

## Welcome to A Level Chemistry

These tasks are important to complete so that you have the correct level of background knowledge needed to start the course. Remember A levels require you to be an independent learner. The skills you accumulated in GCSE will be used and expanded upon due to the volume and depth of work needed for you to complete; this is true across all A level subjects.

### Qualification at a Glance

The specification from the OCR website can be found here:

The OCR Modules are broken up into 6 sections.

Module 1 – Development of Practical Skills in Chemistry

Module 2 – Foundations in Chemistry

Module 3 – Periodic Table and Energy

Module 4 – Core Organic Chemistry and Analysis

Module 5 – Physical Chemistry and Transition Elements

Module 6 – Organic Chemistry and Analysis



Year 12 Exams (sat as Mocks)	Paper 1: Breadth in Chemistry	1 hour 30 minutes, 50% of your Year 12 Grade.
	Paper 2: Depth in Chemistry	1 hour 30 minutes, 50% of your Year 12 Grade.
Year 13 Exams	Paper 1: Periodic Table, Elements and Physical Chemistry	2 hours and 15 minutes, 37% of your grade. Assesses content from Modules 1, 2, 3 and 5.
	Paper 2: Synthesis and Analytical Techniques	2 hours and 15 minutes, 37% of your grade. Assesses content from Modules 1, 2, 4 and 6
	Paper 3: Unified Chemistry	1 hour 30 minutes. 26% of your grade. Assesses content from all modules.
Practical Endorsement	Assessed throughout the course	Pass/Fail

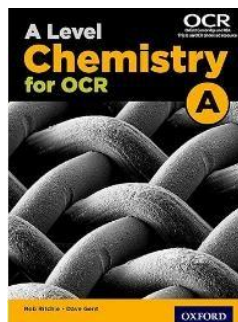
The content for A level chemistry is divided into Physical, Inorganic and Organic Chemistry. All of the year 13 content is built upon the work studied in year 12. Practical work is assessed throughout for the Practical Endorsement.

## Recommended Books

A Level Chemistry for OCR A Level Student Book

ISBN: **978-0198351979**

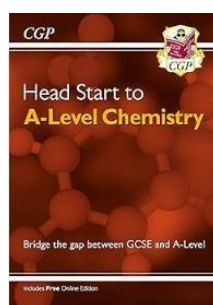
This is the standard textbook we will be working from. We suggest to buy second hand.



Head Start to A-Level Chemistry

ISBN: **978-1782942801**

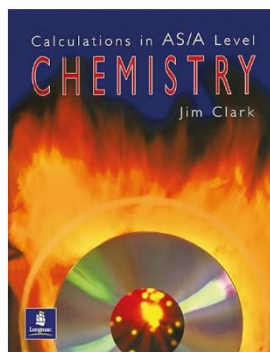
While **very optional**, the Head Start to A Level Chemistry guide is useful for going over the key topics needed to start A level Chemistry and will support you with completing the work in this transition booklet.



Calculations in AS/A Level Chemistry

ISBN: **978-0582411272**

Suggested for those previously taking **Combined Science** or who worry about their **Maths** in chemistry. It has excellent examples and explanations for ALL of the calculations in A level Chemistry.



### Suggestions of Summer Reading:

The Disappearing Spoon – Sam Kean

The Drugs Don't Work – Professor Dame Sally C. Davies

Bad Science – Ben Goldacre

The Poisoner's Handbook – Deborah Blum

Napoleon's Buttons – Penny Le Couteur & Jay Burreson

The Chemistry of Alchemy - Cathy Cobb, Monty Fetterolf, and Harold Goldwhite

Bad Pharma – Ben Goldacre

Choked: The Age of Air Pollution and the Fight for a Cleaner Future - Beth Gardiner

I think You'll Find It's a Bit More Complicated Than That – Ben Goldacre

Empire of the Scalpel - Ira Rutkow

The Drugs That Changed Our Minds - Lauren Slater

The Art of the Drug Deal - Ben McFarland, Mark Blaskovich & Michael Kinch

What Einstein Told His Cook: Kitchen Science Explained - Robert L. Wolke

Storm in a Teacup - Helen Czerski

Caesar's Last Breath - Sam Kean

Humble Pi - Matt Parker (Maths, but has great Chemistry elements in here!)

The Joy of Chemistry - Cathy Cobb and Monty Fetterolf

## **Summer Work**

Your transition work **will be checked** in September, so it is important for you to complete all tasks given.

**You must bring all work for your first chemistry lesson in year 12.**

There are a range of skills which you will need to develop in order to be successful at A level. The beginning of A level is often referred to as the most stressful time in a student's life, and that is including sitting exams. I have arranged the following tasks to help you with some of your key study skills to support this.

You need to be using the A level periodic table from this point onwards. Never fear young scientist, the periodic table is attached on the back of this booklet.

