Year 11 > 12 Bridging Work
Summer Term 2025

Subject	**Chemistry**
Course	**A-Level**
Awarding Body	**OCR**

Contents:

Course/specification overview

The Course: OCR A Level GCE in Chemistry A H432

Module 1 Development of Practical skills in Chemistry
Module 2 Foundation in Chemistry
Module 3 Periodic Table and Energy
Module 4 Core Organic Chemistry
Module 5 Physical Chemistry and Transition Elements
Module 6 Organic Chemistry and Analysis

Assessment Overview

A level in Chemistry A H432

There are 3 written papers covering part/all of the content. All components include synoptic assessment.

Component 01 (37%)	H432/01	2¼ hour written paper	covering Modules 1, 2, 3, 5
Component 02 (37%)	H432/02	2¼ hour written paper	covering Modules 1, 2, 4, 6
Component 03 (26%)	H432/03	1½ hour written paper	covering Modules 1-6

Practical Skills in Chemistry

Chemistry is a practical subject and the development of practical skills is fundamental to understanding the concepts in chemistry. There is no separate assessment for practical skills at A-level as the skills are assessed in the three written papers. Students will be expected to complete a minimum of 12 practical assignments and write them up in full. Each practical assignment will address and assess techniques and skills which will be recorded. The practical assignments will be submitted as part of the A Level Practical Endorsement. The award for a Practical Endorsement requires the student to submit a minimum of 12 practical assignments which cover all the required categories and demonstrate all the required practical skills through their practical work. Students who have demonstrated the above fully will receive a pass grade and will appear on the student's certificate as a separately reported result alongside the overall grade for the qualification.

Our department expectations

A-level study compact for students

Lesson Preparation and Organisation

- **Pre-reading** (from textbook / revision guide) with **5-7 bullet points** and bring one question to the lesson – you may be asked a question about the pre-reading
- Organisation: textbook, folders, data sheet, PLCs for each topic
- Regularly check your email and Satchel One
- Equipment: all Chemistry students are expected to have a lab coat for all practical lessons that can be left in the department for when it is needed, a scientific calculator

Practical work

- Complete pre-PAG work (using checklist), including:
  - Write up practical / PAG plan before coming to the lessons (method can then be amended from experience of the practical)
  - Include risk assessment
  - Include labelled apparatus diagrams (where appropriate)
  - Identified potential sources of error and uncertainty (where appropriate)
- Complete PAG work and write-up for deadline (typically within a week)
- Complete response to PAG feedback shortly after receipt

Independent Study

- Catch up on missed work due to absences
- Use *non-contact study periods* (timetabled) for pre-reading, structured reviewing of learned material and practise questions on topics
- Revision for tests and exams
- Use study skills and revision skills that have been taught to you
- If below target grade, must attend study sessions for support with teacher, complete practise questions on topics taught (to check understanding)

Working as a scientist

- Log ins and subscriptions – Kerboodle
- Reading around subjects and topics / having a wider interest in your field of study
- Read / research about possible careers

Review/revise

The resources linked below provide opportunities to review and refine your understanding of essential practical techniques and key concepts for A-level Chemistry. This is not work to be submitted in September, but represents some key skills and knowledge we will expect you to have.

RSC Titration Screen Experiment – a vital skill that you will need to develop. For those who did Combined Science, this resource is a must as you will not have covered this technique.

http://www.rsc.org/learn-chemistry/resources/screen-experiment/titration/experiment/2

Moles Equations Gridlocks – test your understanding of the moles equations to solve the puzzles.

http://www.rsc.org/learn-chemistry/resources/gridlocks/puzzles/level-2/moles-equations.html

Balancing Chemical Equations Game – a great simulation game from PhET which helps build confidence in the most basic of chemistry skills. Can you conquer all three levels?

https://phet.colorado.edu/sims/html/balancing-chemical-equations/latest/balancing-chemical-equations_en.html

Watch

Rough science – the Open University – 34 episodes available

Real scientists are 'stranded' on an island and are given scientific problems to solve using only what they can find on the island. Great fun if you like to see how science is used in solving problems. There are six series in total.

http://bit.ly/pixlchemvid1a
http://www.dailymotion.com/playlist/x2igjq_Rough-Science_rough-science-full-series/1#video=xxw6pr
or
http://bit.ly/pixlchemvid1b
https://www.youtube.com/watch?v=lUoDWAt259I

A thread of quicksilver – The Open University

A brilliant history of the most mysterious of elements – mercury. This program shows you how a single substance led to empires and war, as well as showing you some of the cooler properties of mercury.

http://bit.ly/pixlchemvid2
https://www.youtube.com/watch?v=t46lvTxHHTA

10 weird and wonderful chemical reactions

10 good demonstration reactions, can you work out the chemistry of …. any… of them?

http://bit.ly/pixlchemvid3
https://www.youtube.com/watch?v=0Bt6RPP2ANI

Chemistry in the Movies

Dantes Peak 1997: Volcano disaster movie.

