-a-h432.pdf>

Where to find resources during the course.

Teams pages for your class and Gryphon iLearn.

<http://www.chemguide.co.uk/> : A comprehensive online textbook

<https://www.physicsandmathstutor.com> : Revision resources and practice exam questions

<https://chemrevise.org> : Concise notes on all of the topics

How the course is delivered

You will have two teachers (5 periods per fortnight with one and 4 with the other).

- In the first year they will split the course as follows:
 - Teacher A will cover Module 2.1 and Module 3
 - Teacher B will cover Module 2.2 and Module 4
- This will include relevant practical skills alongside the taught content

Departmental expectations

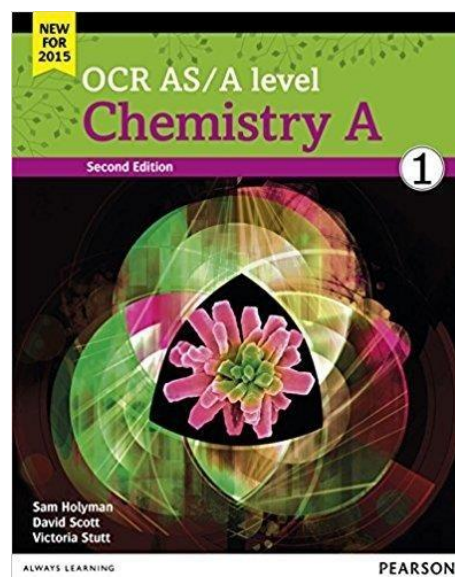
1. Attendance to all lessons
2. Consolidation of knowledge after each lesson using the textbook and consolidation booklets provided.
3. We expect you to purchase a copy of the textbook:

OCR AS/A Level Chemistry A 2015: Student

Book 1 ISBN-13: 978- 1447990789

This covers the year one content so you will need to purchase book two later in the course.

We do have some copies available for students to borrow if financially you are unable to buy your own copy. Please talk to your teachers in September.



Transition task

The rest of this document contains the Chemistry transition task, which is split into different sections, some to complete on paper and bring to your first Chemistry lesson in September, and some to complete online ahead of that. In each section there are a selection of links to videos and animations which would help you to review some of what you have done at GCSE ahead of completing these tasks if you feel you need a refresh.

We have also recommended some books, TED talks and podcasts which you could dip into if you'd like to broaden your knowledge over the summer.

If you have any questions or need any help, then please get in contact with Miss Upton, the Head of Chemistry:

ACU@gryphon.dorset.sch.uk

We look forward to meeting you in September and hope you enjoy the course.

The Gryphon Chemistry Team

- Miss A Upton (Head of Chemistry)
- Miss F Guest
- Mrs C Dallimore
- Mrs Bending

Transition Topic 1: Atoms, Ions and Equations

For this section of the task you will need to **hand write** your answers on paper and **bring them to your first Chemistry lesson in September**.

Resources:

This simulation can be used to help you visualise the properties of the different sub-atomic particles.

<https://phet.colorado.edu/en/simulation/build-an-atom>

These videos from the Fuse School YouTube channel provide a good summary of each of the types of bonding.

<https://www.youtube.com/user/virtualschooluk/search?query=bonding>

This simulation is good for practicing balancing equations.

<https://phet.colorado.edu/en/simulation/balancing-chemical-equations>

Questions:

- 1 Give the formulae of the following ions, e.g. the formula of a calcium ion is Ca^{2+} .

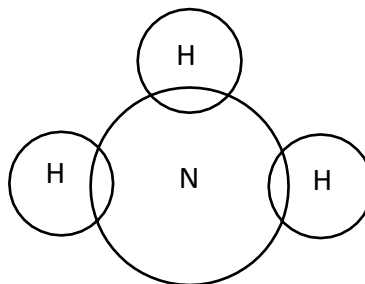
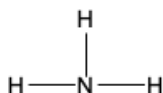
potassium carbonate cobalt(III)

- 2 Give the formulae of the following ionic compounds.

magnesium nitrate aluminium bromide

lithium oxide iron(II) hydroxide

- 3 The displayed formula (stick diagram) of ammonia, NH_3 , is shown. Complete the dot-cross diagram.



- 4 Tetrafluoromethane (CF_4) is a molecular substance with a boiling point of -128°C .

Draw a displayed formula for a molecule of CF_4 .

