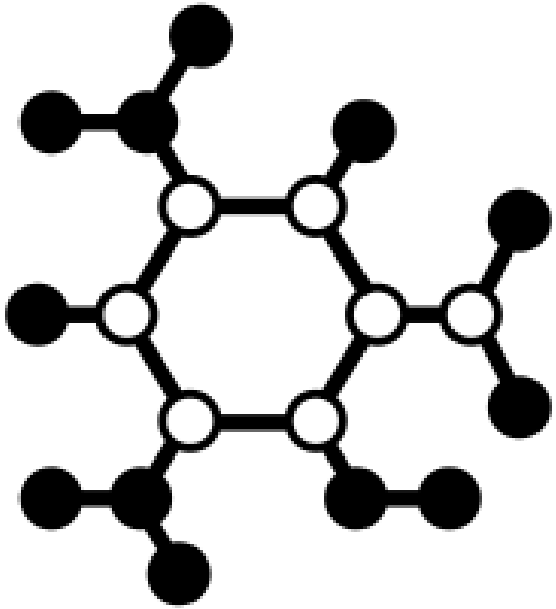
DHFS

AS and A Level Chemistry

Student Welcome Pack



Everything you need to know in order to succeed

Contents

1. About the OCR Chemistry B (Salters) course

We chose OCR Chemistry B (Salters) to teach DHFS students because it:

- Broadens the appeal of chemistry by showing how it relates to people's lives
- Introduces applications first and develops theory when appropriate
- Links theory to relevant context
- Explores contemporary issues
- Allows topics revised in later units
- Allows learning through a range of specially designed innovative activities linked to the course

What is taught in the course?

The following storyline modules introduce a range of relevant chemical ideas in structured and engaging contexts to illustrate the role of chemistry in our daily life and in understanding the world around us. In the exams students will be expected to apply their learning to unfamiliar contexts.

First year (AS)

- Elements of life
- Developing fuels
- Elements from the sea
- The ozone story
- What's in a medicine?

Second year (A level)

- The chemical industry
- Polymers and life
- Oceans
- Developing metals
- Colour by design

Students will initially visit fundamental chemical ideas in year one and then revisit these in the second year but in a different context. **As a result, students often find the first year quite challenging but then start to show greater understanding in year two.**

Assessment

For an AS level in Chemistry, students must sit two exams at the end of the first year:

Component	Marks	Duration	Weighting
Foundations of chemistry (01)	70	1 hour 30 mins	50%
Chemistry in depth (02)	70	1 hour 30 mins	50%

Paper 1 will include 20 multiple choice questions that cover a broad range of ideas, followed by questions that range from 1 mark to 6 marks from all topics.

Paper 2 will include no multiple choice questions, only 1mark-6 mark questions and will assess chemical ideas in depth.

For an A level in Chemistry, students must sit three exams at the end of the two years:

Component	Marks	Duration	Weighting
Fundamentals of chemistry (01)	110	2 hour 15 mins	41%
Scientific literacy in chemistry (02)	100	2 hour 15 mins	37%
Practical skills in chemistry (03)	60	1 hour 30 mins	22%
Practical endorsement in chemistry (04)	-	-	-

Paper 1 will include 30 multiple choice questions, followed by 1 mark – 6 mark questions that cover all topics from year 1 and year 2

Paper 2 will contain no multiple-choice questions, only 1 mark- 6 mark questions that cover all topics from year 1 and 2. 20 marks at the end of the paper will be related to a recently published article. This article will be available for us months before the exam to read and predict questions from. Students cannot take their article into the exam with them – a new one is provided.

Paper 3 will contain no multiple-choice questions, only 1 mark- 6 mark questions. It will be based around the 12 essential practical activities (PAGs) from year 1 and 2 (see below).

2. The Practical Endorsement

Students gain practical skills as they work through the storyline modules. These are assessed in the written examinations and in the practical endorsement (component 04). Students will receive either a 'PASS' or 'FAIL' for their practical work. This is assessed internally (by teachers) and subject to random investigation by external invigilators.

