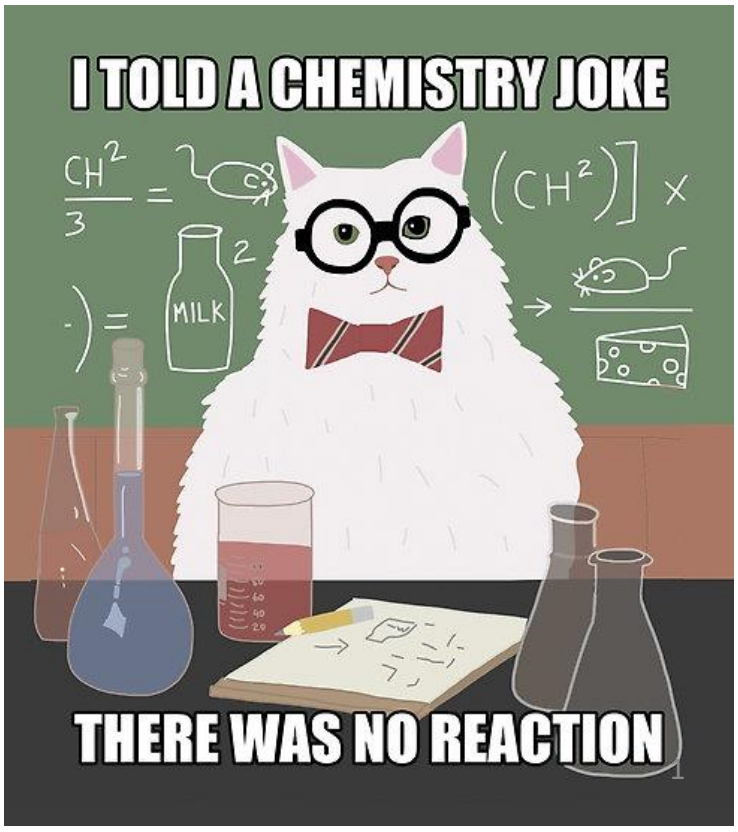
A level Chemistry Transition Work July 2025

We are very happy that you are considering to study Chemistry at A level.

Chemistry is a fantastic subject to study, and not just if you are thinking of a future career within Science. You will gain many valuable transferrable skills including problem solving, applying your ideas to new situations as well as becoming competent with practical work.

Over the summer, we are asking you to complete the work in this booklet. There are also a few topics that you will need to research. During the first week of lessons, you will be given a test to assess what you have covered over the summer.

Good luck!
Mrs Carter
Mrs Roberts



The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 **H** hydrogen 1.0	2											13	14	15	16	17	2 **He** helium 4.0
3 **Li** lithium 6.9	4 **Be** beryllium 9.0											5 **B** boron 10.8	6 **C** carbon 12.0	7 **N** nitrogen 14.0	8 **O** oxygen 16.0	9 **F** fluorine 19.0	10 **Ne** neon 20.2
11 **Na** sodium 23.0	12 **Mg** magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 **Al** aluminium 27.0	14 **Si** silicon 28.1	15 **P** phosphorus 31.0	16 **S** sulfur 32.1	17 **Cl** chlorine 35.5	18 **Ar** argon 39.9
19 **K** potassium 39.1	20 **Ca** calcium 40.1	21 **Sc** scandium 45.0	22 **Ti** titanium 47.9	23 **V** vanadium 50.9	24 **Cr** chromium 52.0	25 **Mn** manganese 54.9	26 **Fe** iron 55.8	27 **Co** cobalt 58.9	28 **Ni** nickel 58.7	29 **Cu** copper 63.5	30 **Zn** zinc 65.4	31 **Ga** gallium 69.7	32 **Ge** germanium 72.6	33 **As** arsenic 74.9	34 **Se** selenium 79.0	35 **Br** bromine 79.9	36 **Kr** krypton 83.8
37 **Rb** rubidium 85.5	38 **Sr** strontium 87.6	39 **Y** yttrium 88.9	40 **Zr** zirconium 91.2	41 **Nb** niobium 92.9	42 **Mo** molybdenum 95.9	43 **Tc** technetium	44 **Ru** ruthenium 101.1	45 **Rh** rhodium 102.9	46 **Pd** palladium 106.4	47 **Ag** silver 107.9	48 **Cd** cadmium 112.4	49 **In** indium 114.8	50 **Sn** tin 118.7	51 **Sb** antimony 121.8	52 **Te** tellurium 127.6	53 **I** iodine 126.9	54 **Xe** xenon 131.3
55 **Cs** caesium 132.9	56 **Ba** barium 137.3	57–71 lanthanoids	72 **Hf** hafnium 178.5	73 **Ta** tantalum 180.9	74 **W** tungsten 183.8	75 **Re** rhenium 186.2	76 **Os** osmium 190.2	77 **Ir** iridium 192.2	78 **Pt** platinum 195.1	79 **Au** gold 197.0	80 **Hg** mercury 200.6	81 **Tl** thallium 204.4	82 **Pb** lead 207.2	83 **Bi** bismuth 209.0	84 **Po** polonium	85 **At** astatine	86 **Rn** radon
87 **Fr** francium	88 **Ra** radium	89–103 actinoids	104 **Rf** rutherfordium	105 **Db** dubnium	106 **Sg** seaborgium	107 **Bh** bohrium	108 **Hs** hassium	109 **Mt** meitnerium	110 **Ds** darmstadtium	111 **Rg** roentgenium	112 **Cn** copernicium		114 **Fl** flerovium		116 **Lv** livermorium		

