A level Chemistry

Pre-Induction Activity

Welcome to A-level Chemistry at the sixth form Bolton.

OCR Chemistry – Chemistry A H432

Specification

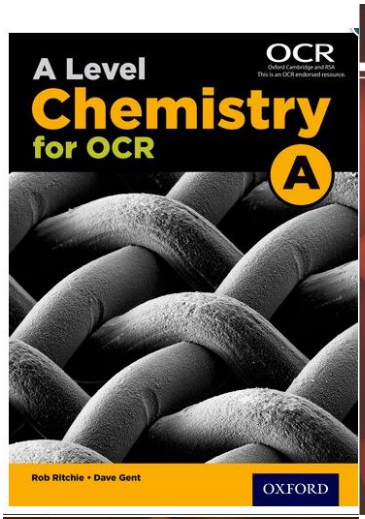
https://www.ocr.org.uk/Images/171720-specification-accredited-a-level-gce-chemistry-a-h432.pdf

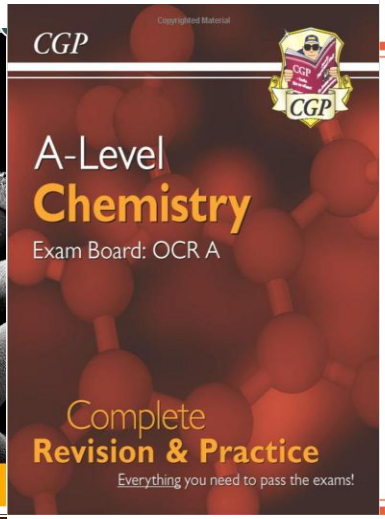
Tool Kit

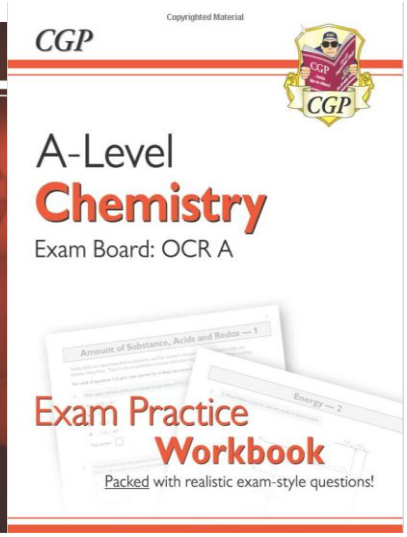
Pen, Pencil, ruler, scientific calculator, lever arch folder.

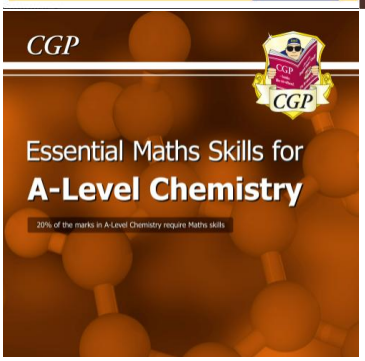
Recommended books and workbooks

The chemistry department will provide printed booklets and question packs for all students which cover the entire course to A* standard, however for additional reference please see below.









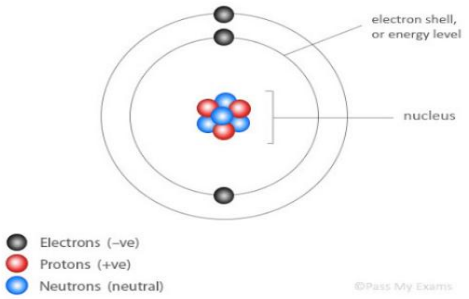
Induction Task – perfection of GCSE skills

In order to get you fully prepared for A-Level Chemistry, you must complete this task.

Your work should be handed in at your first Chemistry lesson or can be uploaded in advance of the first day of teaching.

Part 1: Atomic structure

Need help in parts 1 and 2? *https://tinyurl.com/y4bdmsgz*



What you know from GCSE:

- Electrons orbit the nucleus in energy levels (called shells)
- The first level can hold a maximum of 2 electrons, the second can hold 8 and the third can hold a maximum of 8.