Students must complete 6 Practical activities in year 1 and another 6 in year 2 (see next page). **Evidence of these practical's must be recorded in a lab book in order to PASS the practical endorsement (component 04).**

Lab book expectations

- Bring your lab book with you every lesson, or store in E12.
- All practical work is dated. **This must match the teachers records of when the practical activity was completed**
- All practical work titled correctly *(eg. PAG 2 – Determining an enthalpy change)*
- Write-up practical work and complete all questions and extension opportunities
- When marked, DIRT must be completed in green pen in response to teacher feedback
- It is a good idea to keep it neat and organised. We recommend filing your PAG activity sheets in your lesson folders, separate to the lab book. Do not lose them!

Expectations before and during practical work

- Risk assessment completed
- Goggles worn when using chemicals
- Hair tied back when using Bunsen burners
- Stool tucked under and stood up at all times
- Sensible behaviour
- A level equipment is very expensive so extra care is necessary.
- Alert a teacher if glassware has broken or a chemical spillage has occurred. Do not attempt to clean up yourself unless your teacher allows.
- Be responsible for cleaning glassware you have used and putting it back in the appropriate places. The lab must look the way it did when you entered!
- **Failure to meet these expectations may result in you having to repeat a PAG in your own time or potentially a 'FAIL' for your practical endorsement**

Practical activity group (PAG)	Techniques/skills covered (minimum)
1 Moles determination	• use of appropriate apparatus to record measurements of mass and volume of a gas, 1.2.2(a)
2 Acid–base titration	• measurement of volume of a liquid, 1.2.2(a) • use of volumetric flask, including accurate technique for making up a standard solution, 1.2.2(e) • use of laboratory apparatus for titration, using burette and pipette, 1.2.2(d)(i) • use of acid–base indicators in titrations of weak/strong acids with weak/strong alkalis, 1.2.2(f)
3 Enthalpy determination	• use of appropriate apparatus to record measurements of temperature, 1.2.2(a)
4 Qualitative analysis of ions	• use of laboratory apparatus for qualitative tests for ions, 1.2.2(d)(iii) • make and record qualitative observations, 1.2.1(d)
5 Synthesis of an organic liquid	• use of laboratory apparatus for heating under reflux, 1.2.2(d)(ii)[1] • purification of a liquid product, including use of a separating funnel, 1.2.2(g)(ii) • use of laboratory apparatus for distillation, 1.2.2(d)(ii) • identification of potential hazards (risk assessment), CPAC3
6 Synthesis of an organic solid	• use of laboratory apparatus for heating under reflux, 1.2.2(d)(ii)[1] • use of laboratory apparatus for filtration, including use of fluted filter paper, or filtration under reduced pressure, 1.2.2(d)(iv) • purification of a solid product by recrystallisation, 1.2.2(g)(i) • use of melting point apparatus, 1.2.2(h) • use of thin layer or paper chromatography, 1.2.2(i) • identification of potential hazards (risk assessment), CPAC3
7 Qualitative analysis of organic functional groups	• use of laboratory apparatus for qualitative tests for organic functional groups, 1.2.2(d)(iii) • use of a water bath or electric heater or sand bath for heating, 1.2.2(b) • make and record qualitative observations, 1.2.1(d)
8 Electrochemical cells	• setting up of electrochemical cells and measuring voltages, 1.2.2(j)
9 Rates of reaction – continuous monitoring method	• measurement of rate of reaction by a continuous monitoring method, 1.2.2(l)(ii) • use of appropriate apparatus to record measurements of time, 1.2.2(a) • use appropriate software to process data, 1.2.1(g)[2]
10 Rates of reaction – initial rates method	• measurement of rate of reaction by an initial rate method such as a clock reaction, 1.2.2(l)(i) • identify and control variables, CPAC2 • use appropriate software to process data, 1.2.1(g)[2]
11 pH measurement	• measurement of pH using pH charts, or pH meter, or pH probe on a data logger, 1.2.2(c)
12 Research skills	• apply investigative approaches and methods to practical work, 1.2.1(a) • use online and offline research skills, including websites, textbooks and other printed scientific sources of information, 1.2.1(h) • correctly cite sources of information, 1.2.1(j)