Key
atomic number
Symbol
name
relative atomic mass

57 **La** lanthanum 138.9	58 **Ce** cerium 140.1	59 **Pr** praseodymium 140.9	60 **Nd** neodymium 144.2	61 **Pm** promethium 144.9	62 **Sm** samarium 150.4	63 **Eu** europium 152.0	64 **Gd** gadolinium 157.2	65 **Tb** terbium 158.9	66 **Dy** dysprosium 162.5	67 **Ho** holmium 164.9	68 **Er** erbium 167.3	69 **Tm** thulium 168.9	70 **Yb** ytterbium 173.0	71 **Lu** lutetium 175.0
89 **Ac** actinium	90 **Th** thorium 232.0	91 **Pa** protactinium	92 **U** uranium 238.1	93 **Np** neptunium	94 **Pu** plutonium	95 **Am** americium	96 **Cm** curium	97 **Bk** berkelium	98 **Cf** californium	99 **Es** einsteinium	100 **Fm** fermium	101 **Md** mendelevium	102 **No** nobelium	103 **Lr** lawrencium

Formulae of ionic compounds

Practise writing out formulae by using the group numbers of the elements to find out the charge on the ions formed. Remember, *metals* form *positive ions* and *non-metals* form *negative ions*. Then, work out the number of each ion needed to make the charges add up to zero.

What is the formula for potassium oxide?
Potassium is in group 1 so forms an ion with a 1^+ charge, K^+.
Oxygen is in group 6 so forms an ion with a 2^- charge, O^{2-}.

To cancel the charges…

$2 \times K^+ = +2$ and $1 \times O^{2-} = -2$

The formula is $\mathbf{K_2O}$

What is the formula for calcium nitrate?
Calcium forms a Ca^{2+} ion
The nitrate ion has a 1^- charge, NO_3^-

$1 \times Ca^{2+} = +2$ and $2 \times NO_3^- = -2$

In this example, we need to use brackets as the nitrate ion is made up of more than one atom.

The formula is $\mathbf{Ca(NO_3)_2}$

Writing formulae

Positive ions		Negative ions	
Name	Formula	Name	Formula
Hydrogen	H^+	Chloride	Cl^-
Sodium	Na^+	Bromide	Br^-
Silver	Ag^+	Fluoride	F^-
Potassium	K^+	Iodide	I^-
Lithium	Li^+	Hydroxide	OH^-
Ammonium	NH_4^+	Nitrate	NO_3^-
Barium	Ba^{2+}	Oxide	O^{2-}
Calcium	Ca^{2+}	Sulfide	S^{2-}
Copper(II)	Cu^{2+}	Sulfate	SO_4^{2-}
Magnesium	Mg^{2+}	Carbonate	CO_3^{2-}
Zinc	Zn^{2+}		
Lead	Pb^{2+}		
Iron(II)	Fe^{2+}		
Iron(III)	Fe^{3+}		
Aluminium	Al^{3+}		