Q1. Draw a diagram to show the electron arrangement of the following elements-

a. **Carbon**

b. **Fluorine**

c. **Magnesium**

d. **Sulphur**

e. **Argon**

Part 2: The periodic table

The periodic table gives you two numbers:

- Atomic number = It is also called the proton number as it gives the number of protons in the nucleus.
- Relative atomic mass = A_r. This gives you an average mass of all the isotopes

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1		Key: atomic number / Symbol / name / relative atomic mass															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		

Q2. The periodic table is the way of arranging the chemical elements in order of increasing _____

Q3. What does the group number indicate?

Q4. What does the period number indicate?

Q5. What is meant by isotopes?

Individual isotopes of an element have a mass number:

- The mass number gives the total number of neutrons + protons. This cannot be found on the periodic table.

Q6. Copy and Complete the table for individual isotopes of some elements :

Element	Symbol	Z	A	No. protons	No. neutrons	No. electrons
sodium			23			
		6	12			
		12			12	
		84	210			
chlorine		17	35			
chlorine		17	37			

Part 3: Molecular formulae and Relative formula mass (M_r)

Compounds (and some elements, such as O_2) are formed when more than one atoms bonds together. These compounds or elements have a chemical formula.

Formulae tell you the number of each type of atom that are present in a compound.

Q7. How many of each type of atom are in:

a. $BaCl_2$

b. K_2O

c. Ag_2SO_4,

d. $Mg(NO_3)_2$

e. $(NH_4)_3PO_4$

Relative formula mass (or relative molecular mass) tells you the relative mass of a compound or element. It is worked out by adding together the A_r, or relative atomic mass, of all atoms of a compound.

- Use A_r and NOT mass number.

Q8 Work out the Mr of each of the compounds

a. $BaCl_2$

b. K_2O

c. Ag_2SO_4

d. $Mg(NO_3)_2$

e. $(NH_4)_3PO_4$

Part 4:Balancing Equations

Q9

You will be asked to balance various equations in A level Chemistry

Balance the following symbol equations

a) $Al + HCl \longrightarrow KCl + H_2$

b) $C_2H_4 + O_2 \longrightarrow CO_2 + H_2O$

c) $Ca(OH)_2 + HCl \longrightarrow CaCl_2 + H_2O$

d) $KOH + H_3PO_4 \longrightarrow K_3PO_4 + H_2O$

Part 5:Chemical formulas

Q10 What is the chemical formula of

a. **Sulphuric acid**

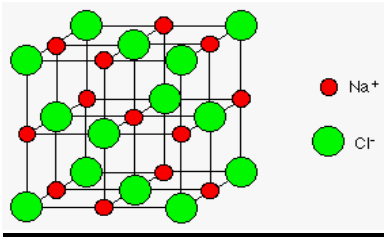
b. **Nitric acid**

c. **Hydrochloric acid**

d. **Phopshoric acid**

Part 6: Bonding

Ionic structures



Q11-How is an ionic bond formed?

Q12-Draw a dot cross diagram showing the ionic bonding in

a. **Sodium Chloride -NaCl**

b. **Calcium Chloride -$CaCl_2$**

c. **Calcium Oxide-CaO**

Covalent bonding

Q13-How is a covalent bond formed?

14) Draw a dot cross diagram to represent covalent bonding for:

a. Methane-CH_4

b. Oxygen-O_2

c. Carbon dioxide-CO_2

Giant covalent/covalent macromolecules

- Giant covalent structures are huge lattices of atoms attached together by covalent bonds.
- Examples of giant covalent are diamond, silicon and graphite
- These types of structures have very large melting points because you need to break lots of strong covalent bonds.

Simple molecules

- Most covalent structures make simple molecules
- When you melt a simple molecular structure, the covalent bonds stay in place, but forces between the simple molecules, called 'intermolecular forces' break.
- Intermolecular forces are weak, so the melting points are low.

15. Complete the table by adding the type of structure:

	Melting Point ^oC (high or low)	Boiling Point ^oC (high or low)	Ionic, giant covalent or simple molecule?
Diamond			
Methane			
Water			
Barium oxide			