3. Suggested ‘link’ subjects

Chemistry can open up many doors into further study. It is a highly regarded A level and often a requirement for science degrees. As well as this, science degrees usually require a minimum of two science A levels. Therefore, it is important students choose appropriate subjects to keep all options available. Below are our recommendations, including ideas for further study.

Maths

- Chemistry is a very mathematical subject and maths can support and develop this skill.
- Statistically, chemists who study maths at A level do better in chemistry than those who do not.
- Maths and chemistry can lead you into degrees such as *Chemical Engineering*

Physics

- Similar to maths, Physics can support the mathematical requirements of chemistry
- Like chemistry, Physics is the study of abstract ideas and phenomena. Both require a similar set of skills.
- Physics and chemistry can lead you into degrees such as *Chemical Engineering, Chemical Physics, Molecular Physics, Nuclear engineering, Civil engineering*

Biology

- This is a popular combination and are the typical courses required for clinical-based degrees such as *medicine, dentistry, biomedical sciences, veterinary sciences* and *pharmacology.*
- There is a huge overlap in content from both subjects – similar ideas are reinforced several times over the two years.

4. Staff

There are five teachers in the A level chemistry department:

E Block:

Dr A Jones	ajones@dronfield.derbyshire.sch.uk
Mr R Webster	rwebster@dronfield.derbyshire.sch.uk
Dr G Keith	gkeith@dronfield.derbyshire.sch.uk

F Block:

Mr C Shortman	cshortman@dronfield.derbyshire.sch.uk
Mr J Alcock	jalcock@dronfield.derbyshire.sch.uk

Students are assigned two teachers over the entire course. There are 5 lessons per week in a 2:3 teacher ratio.

All teachers are available for support and contactable by email (above). They are more than happy to help support your journey through the course!

During the year, teachers host catch-up or revision sessions that are advertised when available.

During study leave, students can request to see teachers about particular problems they have. **It is important to note that lessons will not be timetabled during this time and it is under the teachers' discretion whether they choose to host entire lessons.**

Teachers should not be contacted during holidays or weekends unless urgent. **It is under the teachers' discretion whether they choose to be contacted in this time.**

5. Expectations

There is no denying that chemistry is a very challenging subject. We do however believe that **any** student can succeed in chemistry as long as the following expectations are met. **We find that Y13 students often 'wish' they had put these expectations into action as soon as they started the course.**

Equipment:

Every lesson requires:

- Pen, Green Pen, Pencil, Ruler, Eraser, Sharpener, Scientific calculator
- Coloured pens for diagrams
- Data sheet (given digitally to print out) including a periodic table
- Lab book
- Lined paper

Attendance:

Obviously, 100% attendance is our expectation in order to succeed. Every lesson includes new content that may not be visited again. However, if lessons are missed, you should:

- Contact your teacher via email ASAP, preferably before the lesson.
- Complete tasks set by your teacher for the next lesson
- Use the VLE to locate relevant lesson slides to take notes.

Attitude:

- Commitment. Match the 5 hours a week in lesson with 5 hours of your own independent study, including homework. If you stick to this from the beginning, you will be successful.
- We try to encourage a friendly environment where students are comfortable enough to ask questions, no matter how silly they may think it is. Making mistakes is important for learning!
- Take part in discussions, be inquisitive, challenge ideas!
- Students should expect to be asked questions regularly every lesson. It is important teachers know how much or how little you have learnt. Teachers have a 'no hands up' policy.
- Complete all tasks set and aim to complete challenges every lesson
- Ask for help when needed – please don't be quiet as this can allow misconceptions to get worse!
- We expect outstanding behaviour from our students. Disruptive and distracting behaviour is not acceptable and will be recorded. If problems persist, the sixth form team will be contacted.