Use the link to look at the Science of acids and how this links to the movie.
http://www.open.edu/openlearn/science-maths-technology/science/chemistry/dantes-peak

Fantastic 4 2005 & 2015: Superhero movie

Michio Kaku explains the "real" science behind Fantastic Four

https://archive.nerdist.com/michio-kaku-explains-the-real-science-behind-fantastic-four/

Listen to

Learn Chemistry from the Royal Society of Chemistry

From the Nobel Prize to making aircraft from seaweed, listen to these useful podcasts all about the world of Chemistry.

https://podcasts.apple.com/gb/podcast/learn-chemistry-from-the-royal-society-of-chemistry/id627434169

Chemistry in its Element from Chemistry World

A weekly tour of the Periodic Table.

https://podcasts.apple.com/gb/podcast/chemistry-in-its-element/id1162733995

In Their Element from BBC Radio 4

Scientists tell the stories of different elements, explaining why these well-known substances matter for Chemistry and also for the development of modern civilisation.

https://www.bbc.co.uk/programmes/m000cn05

Quirks & Quarks from CBC Radio

For the past 40 years, *Quirks & Quarks* has brought its listeners to the cutting edge of scientific inquiry. Every week, the program presents the people behind the latest discoveries in the physical and natural sciences, from the smallest sub-atomic particle to the largest objects in the sky and everything in between. The program also examines the political, social, environmental and ethical implications of new developments in science and technology. *Quirks & Quarks* is a program for people fascinated by the world above, below and around them. And you don't need a PhD to enjoy it.

https://www.cbc.ca/radio/podcasts/science-and-tech/quirks-quarks/

Read

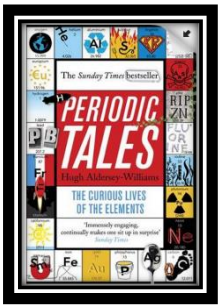
You are strongly advised to undertake some background reading before and during the course. You will also be required to buy the textbook by the start of Year 12 and this will cover the Year 12 and Year 13 content.

- Course textbook: **A Level Chemistry A for OCR Student Book:** Authors : David Gent and Rob Ritchie (ISBN 13 978 0 198351979)
- Maths for A-level Chemistry published by CGP (ISBN 9781782944720) ***Vital if you are not taking Maths at A-level***

You may wish to purchase an additional textbook(s) and a revision guide to help consolidate your learning, and for background reading. There are also several practice exam-style question books available from different publishers (CGP, Hodder, etc). These are extremely helpful in preparing yourself for the higher demand of A-level exams.

You are also advised to subscribe to a scientific journal. Chemistry Review subscriptions are available through the school: details will be published next term.

Book Recommendations

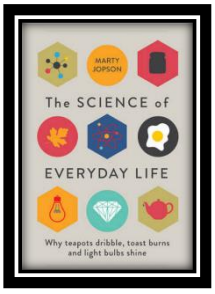


Periodic Tales: The Curious Lives of the Elements (Paperback) Hugh Aldersey-Williams

ISBN-10: 0141041455

http://bit.ly/pixlchembook1

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.

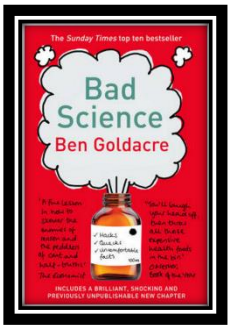


The Science of Everyday Life: Why Teapots Dribble, Toast Burns and Light Bulbs Shine (Hardback) Marty Jopson

ISBN-10: 1782434186

http://bit.ly/pixlchembook2

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

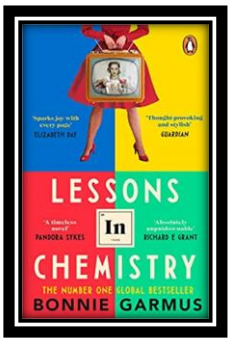


Bad Science (Paperback) Ben Goldacre

ISBN-10: 000728487X

http://bit.ly/pixlchembook3

Here Ben Goldacre takes apart anyone who published bad / misleading or dodgy science – this book will make you think about everything the advertising industry tries to sell you by making it sound 'sciency'.



Lessons in Chemistry (Paperback) Bonnie Garmus

ISBN-10: 1804990922

Chemist Elizabeth Zott is not your average woman. In fact, Elizabeth Zott would be the first to point out that there is no such thing.

