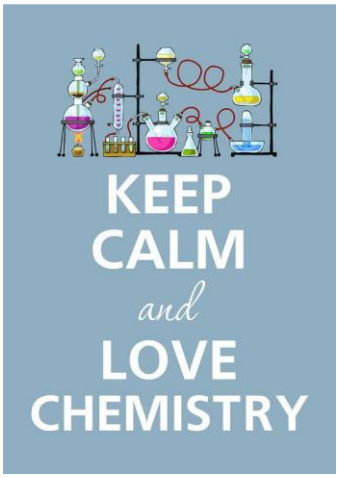
A Level Chemistry Transition Guide

You're studying AS or A-level Chemistry, congratulations!

Welcome to A-level Chemistry. This pack contains a programme of activities and resources to prepare you to start an A-level in Chemistry in September. It is aimed to be used over the Summer Holidays to ensure you are ready to start your course in September.

The transition from GCSEs to A-levels is challenging, and we as teachers expect mature and organised students, but most of all we want you to be passionate about our subject.



You might think of chemistry only in the context of lab tests, food additives or dangerous substances, but the field of chemistry involves everything around us.

"Everything you hear, see, smell, taste, and touch involves chemistry and chemicals (matter)," American Chemical Society

Chemistry is about matter, defined as anything that has mass and takes up space, and the changes that matter can undergo when it is subject to different environments and conditions.

At first, you may find the jump in demand from GCSE a little daunting, but if you follow the tips and advice in this guide, you'll soon adapt.

Chemists are problem solvers because they ask questions

Have you ever wondered……?

- What are the component parts of fireworks? What chemical compounds cause fireworks to explode? What chemical compounds are responsible for the colour of fireworks?
- Why is copper sulfate blue?
- Aspirin - What was the history of the discovery of aspirin, how do we manufacture aspirin in a modern chemical process?
- 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?
- 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?

Try finding the answers to these questions and begin to explore the wider world of chemistry

Course information:

- We will be following the AQA A-level Chemistry syllabus
- You will complete a baseline test in September to check your understanding of topics
- You will sit two exams at the end of Year 12, which you will need to pass in order to progress to Year 13. These exams do NOT contribute to your final A-level qualification.
- You will sit three exams at the end of Year 13, each contributing ≈33% towards your A-level qualification

Chemistry lesson information and expectations:

- You will attend 5 x 60 minute lessons each week
- Lessons and assessments will consist of both practical skill and theory content
- You must complete at least 12 assessed practical investigations over the course of the A-level course
- Homework must be completed and handed in on time
- Tests will take place at the end of each topic and each unit

Independent study will be completed each week

Specification at a glance

AS and A-level

3.1 Physical chemistry

3.1.1 Atomic structure
3.1.2 Amount of substance
3.1.3 Bonding
3.1.4 Energetics
3.1.5 Kinetics
3.1.6 Chemical equilibria, Le Chatelier's principle and K_c
3.1.7 Oxidation, reduction and redox equations
3.1.8 Thermodynamics (A-level only)
3.1.9 Rate equations (A-level only)
3.1.10 Equilibrium constant K_p for homogeneous systems (A-level only)
3.1.11 Electrode potentials and electrochemical cells (A-level only)
3.1.12 Acids and bases (A-level only)

3.2 Inorganic chemistry

3.2.1 Periodicity
3.2.2 Group 2, the alkaline earth metals
3.2.3 Group 7(17), the halogens
3.2.4 Properties of Period 3 elements and their oxides (A-level only)
3.2.5 Transition metals (A-level only)
3.2.6 Reactions of ions in aqueous solution (A-level only)

3.3 Organic chemistry

3.3.1 Introduction to organic chemistry
3.3.2 Alkanes
3.3.3 Halogenoalkanes
3.3.4 Alkenes
3.3.5 Alcohols
3.3.6 Organic analysis
3.3.7 Optical isomerism (A-level only)
3.3.8 Aldehydes and ketones (A-level only)
3.3.9 Carboxylic acids and derivatives (A-level only)
3.3.10 Aromatic chemistry (A-level only)
3.3.11 Amines (A-level only)
3.3.12 Polymers (A-level only)
3.3.13 Amino acids, proteins and DNA (A-level only)
3.3.14 Organic synthesis (A-level only)
3.3.15 Nuclear magnetic resonance spectroscopy (A-level only)
3.3.16 Chromatography (A-level only)

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'.