Classwork:

- You must actively take notes during the lesson on lined paper. We recommend writing up these notes again after the lesson for consolidation. If you missed any, slides are available on the VLE.
- When going through work in lesson, green pen must be used to tick, cross and improve work as you go. This is very helpful when you come to revise!

Homework:

- Students should expect a piece of homework every week from both chemistry teachers

- **Complete the homework as soon as you get it. Leaving it till the last-minute results in work that does not reflect your true potential and causes missed deadlines.**

- Do not rush homework! Try it in enough time so you have an opportunity to ask your teachers before handing it in. 'I did not get a sheet' and 'I lost the sheet' and 'can you send me the sheet again' excuses the night before are particularly irritating.

- If homework is poor quality and you haven't approached your teacher beforehand, it will be rejected by your teacher unmarked and you will be asked to do it again.

- Teachers will not mark all of your homework. In these cases, they will provide you with mark schemes to DIRT work yourselves.

Folder work:

Both classwork and homework need to be kept organised in order to succeed. Therefore, we expect the following to be put in place. You will not be required to carry your folder around as they will get heavy, however **random folder inspections occur twice every year.** So, keep it organised from day one!

1. Use a ring binder, file dividers, lined paper, a hole punch and plastic wallets
2. Have your data sheets and equations at the front of the folder
3. Each file divider should be divided into each topic (Elements of life, Developing fuels, elements from the sea, ozone story, what's in a medicine?, practical work)
4. For each unit, have your specification checklist at the front which is kept up-to-date by completing at the end of each lesson and at the end of the topic
5. Complete your own notes during lesson time, giving a clear title using your green pen to tick, correct and improve your work as you go along. It is an expectation you complete DIRT work habitually.
6. File certain topics (sub topics) within a module together in a plastic wallet and title this clearly with either a post-it or written in marker on the wallet
7. At the end of each module, have a separate wallet for (a) assessments and (b) homework
8. You may wish to keep your lab book in your 'practical work' section, alongside any relevant PAG work.

Ask your teacher to see good examples of folders of some of our students.

6. Y12 Induction Examination

In order to get to know the ability of our students, we start year 12 with an induction exam. This exam also determines how suitable the student is for the course. In some cases, we may recommend to the sixth form team that the student does not continue with the course based on the outcome. This is beneficial because the student does not waste a year and makes a more appropriate, informed subject choice.

We ask the students to revise GCSE Chemistry (combined) over the summer holidays. The exam covers:

- Atomic structure, bonding and properties (C1 & C2)
- Quantitative chemistry (C3)
- Chemical reactions (C4)
- Energy changes (C5)
- Rates and equilibria (C6)

Triple content is not assessed. However, the questions are designed to be challenging and are based on applying knowledge to unfamiliar contexts.

7. Assessment during the course

Progress tests:

At the end of every unit, a progress test will be completed by the students in lesson. These all include 10 multiple-choice questions and long-answer questions (1 mark – 6 marks) worth 50 marks. These will inform parents evenings and SPR's.

Trial exams:

Students will have trial exams in January and April:

Y12:

- January exams assess content from 'Elements of life' and 'Developing fuels' topics.
- April exams will assess all Y12 content.

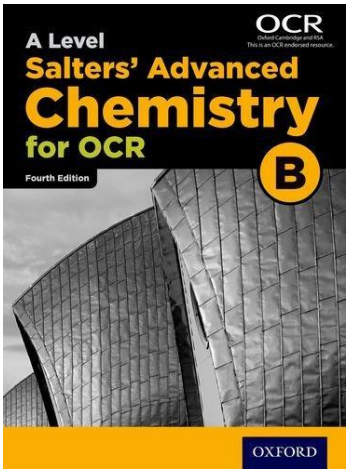
Y13:

- January exams assess content from all Y12 content, 'Chemical Industry', 'Polymers and Life' and 'Oceans' units.
- April exams will assess all Y12 & Y13 content.