But it's the early 1960s and her all-male team at Hastings Research Institute take a very unscientific view of equality. Except for one: Calvin Evans, the lonely, brilliant, Nobel-prize nominated grudge-holder who falls in love with - of all things - her mind. True chemistry results.

Like science, life is unpredictable. Which is why a few years later, Elizabeth Zott finds herself not only a single mother, but the reluctant star of America's most beloved cooking show, Supper at Six. Elizabeth's unusual approach to cooking ('combine one tablespoon acetic acid with a pinch of sodium chloride') proves revolutionary. But as her following grows, not everyone is happy. Because as it turns out, Elizabeth Zott isn't just teaching women to cook. She's daring them to change the status quo.

Meet the unconventional, uncompromising Elizabeth Zott.

Salters' Advanced Chemistry: Chemical Storylines

Do not feel you need to buy the latest edition. You can pick up an old edition for a few pounds on ebay, gives you a real insight into how chemistry is used to solve everyday problems from global pollution through feeding the world to making new medicines to treat disease.

Research

Use your online searching abilities to see if you can find out as much about the topic as you can. Remember if you are a prospective A level chemist, you should aim to push **your** knowledge.

You can make a 1-page summary for one topic below using Cornell notes:

http://coe.jmu.edu/learningtoolbox/cornellnotes.html

https://www.youtube.com/watch?v=d6n7lm0fcCs

Task 1: The chemistry of fireworks

What are the component parts of fireworks? What chemical compounds cause fireworks to explode? What chemical compounds are responsible for the colour of fireworks?

Task 2: Why is copper sulfate blue?

Copper compounds like many of the transition metal compounds have got vivid and distinctive colours – but why?

Task 3: Aspirin

What was the history of the discovery of aspirin, how do we manufacture aspirin in a modern chemical process?

Task 4: The hole in the ozone layer

Why did we get a hole in the ozone layer? What chemicals were responsible for it? Why were we producing so many of these chemicals? What is the chemistry behind the ozone destruction?

Task 5: ITO and the future of touch screen devices

ITO – indium tin oxide is the main component of touch screen in phones and tablets. The element indium is a rare element and we are rapidly running out of it. Chemists are desperately trying to find a more readily available replacement for it. What advances have chemists made in finding a replacement for it?

Complete

This section needs to be completed and brought to school for your first Chemistry lesson of Year 12.

1) Explain the following in words:

a) The difference between an element and a compound?

_____

_____(2)

b) An atom:

_____(1)

c) A molecule:

_____(1)

d) An ion:

_____(1)

e) A mole (the chemical quantity not the burrowing mammal kind):

_____(1)

2) Identify each of the following particles as an atom, molecule or ion AND name them:

(i) NH_3 (ii) O^{2-}

(iii) SO_4^{2-} (iv) F_2

(v) O (vi) O_2

(vii) NO_3^- (viii) H_2O

(ix) Cl^- (xi) H^+

(10)

3) a) Write the formula of the following substances:

i) lithium oxide ii) ammonia

iii) calcium nitrate iv) nitrogen

v) methane vi) argon

vii) ammonium sulphate viii) iron (III) hydroxide

ix) calcium oxide x) magnesium hydroxide

xi) barium nitrate xii) magnesium carbonate

xiii) calcium sulphate xiv) barium chloride

xv) sodium bromide xvi) iron (III) chloride

xvii) iodine monochloride xviii) strontium iodide

(18)

b) Give the name of the following substances from their formula:

(i) $Ca(OH)_2$ ii) $MgCO_3$

iii) $SrSO_4$ iv) MgI_2

v) NH_4Cl vi) $Ca(NO_3)_2$

vii) $CaCO_3$ viii) $Mg(OH)_2$

ix) $FeBr_3$ x) Br_2

xi) $CaSO_4$ xii) $BaCl_2$

xiii) $AgCl$ xiv) $AgNO_3$

(14)

4) a) Give the name and relative formula mass (M_r) of each of the following substances. You will need to use the Periodic Table (see appendices).