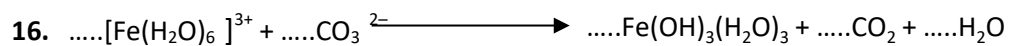
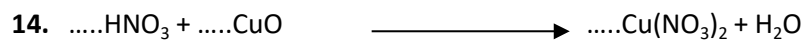
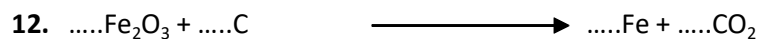
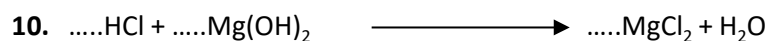
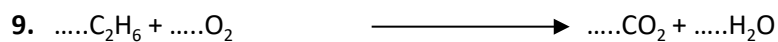
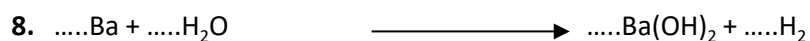
- 5 Identify the structure of the following substances

name	silver nitrate	silicon oxide	helium	ammonia	copper	buckminsterfullerene	graphene	sucrose
formula	AgNO_3	SiO_2	He	NH_3	Cu	C_{60}	C	$\text{C}_{12}\text{H}_{22}\text{O}_{11}$
giant covalent								
ionic								
metallic								
molecular								
monatomic								

6 Identify the structure of the following substances based on their properties.

	melting point (°C)	boiling point (°C)	electrical conductivity as		structure type				
			solid	liquid	giant covalent	ionic	metallic	molecular	monatomic
A	583	861	does not conduct	conducts					
B	-35	12	does not conduct	does not conduct					
C	1538	2862	conducts	conducts					
D	1414	3265	does not conduct	does not conduct					
E	44	280	does not conduct	does not conduct					
F	-248	-246	does not conduct	does not conduct					

Now try balancing these equations.



Transition Topic 2: Mass, moles and concentrations

For this section of the task you will need to submit your answers to the questions **online** using Microsoft Forms.

Resources

Good starting point for revision of the calculations with some straightforward practice questions

<https://www.bbc.co.uk/bitesize/guides/ztdsmg/revision/1>

<https://www.bbc.co.uk/bitesize/guides/zymgng8/revision/1>

This simulation is good for helping to make the links between amount of substance, volume and concentration.

<https://phet.colorado.edu/en/simulation/concentration>

Questions

Click on the link below to a Microsoft forms quiz on calculations. (15 questions)

https://forms.office.com/Pages/ResponsePage.aspx?id=pi1KxTv1_0-91DI2s8nSTJ-1fm-Gz_JKkjD61OX11P9UMUEwQkdEWk5KWDIESkFMQ1dFUIIDMkQ1WC4u

Transition Topic 3: Energy Changes

For this section of the task you will need to submit your answers to the questions **online** using Microsoft Forms.

Resources

This is a really good starting point to recap your understanding of enthalpy changes from GCSE

<https://www.bbc.co.uk/bitesize/guides/zg87b82/revision/1>

This is a short video on Exothermic and Endothermic reactions

<https://www.youtube.com/watch?v=eJXL0IrbtqE>

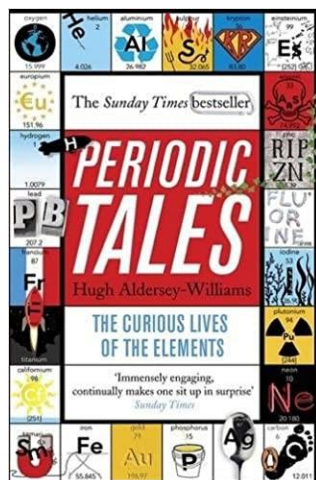
Questions

Click on the link below to a Microsoft forms quiz on energy changes in reactions. (10 questions)

https://forms.office.com/Pages/ResponsePage.aspx?id=pi1KxTv1_0-91DI2s8nSTJ-1fm-Gz_JKkjD61OX11P9UQTVVVjhLMkYwU0g5Q1A0TzZVUjBHN0VDRC4u

Book Recommendations

You may choose to read one or more of these books over the summer to extend your understanding of Chemistry.

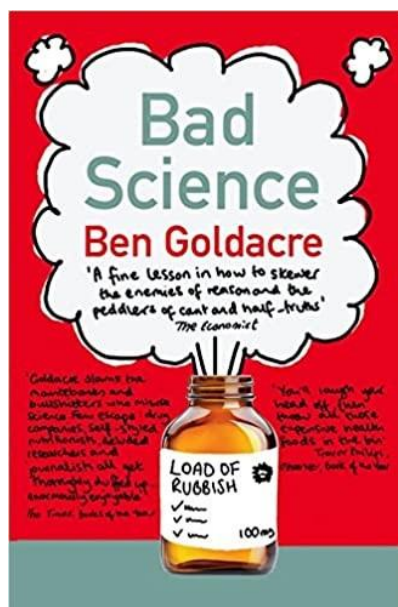
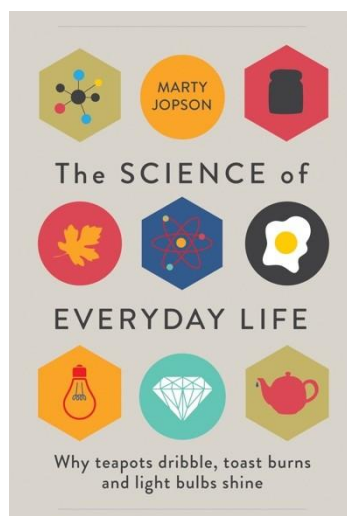


