



## Wath Sixth Form Subject Preparation Pack

---

# CHEMISTRY

### World-class learning

World-class learning every lesson, every day

### The highest expectations

Everyone can be successful; always expect the highest standards

### No excuses

Create solutions not excuses; make positive thinking a habit

### Growth mindset

Believe you can improve; work hard and value feedback

### Never give up

Resilience is essential; be relentless in the pursuit of excellence

### Everyone is valued

Diversity is celebrated; see the best in everyone

### Integrity

Be trustworthy and honest; deliver on promises and walk the talk

# **A Level Chemistry Transition Pack**

## **Contents**

- What is Chemistry?
- Why should I study Chemistry?
- What careers could A Level Chemistry lead to?
- Meet your Chemistry Team
- What will I study?
- How will I be assessed?
- Recommended resources
- Additional Resources
- Preparation Work - to be completed for September

### **What is Chemistry?**

Is the molecular understanding of everything. That is to say it's the key to knowing why almost everything in our lives happens. There are very few aspects of our lives that can not be explained by the interactions of its molecules.

Chemistry at this level is split in to three discreet topics, Physical chemistry, Organic chemistry, and Inorganic chemistry.

Physical Chemistry is the study of chemical systems and the factors which impact on their success or failure as chemical reactions. We consider some topics already covered such as rates of reaction and chemical equilibria but also introduce topics which look more closely at energies in chemical reactions and the behaviour of acids and bases.

Organic chemistry involves looking at how different organic molecules, ones made primarily of carbon chains, can react to form highly useful products such as polymers and aromatic chemicals.

Inorganic chemistry at A-level focuses on many of the reactions of other elements of the periodic table, these reactions are highly useful and help in life with everything from water treatment to cutting edge cancer fighting drugs.

### **Why should I study Chemistry?**

Chemistry is a broad subject utilising many different skills, there is a fair amount of maths in the subject a long with key understanding of facts and learning of chemical reactions. There is also understanding some of the more abstract concepts such as why chemicals are certain colours or what chemistry takes place in our atmosphere.

Studying chemistry will provide you with a challenging course which will allow you to demonstrate your abilities in a wide range of skills. It is highly regarded by universities as being a strong A-Level and grades are well earned.

### **What careers could Chemistry lead to?**

The diverse nature of chemistry means that it can lead to many different carers.

Staying within chemistry many people go on to become Analytical Chemists, Research Chemist, Chemical Engineers, Forensic Scientists, Pharmacologists and Pharmacists.

Many students also use Chemistry to access other careers such as Dentistry, Medicine and Veterinary Science where an A-level in Chemistry is an essential entry requirement for the university course.

Students also choose chemistry as it allows them to access a wide range of other degree courses within the STEM field, this can be any other Science based degree, Maths degrees or Engineering degrees.

<https://edu.rsc.org/future-in-chemistry/career-options>

## The Chemistry Team



Mr J Bale

Head of Chemistry

*I like teaching chemistry because I enjoy helping students discover the complexities of how different atoms interact to make all the useful products around us.*



Mrs C Gruszka

Chemistry Teacher

*I really enjoy teaching Chemistry as it is a subject that genuinely interests me. My favourite part of Chemistry is Organic Chemistry, due to the intricacies of all the mechanisms and the way they all link together, it is like a big puzzle*



Mr R Fox

Chemistry Teacher

*I love teaching chemistry because the subject not only explains the 'wonderful' we see around us, but with fields like nano technology, it will also drive the developments that will make our World an even more amazing place to live.*



Mrs L Stanley

Chemistry Teacher

*I love teaching Chemistry because of its logical nature. From analysing trends in the properties of elements and compounds, to deducing how molecules interact with one another in chemical reactions. Understanding chemistry makes sense of the world around you!*

## What will I study?

At Wath Academy we cover the AQA Chemistry syllabus which covers a breadth of knowledge split across three papers.

### Paper 1

This paper covers half of the physical chemistry and all the inorganic chemistry for the course

#### Physical Chemistry

Atomic Structure, Amount of substance, Bonding, Energetics, Chemical Equilibria, REDOX, Thermodynamics, Electrochemistry, Acids and Bases

#### Inorganic Chemistry

The reactions of group 7 and group 2 elements. The reactions of transition metals and the general trends on the periodic table.

### Paper 2

This paper covers the other half of the physical chemistry with some overlapping topics. It also covers all the organic chemistry

#### Physical Chemistry

Amount of Substance, Bonding, Energetics, Kinetics, Chemical Equilibria, Rate Equations.