Use the formulae of common ions to write formulae for the following…

Sodium bromide		Copper (II) oxide	
Potassium sulfate		Iron (III) fluoride	
Calcium fluoride		Aluminium oxide	
Zinc sulfide		Barium nitrate	
Iron (III) nitrate		Copper hydroxide	
Iron (II) oxide		Aluminium hydroxide	
Barium sulfate		Iron (III) sulfate	
Lead iodide		Aluminium carbonate	

You will not get these charges on ions in an exam – you will have to use the periodic table to work them out!

Equations

It is really important that you become competent with writing equations for different reactions, and this includes word and symbol equations.

Below are some general equations that you need to be aware of.

Acid + metal → salt + hydrogen

Acid + alkali → salt + water

Acid + metal carbonate → salt + water + carbon dioxide

(and metal hydrogen carbonate)

Acid + metal oxide → salt + water

Acid + ammonia → ammonium salt

Element + oxygen → oxide

Element + halogen → halide

Displacement reactions (using the reactivity series)

Remember the names of the salts formed from these acids…

- Hydrochloric acid makes **chlorides**
- Sulfuric acid makes **sulfates**
- Nitric acid makes **nitrates**
- Phosphoric acid makes **phosphates**

Equations

Using the information on the previous page, complete the word equations and write symbol equations for the following.
Try to balance them if you can! The first one is done for you.

Reactants		Products
Magnesium + oxygen $2Mg + O_2$	→	Magnesium oxide $2MgO$
Calcium + hydrochloric acid	→	
Potassium + chlorine	→	
Zinc oxide + sulfuric acid	→	
Sodium hydroxide + sulfuric acid	→	
Ammonia + nitric acid	→	
Aluminium + iron (II) chloride (this is a displacement reaction!)	→	

Structure and Bonding

Being confident with bonding and the properties of different structures is a fundamental part of A level study. This follows on from what you have learnt at GCSE and includes:

- Ionic
- Simple molecular (covalent)
- Giant covalent
- Metallic

Draw dot and cross diagrams for the following substances and make predictions about their properties. TIF – can you explain the properties?

Substance	Type of bonding	Dot and cross diagram	Conducts electricity?	High or low melting point?
Hydrogen chloride, HCl				
Magnesium chloride, $MgCl_2$				
Ammonia. NH_3				
Aluminium oxide, Al_2O_3				

Atomic Structure

At GCSE, you will have covered atomic structure and should be able to work out the number of the sub-atomic particles in the first 20 elements.
At A level, you are expected to be familiar with the first 36 elements, and be expected to work out the number of sub-atomic particles in isotopes of their atoms and their ions.

For example; ^{23}Na is the isotope of sodium with a mass number of 23. It has 11 protons, 11 electrons and 12 neutrons.

$^{7}Li^{+}$ is an ion of the isotope of lithium with a mass number of 7. It has 3 protons, 2 electrons and 4 neutrons.

Use the Periodic table on **page 2** to fill in the table below.

Atom/Ion	Number of protons	Number of electrons	Number of neutrons
^{24}Mg			
^{35}Cl			
$^{16}O^{2-}$			
$^{32}S^{2-}$			
$^{27}Al^{3+}$			
$^{14}N^{3-}$			
$^{39}K^{+}$			
$^{52}Cr^{3+}$			

Research!

Find out the answers to the following!

1) Water is a simple covalent substance, yet has a relatively high melting and boiling point. Find out why. Some diagrams may be useful in your explanation.

2) Two new examples of organic compounds you will encounter this year are **aldehydes** and **ketones**. Find out the names and structures of the first 4 members of each homologous series and explain why an aldehyde and a ketone with the same number of carbon atoms are structural isomers of each other.

3) What is the trend in the melting and boiling points as you go down group 0? (from Helium to Radon). Explain why this pattern is observed.