Periodic Tales: The Curious Lives of the Elements

This book covers the chemical elements, where they come from and how they are used. There are loads of fascinating insights into uses for chemicals you would have never even thought about.

The Science of Everyday Life, Marty Jopson:

The title says it all really, lots of interesting stuff about the things around your home!

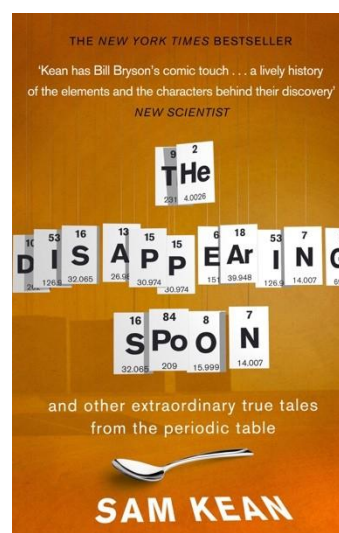


Bad Science, Ben Goldacre:

The author takes apart anyone who has published bad/misleading or dodgy science – the book will make you think about everything the advertising industry tries to sell by making it sound ‘sciencey’

The Disappearing Spoon, Sam Kean:

This book follows the elements, their parts in human history, finance, mythology, conflict, the arts, medicine and the lives of the (frequently) mad scientists who discovered them.



TED Talk Recommendations

If you have some spare time why not watch one of these short TED talks from leading scientists and researchers on a variety of topics.

The Chemistry of Cookies: You stick cookie dough into an oven, and magically, you get a plate of warm, gooey cookies. Except it's not magic; it's science. Stephanie Warren explains via basic chemistry principles how the dough spreads out, at what temperature we can kill salmonella, and why that intoxicating smell wafting from your oven indicates that the cookies are ready for eating. https://www.ted.com/talks/stephanie_warren_the_chemistry_of_cookies

Play with Smart Materials: Ink that conducts electricity; a window that turns from clear to opaque at the flip of a switch; a jelly that makes music. All this stuff exists, and Catarina Mota says: It's time to play with it. Mota leads us on a tour of surprising and cool new materials, and suggests that the way we'll figure out what they're good for is to experiment, tinker and have fun. https://www.ted.com/talks/catarina_mota_play_with_smart_materials

Just how small is an atom?: Just how small are atoms? Really, really, really small. This fast-paced animation from TED-Ed uses metaphors (imagine a blueberry the size of a football stadium!) to give a visceral sense of just how small atoms are. Lesson by Jon Bergmann, animation by Cognitive Media. https://www.ted.com/talks/jon_bergmann_just_how_small_is_an_atom

Battling bad science: Every day there are news reports of new health advice, but how can you know if they're right? Doctor and epidemiologist Ben Goldacre shows us, at high speed, the ways evidence can be distorted, from the blindingly obvious nutrition claims to the very subtle tricks of the pharmaceutical industry. https://www.ted.com/talks/ben_goldacre_battling_bad_science#t-44279

How spectroscopy could reveal alien life: Garik Israelian is a spectroscopist, studying the spectrum emitted by a star to figure out what it's made of and how it might behave. It's a rare and accessible look at this discipline, which may be coming close to finding a planet friendly to life. https://www.ted.com/talks/garik_israelian_how_spectroscopy_could_reveal_alien_life

Podcast Recommendations

Why not try listening to a few episodes from one or more of these podcasts.

Science vs: Science Journalist Wendy Zukerman dissects the latest fad framing itself as a scientific fact, wading through the mass of information so you don't have to. *Average episode length 20-30 minutes.*

The Naked Scientists: Scientists based at Cambridge University discuss the latest science news, interview top scientists, do hands-on science experiments and answer science questions. *Average episode length 1 hour.*

Science(ish): Flâneur and irrepressible commentator, Rick Edwards and "Indiana Jones in a lab coat" Dr Michael Brooks, delve into the science behind popular culture. *Average episode length 40 minutes.*