

## Introduction to A Level Chemistry

The A Level course studied is OCR Chemistry A

Before starting to study at A Level you should work your way through this material. The content covered within the booklet is expected GCSE knowledge. You will be tested on these areas within the first week of starting the A Level Chemistry course.

This material will contain information and activities along with answers for you to check your work. The areas covered are;

- Important formulae
- Subatomic particles
- Relative atomic and formula mass
- Balancing equations
- Bonding

## Important Formulae

Below is a list of compounds you are expected to know the formulae of. Fill in the table below.

Compound	Formula
Water	
Carbon dioxide	
Carbon monoxide	
Hydrogen	
Oxygen	
Hydrochloric acid	
Nitric acid	
Sulphuric acid	
Ammonia	
Methane	
Sodium Chloride	
Sodium hydroxide	

There are other compounds you will have studied during GCSE. You will be expected to be familiar with the formula and structure of the Alkane and Alkene series. You should be able to write the formula and draw displayed formula for the first 6 in each series.

## Atomic Structure

Read the pages on atomic structure

<https://www.bbc.co.uk/bitesize/guides/zg2h4qt/revision/1>

Complete the following tables.

You will need a periodic table to help you.

Particle	Charge	Mass
Proton		
Neutron		
Electron		

Atom	Atomic Number	Mass Number	Number of protons	Number of neutrons	Number of electrons
Hydrogen	1	1	1	0	1
Lithium	3	7			
					6
	26		26		
				10	

You could also be asked to state the number of sub atomic particles in ions.  
For example within a fluoride ion  $F^-$

$F^-$       Protons = Atomic number = 9  
              Neutrons = Mass number - Atomic number =  $19 - 9 = 10$   
              Electrons = Atomic number + 1 since ion is negative =  $9 + 1 = 10$

Complete the following table for ions

Ion	Atomic Number	Mass Number	Number of protons	Number of neutrons	Number of electrons
$H^+$	1	1	1	0	0
$O^{2-}$	16				
$Al^{3+}$					
$Na^+$					
$I^-$					

## Relative atomic and relative formula mass

Read through the revision material from

<https://www.bbc.co.uk/bitesize/guides/zgcyw6f/revision/1>

Ensure you understand the examples by working through them yourself.

Answer the following questions

Find the relative atomic mass for the following elements

1. Helium
2. Gold
3. Potassium
4. Sulphur
5. Lead

Calculate the relative formula mass for the following compounds

1. Hydrochloric acid
2. Water
3. Carbon dioxide
4. Magnesium chloride  $\text{MgCl}_2$
5. Ammonium nitrate  $\text{NH}_4\text{NO}_3$
6. Calcium hydroxide  $\text{Ca}(\text{OH})_2$

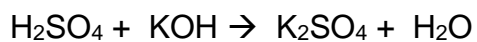
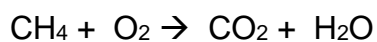
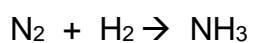
## Balancing Equations

Balancing equations is an essential skill. At A-level when asked to write a symbol equation it is assumed that you will also balance it.

Watch the video to remind yourself how to do these.

<https://www.khanacademy.org/science/chemistry/chemical-reactions-stoichiome/balancing-chemical-equations/v/balancing-chemical-equations-introduction>

Balance the following equations



## Bonding

At GCSE you will have come across 3 types of bonding

- Ionic Bonding
- Covalent Bonding
- Metallic Bonding

### Ionic Bonding

Ionic bonding occurs between a metal and non-metal. Use the bitesize pages for this section, attempt the test section.

<https://www.bbc.co.uk/bitesize/guides/zyydng8/revision/1>

Draw diagrams to show bonding in the following compounds

1. Magnesium oxide
2. Sodium oxide
3. Sodium chloride
4. Magnesium chloride

### Covalent Bonding

Non-metals combine together by sharing electrons to form simple molecular structures. Read the following pages, ensure you play the video section.

<https://www.bbc.co.uk/bitesize/guides/zcpjfcw/revision/1>

You are expected to be able to draw dot and cross diagrams for the following molecules.

- Hydrogen  $H_2$
- Chlorine  $Cl_2$
- Methane  $CH_4$
- Carbon dioxide  $CO_2$
- Water  $H_2O$

### Metallic Bonding

Metallic bonding is strong electrostatic attraction between a sea of delocalised electrons and closely packed positive metal ions.

Read the following page

<https://www.bbc.co.uk/bitesize/guides/z8db7p3/revision/1>

Ensure you can sketch the bonding within a metal.

## Answers

Compound	Formula
Water	H <sub>2</sub> O
Carbon dioxide	CO <sub>2</sub>
Carbon monoxide	CO
Hydrogen	H <sub>2</sub>
Oxygen	O <sub>2</sub>
Hydrochloric acid	HCl
Nitric acid	HNO <sub>3</sub>
Sulphuric acid	H <sub>2</sub> SO <sub>4</sub>
Ammonia	NH <sub>3</sub>
Methane	CH <sub>4</sub>
Sodium Chloride	NaCl
Sodium hydroxide	NaOH

Particle	Charge	Mass
Proton	+	1
Neutron	0	1
Electron	-	0.005

Atom	Atomic Number	Mass Number	Number of protons	Number of neutrons	Number of electrons
Hydrogen	1	1	1	0	1
Lithium	3	7	3	4	3
Carbon	6	12	6	6	6
Iron	26	56	26	30	26
Fluorine	9	19	9	10	9

Ion	Atomic Number	Mass Number	Number of protons	Number of neutrons	Number of electrons
H <sup>+</sup>	1	1	1	0	0
O <sup>2-</sup>	8	16	8	8	10
Al <sup>3+</sup>	13	27	13	14	10
Na <sup>+</sup>	11	23	11	12	10
I <sup>-</sup>	53	127	53	74	54

## Relative atomic Masses

He - 4  
 Au- 197  
 K- 39  
 S- 32  
 Pb- 207

## Relative formula Mass

HCl- 36.5

H<sub>2</sub>O- 18

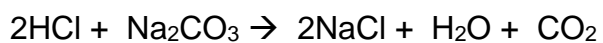
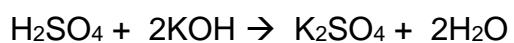
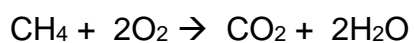
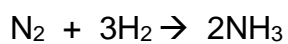
CO<sub>2</sub>- 44

MgCl<sub>2</sub> 92

NH<sub>4</sub>NO<sub>3</sub> -80

Ca(OH)<sub>2</sub>- 74

## Balancing equations



Bonding diagrams are found on the bitesize pages linked within this document.