(i) Fe_2O_3 ii) C_5H_{10}

(iii) $(NH_4)_2CO_3$ iv) $Fe_2(SO_4)_3$

(4)

(b) Give the charge on the following ions:

(i) iron in Fe_2O_3 (ii) ammonium ion in $(NH_4)_2CO_3$ (iii) iron in $Fe_2(SO_4)_3$

(3)

5) Balance the following equations. For (c) and (d) you will need to find the chemical formulae for the reactants and products first.

a) $Fe + H_2O \rightarrow Fe_3O_4 + H_2$ (1)

b) $PCl_3 + H_2O \rightarrow P(OH)_3 + HCl$ (1)

c) ammonia + oxygen $\rightarrow$ nitrogen + water

_____

(2)

d) ethane + oxygen $\rightarrow$ carbon dioxide + water

_____

(2)

6) Mohr salt is a compound with the chemical formulae $(NH_4)_2Fe(SO_4)_2 \cdot 6H_2O$

a) Calculate the total number of atoms in a molecule of Mohr salt

_____ (1)

b) Mohr salt has a formulae mass 392. Calculate the % by mass of nitrogen in Mohr salt

_____

_____

_____ (2)

7) The volume of the ocean is 1.37 x 10^{24} cm^3. Calculate its volume in dm^3

_____

_____

_____(2)

Large numbers, Significant Figures and Rounding up and down

When quoting a result, it should contain the same number of significant figures (sig figs) as the measurement with the smallest number of significant figures.

If the last figure is between 5 and 9 inclusive, round up

If the last figure is between 0 and 4 inclusive, round down

Significant figures and rounding up and down should ***only be done at the end*** of a calculation, otherwise it causes rounding errors

Use standard form for large numbers and very small numbers

8) a) Give the following numbers to 3 sig figs:

i) 50.67 _____ ii) 506789 _____

iii) 0.5067 _____ iv) 0.0005067 _____

b) Give the following numbers to standard form and 2 sig figs

i) 5067 _____ ii) 0.0005067 _____

(2)

9) The following results are accurately measured values from experiments. Complete the sum and give the answer to the most number of significant figures that you think gives an answer that is trustworthy.

a) 1.4567 + 2.3

_____

b) 10.5 - 0.145

_____(2)

10) What mass of hydrogen is produced when 192 g of magnesium is reacted with hydrochloric acid? (See appendicies for Periodic Table)

$$Mg + 2\,HCl \rightarrow MgCl_2 + H_2$$

_____

_____

_____(3)

11) What mass of oxygen is needed to react with 8.5 g of hydrogen sulphide (H_2S)?

$$2\,H_2S + 3\,O_2 \rightarrow 2\,SO_2 + 2\,H_2O$$

_____

_____

_____

_____(3)

12) (a) Railway lines are welded together by the Thermite reaction, which produces molten iron. What mass of iron oxide is needed to form 1 kg of iron?

$$Fe_2O_3 + 2\ Al \rightarrow 2\ Fe + Al_2O_3$$

_____

_____

_____

_____(3)

(b) The company calculated that they would produce 1.2 kg of iron, but only 0.9 kg was produced. Calculate the percentage yield. ***(Chemistry only content – Combined students you will need to do some research)***

(1)

13) Complete the following:

	Sub atomic particles		
	Electron	Proton	Neutron
Charge			
Relative mass			1
Where are they found in an atom			
How to work out how many of them are there in an atom of an element			

(3)

14) Complete the following table. You will need the Periodic Table (see appendices):

			Number of…		
	Atomic Number	Mass Number	Electrons	Protons	Neutrons
^{35}Cl					
^{37}Cl					
$^{35}Cl^-$					
Ca					
Ca^{2+}					

(5)

15) Draw the electron configurations and write its electron arrangement. Use ● or **x** to represent the electrons. Put the symbol of the element in the centre.

(a) magnesium (b) oxygen (c) chlorine (d) potassium

(4)

16) Draw dot cross diagrams to show the ions in ionic bonding of the following compounds. Only show outer electrons and put the element's symbol in the centre.

(a) Magnesium oxide

(b) Calcium chloride

(c) Sodium oxide

(9)

17) Draw dot cross diagrams to show the covalent bonding in the following molecules. Only show outer electrons and put the element's symbol in the centre.

(a) ammonia (NH_3)

(b) methane (CH_4)

(c) water

(d) nitrogen

(e) carbon dioxide

(10)

18) Complete the following table:

				Electrical Conductivity		
Compound	**Type of bonding**	**Type of structure**	**Melting pt & Boiling pt**	**In solid**	**molten**	**In solution**
Silver						
Chlorine						
Magnesium chloride						
Diamond						
Graphite						
Silicon dioxide						
Carbon dioxide						
Aluminium oxide						

(8)

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 H hydrogen 1.0	2											13	14	15	16	17	2 He helium 4.0
3 Li lithium 6.9	4 Be beryllium 9.0											5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
55 Cs caesium 132.9	56 Ba barium 137.3	• 57–71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon
87 Fr francium	88 Ra radium	• 89–103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium		114 Fl flerovium		116 Lv livermorium		

Key
atomic number
Symbol
name
relative atomic mass