8. Resources

Textbooks

Students will hugely benefit from purchasing the following textbooks. They can be bought at a discounted price from the LRC. *Note that these books are also available to loan from the LRC.*



OCR A Level Salters' Advanced Chemistry Student book

R.R.P £45.00
LRC discounted Price £36.00

Includes module content & activities, practical skills, and topic assessments for both years of the course.

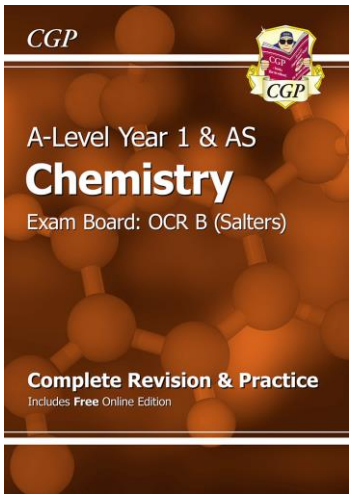
Note – A free digital version will be available for all students on www.kerboodle.com

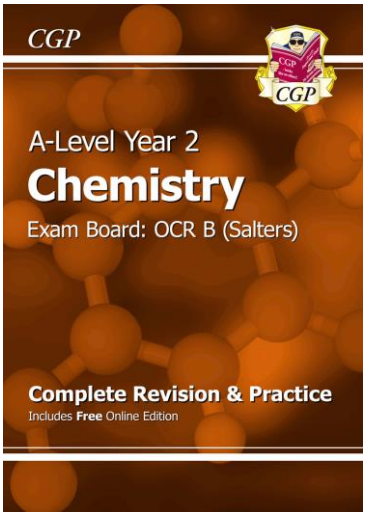
CGP A Level year 1 & AS Chemistry – OCR B (Salters)

R.R.P £10.99
LRC Discounted price

Includes module content & activities, revision skills and practical skills

There are also online versions available to purchase which can be accessed from a smartphone.





CGP A Level year 2 Chemistry – OCR B (Salters)

R.R.P £10.99
LRC Discounted price

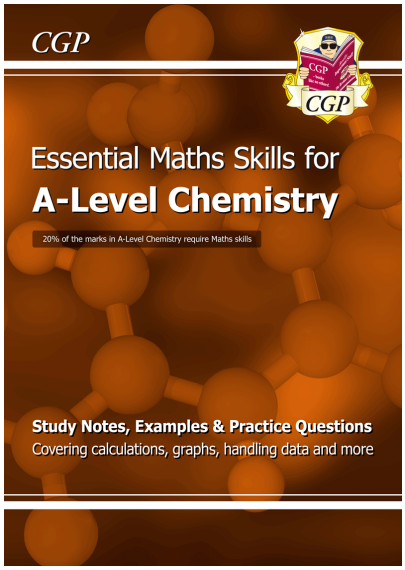
Includes module content & activities, revision skills and practical skills

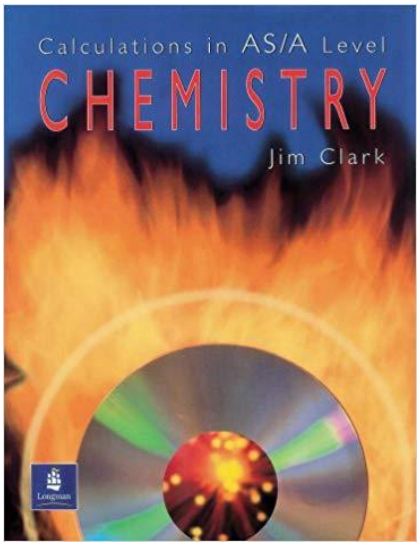
There are also online versions available to purchase which can be accessed from a smartphone.