#### Organic Chemistry

Alkanes, Halogenoalkanes, Alkenes, Alcohols, Organic Analysis, Optical Isomerism, Aldehydes and ketones, Carboxylic acids, Aromatic Chemistry

### Paper 3

This paper is a synoptic paper covering all the topics on the course. It does however focus towards the practical elements and the chemistry applied to those experiments.

#### Normal Exam Questions

The first part of the paper consists of normal exam questions from any of the topics on the A-level course, these questions all have a practical focus

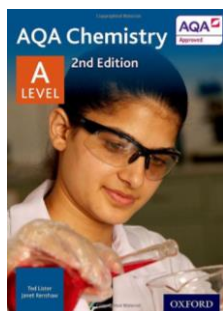
#### Multiple Choice

The second part of this paper is often considered the most challenging as students complete 30 Multiple Choice Questions. This is synoptic and can cover any topic from the course

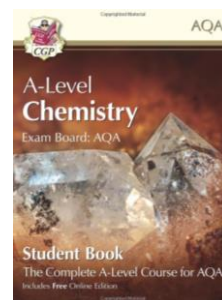
## How will I be assessed?

AQA assesses all content at the end of the course meaning that you will sit 3 x 2 hour exams in the summer of Y13. As a department, we conduct ongoing assessment throughout the two years which will reflect the full spectrum of skill and question styles assessed by the exam board. You also complete a set of 12 required practical activities throughout the course, successful completion of these activities qualifies you for the practical endorsement which is required by many universities.

## Recommended resources



This textbook will be issued to you when you start the course and used to support your learning through the two years.



We have a library of these textbooks which can be borrowed from the chemistry department.

**CGP Headstart to A Level Chemistry** – Excellent resource to help you prepare for your a-level course.

[https://www.amazon.co.uk/Head-Start-level-Chemistry-Level-ebook/dp/B00VE2NIGG/ref=sr\\_1\\_1?dchild=1&keywords=cgp+a-level+chemistry+bridge&qid=1587713602&s=books&sr=1-1](https://www.amazon.co.uk/Head-Start-level-Chemistry-Level-ebook/dp/B00VE2NIGG/ref=sr_1_1?dchild=1&keywords=cgp+a-level+chemistry+bridge&qid=1587713602&s=books&sr=1-1)

**AQA Chemistry Specification** – All the content you will learn and clear details on how you will be assessed

<https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-7404-7405-SP-2015.PDF>

**Chem guide website** – a great website with lots of information for all specifications for A-Level Chemistry

<https://www.chemguide.co.uk/>

**Royal Society of Chemistry** – A great collection of resources for students

<https://edu.rsc.org/student>

### **Additional resources**

The following resources may or may not link directly to the specification but are useful in developing your wider understanding of key theories and concepts.

#### **TED talks Chemistry**

A fantastic collection of inspirational talks about cutting edge chemistry

<https://www.ted.com/topics/chemistry>

#### **Chemistry Crash Course**

Whilst it's not all relevant to the syllabus these videos are entertaining and very helpful in understanding lots of the basics and beyond.

<https://www.youtube.com/playlist?list=PL8dPuuaLjXtPHzzYuWy6fYEaX9mQQ8oGr>

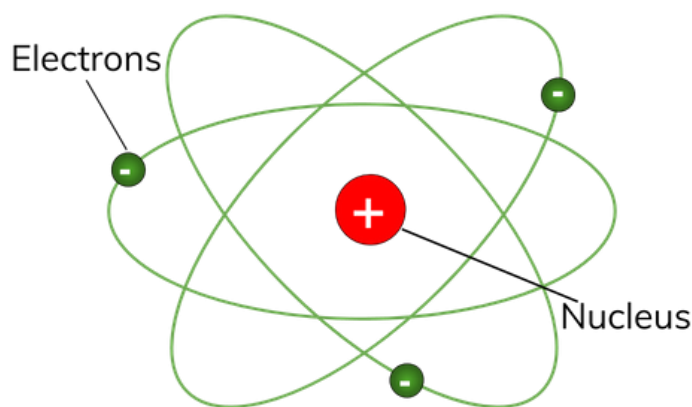
#### **Bale's Chemistry YouTube**

<https://www.youtube.com/c/BalesChemistry>

These videos are created by Mr Bale to help you with your A-Level studies, you will be using them next year but could always get a head start!