Calculations in AS/A Level Chemistry (Paperback) Jim Clark
ISBN-10: 0582411270
http://bit.ly/pixlchembook4
If you struggle with the calculations side of chemistry, this is the book for you. Covers all the possible calculations you are ever likely to come across. Brought to you by the same guy who wrote the excellent chemguide.co.uk website.

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 to world to making new medicines to treat disease.

Movie / Video Clip Recommendations

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
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 come of the cooler properties of mercury.
https://youtu.be/t46lvTxHHTA

10 weird and wonderful chemical reactions
10 good demonstration reactions, can you work out the chemistry of …. any… of them?
https://www.youtube.com/watch?v=0Bt6RPP2ANI

Science in the movies

Enjoy the selection

https://www.bbc.co.uk/bitesize/articles/zgwdqfr

https://youtu.be/-Nu7I0LTNzA

https://www.wired.com/video/watch/technique-critique-chemist-breaks-down-scenes-from-movies-and-tv

You are not expected to watch / read all recommendations but if you could pick a selection that particularly appeals.

Transition Tasks

1. You need to purchase and complete 'Head Start to AS Chemistry' book
   - Publisher: Coordination Group Publications Ltd (CGP) (2nd Mar. 2015)
   - ISBN 978 1 78294 280 1

   All of the questions should be fully answered with clear and structured workings on paper with content titles.

   The step up to A level Chemistry is a significant one, and your success in this subject will largely depend on your ability to build upon your knowledge from GCSE and revise throughout this year. The CGP book will help you with this transition, as well as introducing you to some key concepts that you will meet next year. It also gives you a chance to develop the layout of your workings and answers.

2. Look at AQA 'Lesson Activity: GCSE to A Level Progression:

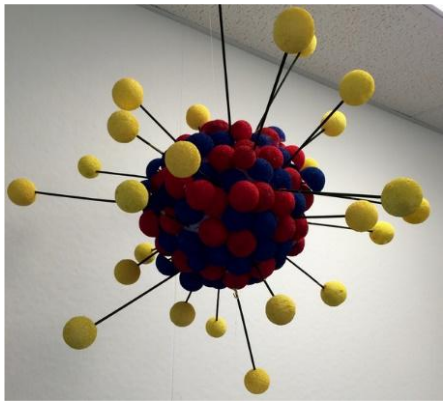
   https://www.aqa.org.uk/subjects/chemistry/as-level/chemistry-7404/planning-resources?secondaryResourceType=GCSE+to+A-level+progression

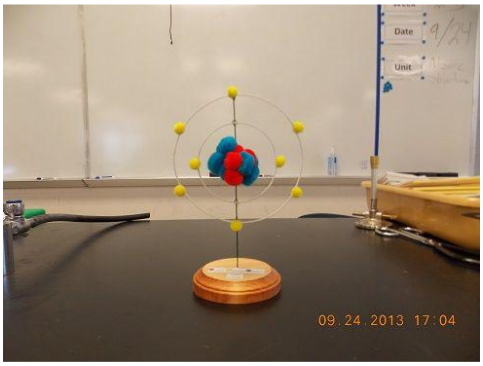
There are some useful exercises for you to print off and complete – there is also a mark scheme at the same reference

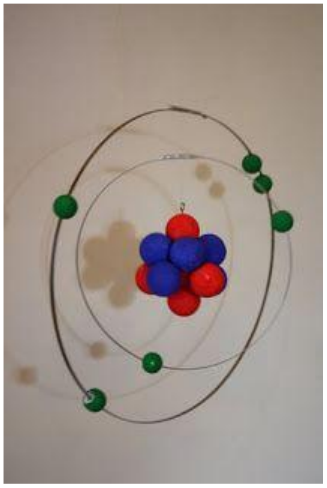
Extension

Build a model of an atom using whatever you like. Some useful materials might include polystyrene balls, straws, cocktail sticks, plasticine, coat hanger, wire, buttons, tiddly-winks, small fury pom-poms from art shop, sweets etc. What every you fancy. Take a picture and send to me, Dr Sarah Cockbill, cockbills@holmer.org.uk

Here are some examples to inspire you:







Pupil Background Information

Name	
GCSE results	
Why you chose to study Chemistry at A-level?	
What are you most looking forward to about studying A-level Chemistry?	
What are you most apprehensive about studying A-level Chemistry?	
What areas of Chemistry interest you the most?	

Please bring the completed background info sheet below to your first lesson