CGP Essential Maths Skills for A Level Chemistry

R.R.P £7.50
LRC Discounted price:

We strongly recommend this resource for those students not studying A Level Maths or struggle with maths in general





CGP Essential Maths Skills for A Level Chemistry

R.R.P £18-20 (Amazon)
LRC Discounted price:

This book is highly valued by the department and we believe it is vital for the calculations you will face in exams. The more of these you do, the better you will be at applying yourself to complex calculations. It teaches basics very well and slowly brings you into very challenging problems.

VLE:

Every member of the DHFS school has access to the VLE from the school website. Here you will find:

- Past Papers and mark schemes
- Topic-based exam style questions and mark schemes
- Multiple choice questions
- Lesson Powerpoint slides for each module
- Revision materials and syllabus checklists
- The OCR Specification
- Data Sheets
- Practical skills powerpoint slides

We recommend spending an hour of your first week exploring it and seeing what it has to offer!

Kerboodle:

The science department has purchased access to an online facility, www.kerboodle.com

Kerboodle provides an online version of the **OCR A Level Salters' Advanced Chemistry Student book**, as well as interactive quizzes, revision materials and video tutorials.

To log in, your teacher will provide you with your username and password. It will follow the format shown in an example below for a student called Dmitri Mendeleev:

Username: dmendeleev **Password:** password **Institution** code: ghx5

Once you have logged in, you are asked to change your password to something personal and memorable. Write this somewhere in your folder!

Recommended Websites:

The chemistry department recommends the following websites for revision and support:

www.chemguide.co.uk – good for explaining chemical ideas and activities

www.rsc.org 'The Royal Society of Chemistry' website. Lots of amazing resources including interactive practical tutorials. Must look!

www.physicsandmathstutor.com – good for past paper resources

http://www.ocr.org.uk/qualifications/as-a-level-gce/as-a-level-gce-chemistry-b-salters-h033-h433-from-2015/ - for access to the specification, data sheets, assessment resources etc.

https://phet.colorado.edu/ - for simulations and models to help understand abstract ideas

9. Revision

Revision is vital for success, but students must know how to revise properly. For example, reading a textbook often leads to little retainment of information and becomes a waste of time. Students may be convinced they have revised because they focus on things they CAN do rather than address areas of weakness. Below is our advice for how to revise effectively.

1. **Keep your folder & lab book organised**

- When it comes to exam season, you will be very thankful that your notes are clearly organised into topics so you can easily use them. This saves so much time!

2. **Mark all lesson work and complete DIRT**

- Correcting work as you go means that when it does come to exam season, you are not revising from incorrect notes!

3. **Past papers, past papers, past papers!**

- Students may often be very good in lessons but find it difficult to transfer these skills onto exam papers. They may not understand the questions, not read questions properly and lose marks as a result. Therefore, we recommend as many past papers as you possible can – even if it means repeating them. That way, you become familiar with mark schemes and examiners' expectations.
- A good routine would be:

(a) start an exam paper blind (no revision materials with you) then mark it and correct your mistakes. (roughly 2 hours)
(b) Make a list of the things you got wrong and why.
(c) Revise these things using your preferred methods
(d) Complete another exam paper (blind) and mark it to see whether these issues have been resolved. Then start the cycle again.

4. **Express yourself!**

- Verbalising explanations to other students, family and friends can really help you remember information. It also helps structure answers clearly and methodically, using key terms. For example, try teaching something to a family member to make them understand!

5. **Revision cards**

- These have been successful with most students. Most write a question on one side and the answer on the other. It allows you to condense information, ask questions to other students or vice versa. Maybe a family friend can test you!