# A – Level Chemistry Preparation work



This work should be completed and brought to your first  
Chemistry lesson at Wath Academy

Name: \_\_\_\_\_

# Balancing equation practice

- An equation is balanced when there are the same number of atoms of each type on both sides of the equation.
- An equation can only be balanced by putting numbers in front of formulas – you cannot change the formula itself.
- Equations can be written with state symbols: (s) = solid, (l) = liquid, (g) = gas, (aq) = aqueous (dissolved in water).

## How to balance an equation:

- Calculate how many atoms of each type are on each side of the equation.
- If the numbers are the same then the equation is balanced.
- If the numbers are not the same, then numbers are put in front of the formulas (this adds more of that substance). You cannot change the formulas (this would make a different substance). Hint – start with unbalanced elements that only appear in one substance on each side of the equation.
- Keep doing this until the equation is balanced.

e.g.  $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

## Questions

Put your final answers here although you may wish to do your working on a separate sheet of paper or on the back.

$\text{Ca} + \text{O}_2 \rightarrow \text{CaO}$
$\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{NaOH}$
$\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$
$\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$
$\text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{O} + \text{CO}_2$
$\text{K} + \text{O}_2 \rightarrow \text{K}_2\text{O}$
$\text{C}_4\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
$\text{Fe}_2\text{O}_3 + \text{HCl} \rightarrow \text{FeCl}_3 + \text{H}_2\text{O}$
$\text{F}_2 + \text{KBr} \rightarrow \text{KF} + \text{Br}_2$
$\text{C}_5\text{H}_{12} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
$\text{NH}_3 + \text{O}_2 \rightarrow \text{NO} + \text{H}_2\text{O}$
$\text{HNO}_3 \rightarrow \text{NO}_2 + \text{H}_2\text{O} + \text{O}_2$

## Ionic Formula

Write out the ionic formula for each ionic compound.

Video to help <https://www.youtube.com/watch?v=bPqww5kKyko>

Compound	Formula
sodium iodide	
potassium oxide	
aluminium chloride	
magnesium bromide	
aluminium oxide	
iron(II) oxide	
iron(III) oxide	
magnesium sulfide	
copper(II) fluoride	
lithium iodide	
barium bromide	
zinc(II) sulfide	
lead(II) iodide	
iron(III) sulfide	
magnesium oxide	
rubidium bromide	
strontium chloride	
magnesium hydroxide	
copper(II) carbonate	
ammonium hydroxide	
magnesium nitrate	
platinum(II) nitrate	
copper(I) oxide	
copper(II) oxide	

## Relative Formula Mass

Calculate the relative formula mass for the following compounds

Compound	Relative formula mass
$\text{F}_2$	
$\text{Fe}$	
$\text{H}_2\text{SO}_4$	
$\text{Al}_2\text{O}_3$	
$\text{Mg}(\text{OH})_2$	
$\text{Al}(\text{NO}_3)_3$	
$(\text{NH}_4)_2\text{SO}_4$	
$\text{CuCO}_3$	
$\text{AgNO}_3$	
$\text{NH}_4\text{NO}_3$	
$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	

Calculate the relative formula mass for the following compounds

Compound	Relative formula mass
Magnesium	
Oxygen	
Sodium Bromide	
Calcium Fluoride	
Potassium Sulfate	
Chlorine	
Chromium(III) Oxide	
Sodium	
Iron(III) Sulfate	

# Moles calculations

1) Calculate the number of moles of each of the following substances. Give your answers to 3 sig figs.

a) 90.0 g of  $\text{H}_2\text{O}$  .....

.....

b) 20.0 g of  $\text{C}_4\text{H}_{10}$  .....

.....

c) 685 g of  $\text{NH}_3$  .....

.....

d) 102 tons of  $\text{O}_2$  .....

.....

e) 2.00 kg of  $\text{Al}_2\text{O}_3$  .....

.....

f) 20.6 mg of Au .....

.....

2) Calculate the mass of each of the following substances. Give your answers to 3 sig figs.

a) 4.00 moles of  $\text{N}_2$  .....

.....

b) 0.100 moles of  $\text{HNO}_3$  .....

.....

c) 0.0200 moles of  $\text{K}_2\text{O}$  .....

.....

d) 2.50 moles of  $\text{PH}_3$  .....

.....

e) 0.400 moles of  $\text{C}_2\text{H}_5\text{OH}$  .....

.....

f) 10.0 moles of  $\text{Ca}(\text{OH})_2$  .....

.....

3) 0.0200 moles of a compound is found to have a mass of 1.64 g. Find the formula mass of the compound. Give your answers to 3 sig figs.

.....

.....