### **Task 1 – Structure and Bonding**

#### **1a:**

Define and give one example of a structure for each type of bonding:

1. Ionic Bonding
2. Covalent Bonding
3. Metallic Bonding

#### **1b:**

For each type of bonding, describe:

What particles are involved

How the bond forms

Key properties (e.g. melting point, conductivity)

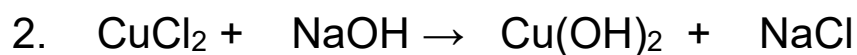
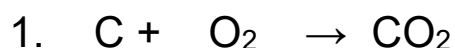
1c: Complete the table below

Compound	Type of Bonding	Diagram (dot-and-cross or labelled)	Melting Point High/Low?	Conducts Electricity? (Solid / Liquid)
Sodium chloride				
Oxygen (O <sub>2</sub> )				
Magnesium				
Ammonia (NH <sub>3</sub> )				

### Task 2: Balancing Equations

Required to do more complex calculations regarding masses in chemistry, balancing equations is the equivalent to a chemist's bread and butter. By the time you finish A level chemistry, you should be able to do it completely fluidly. Like breathing, or making a sandwich.

Balance the following equations



### Task 3: The Mole

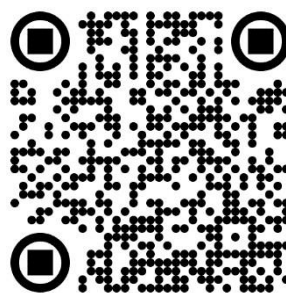
The mole is the chemists equivalent to a dozen. With atoms being smaller than the eye can see chemists had to develop a new way of being able to count them, without counting them individually. This quantity is known as the mole.

Calculate the number of moles in:

1. 9.00g of  $\text{H}_2\text{O}$
2. 24g of C
3. 196g of NaOH
4. 41.025g of  $\text{Ca}(\text{NO}_3)_2$
5. 145kg of  $\text{FeSO}_4$

Calculate the mass of these substances based on the number of moles.

6. 0.2 mol of  $\text{Al}_2\text{O}_3$
7. 0.00111 mol of  $\text{CO}_2$
8. 160 mol of  $\text{O}_2$
9. 1.673 mol of  $\text{Na}_2\text{SO}_4$
10. 0.95 mol of  $\text{CuCO}_3$



# The Periodic Table of the Elements

1	2	Key										18		
H hydrogen 1.0	He helium 4.0	atomic number	Symbol	relative atomic mass										

3	4	3										13	14	15	16	17	18
Li lithium 6.9	Be beryllium 9.0	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Na sodium 23.0	Mg magnesium 24.3	Sc scandium 45.0	Ti titanium 47.9	V vanadium 50.9	Cr chromium 52.0	Mn manganese 54.9	Fe iron 55.8	Co cobalt 58.9	Ni nickel 58.7	Cu copper 63.5	Zn zinc 65.4	Ga gallium 69.7	Ge germanium 72.6	As arsenic 74.9	Se selenium 79.0	Br bromine 79.9	Kr krypton 83.8
Rb rubidium 85.5	Sr strontium 87.6	Y yttrium 88.9	Zr zirconium 91.2	Nb niobium 92.9	Mo molybdenum 95.9	Tc technetium	Ru ruthenium 101.1	Rh rhodium 102.9	Pd palladium 106.4	Ag silver 107.9	Cd cadmium 112.4	In indium 114.8	Sn tin 118.7	Sb antimony 121.8	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.3
Cs caesium 132.9	Ba barium 137.3	57-71 lanthanoids	Hf hafnium 178.5	Ta tantalum 180.9	W tungsten 183.8	Re rhenium 186.2	Os osmium 190.2	Ir iridium 192.2	Pt platinum 195.1	Au gold 197.0	Hg mercury 200.6	Tl thallium 204.4	Pb lead 207.2	Bi bismuth 209.0	Po polonium	At astatine	Rn radon
Fr francium	Ra radium	89-103 actinoids	Rf rutherfordium	Db dubnium	Sg seaborgium	Bh bohrium	Hs hassium	Mt meitnerium	Ds darmstadtium	Rg roentgenium	Cn copernicium		Fl flerovium		Lv livermorium		
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71			
La lanthanum 138.9	Ce cerium 140.1	Pr praseodymium 140.9	Nd neodymium 144.2	Pm promethium 144.9	Sm samarium 150.4	Eu europium 152.0	Gd gadolinium 157.2	Tb terbium 158.9	Dy dysprosium 162.5	Ho holmium 164.9	Er erbium 167.3	Tm thulium 168.9	Yb ytterbium 173.0	Lu lutetium 175.0			
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103			
Ac actinium	Th thorium 232.0	Pa protactinium	U uranium 238.1	Np neptunium	Pu plutonium	Am americium	Cm curium	Bk berkelium	Cf californium	Es einsteinium	Fm fermium	Md mendelevium	No nobelium	Lr lawrencium			