6. **Using the Jim Clark Book**

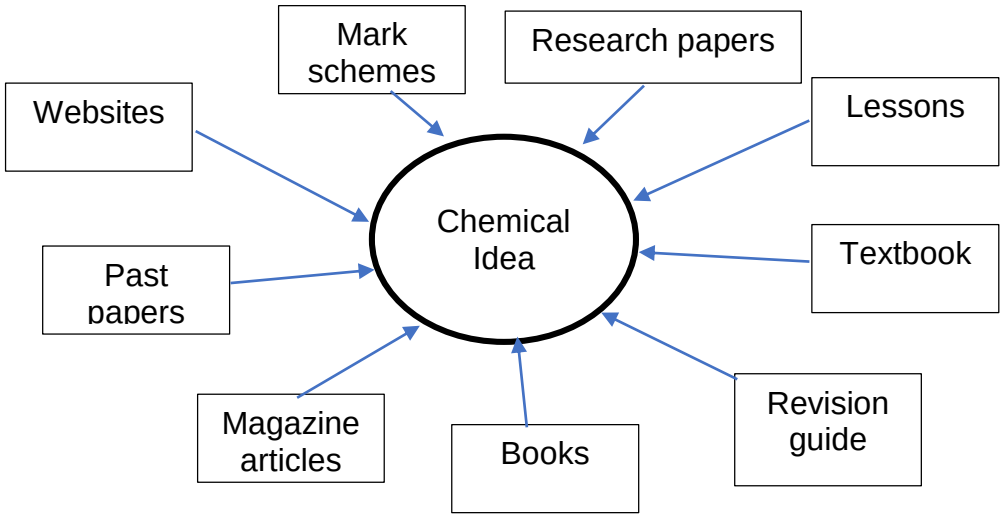
- This book is really important when addressing calculation problems. Work through it from page 1!

7. **Attend revision sessions**

- Teachers give up their time to revisit difficult concepts. Attend as many as you can!

10. Recommended reading

Chemistry makes much more sense when you read around it and see various interpretations and applications of the same ideas. Look at the model below:



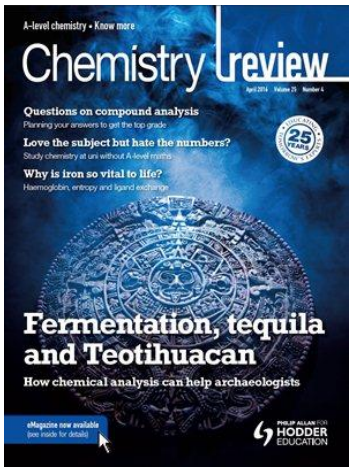
The more ways you learn about a chemical idea, the better you learn. Therefore, we recommend lots of other materials to read to help embed these concepts. These are shown below and most can be loaned from the LRC or from websites:

Chemistry Review Magazine

- Useful for research tasks, help with exams and broadening your knowledge around topics

- Available through www.my-dynamic-learning.co.uk

Username: fanshawelrc@dronfield.derbyshire.sch.uk
Password: dhfslrc
Institute code: 23162



Books
Periodic tales - Hugh Aldersley-Williams
The disappearing spoon and other extraordinary true tales from the periodic table – Sam Kean
A is for Arsenic – the poisons of Agatha Christie – Kathryn Harkup
Curious tales from Chemistry – the last alchemist in Paris, and other episodes – Lars Ohrstrom

11. Chemistry for the future

Chemistry can take you many places after A levels. We recommend visiting UCAS.com and other university websites to get an idea of the degrees available for those studying chemistry at A Level. Knowing where you want to be after Y13 can really motivate you! Visiting universities can be really informative and inspiring. Students are often blown away by the laboratory facilities available!

Below are some course that previous students have taken which required an A Level in chemistry:

- **Chemistry**
- **Medicinal Chemistry**
- **Forensic and Analytical Chemistry**
- **Materials Chemistry**
- **Chemical Physics**
- **Medicine**
- **Dentistry**
- **Veterinary Science**
- **Pharmacy**
- **Biomedical Sciences**
- **Chemical Engineering**