

Chemistry (Edexcel)

A Level Preparation Work

Welcome to A Level Chemistry! The tasks below are designed to support and prepare you to start the course.

Folder Preparation

So that you are ready for September, please get yourself three folders and divide into sections as below. One smaller ring binder, this will be your day-to-day folder that you must bring to each lesson, and two larger A4 lever arch files, these will be for the long term storage of your notes. Please bring all these folders to the first lesson along with dividers labelled with the below headings.

Day-to-day folder:

Teacher 1

Teacher 2

Progress booklet

Data booklet

Assessments

Year 12 Lever Arch Folder (1)

Topic 1: Atomic Structure and the Periodic Table

Topic 2: Bonding and Structure

Topic 3: Redox I

Topic 4: Inorganic Chemistry and the Periodic Table

Topic 5: Formulae, Equations and Amounts of Substance

Topic 6: Organic Chemistry I

Topic 7: Modern Analytical Techniques I

Topic 8: Energetics I

Topic 9: Kinetics I

Topic 10: Equilibrium I

Year 13 Lever Arch Folder (2)

Inorganic paper 1

Topic 11: Equilibrium II

Topic 12: Acid-base Equilibria

Topic 13: Energetics II

Topic 14: Redox II

Topic 15: Transition Metals

Organic paper 2

Topic 16: Kinetics II

Topic 17: Organic Chemistry II

Topic 18: Organic Chemistry III

Topic 19: Modern Analytical Techniques II



You will have a baseline assessment in the first few weeks of September (date to be confirmed by your teacher in the first week of term) this baseline assessment will assess your understanding of key GCSE topics that you need to have a thorough understanding of to succeed at A Level chemistry. The assessment will **focus mainly on bonding and structure and quantitative chemistry.**

Your bridging work requires you to consolidate your understanding of these GCSE topics in preparation for your baseline assessment in September. By completing this work thoroughly over the summer will set you up for success at the start of your A Level course.

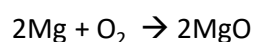
Complete the activities below to consolidate your understanding of bonding and structure from GCSE. Use this link to help you: [Link](#)

1. Draw a table to summarise the general properties of solids, liquids, gases as well as the average distance, arrangement and movement of their particles.
2. Describe the changes that occur to the particle as a gas is cooled down to a temperature below its freezing point
3. When an atom gains or loses electrons, what particle is formed?
4. Draw dot and cross diagrams to show the ions that would form when the following atoms are involved in ionic bonding
 - a) Aluminium, Al
 - b) Fluorine, F
 - c) Potassium, K
 - d) Oxygen, O
5. Explain how and why atoms of Group 1 and Group 7 elements react with each other in terms of their electronic structures.
6. Draw dot and cross diagrams to represent the bonding in the following substances:
 - a) Potassium and Oxygen
 - b) Aluminium and Fluorine.
7. Explain the following:
 - a) Why ionic compounds have high melting points
 - b) Why ionic compounds conduct electricity on when molten or dissolved in water
8. Draw diagrams, showing electrons to represent the covalent bonding between the following atoms:
 - a) Two hydrogen atoms
 - b) Two chlorine atoms
 - c) Carbon dioxide.
9. Describe what is meant by intermolecular forces
10. Explain the melting point of hydrogen chloride is -115 but sodium chloride is 801 degrees Celsius.
11. Explain the properties of silicon dioxide.
12. Draw a diagram to represent the bonding in Lithium metal. Ensure you draw the correct number of electrons for the number of positive ions you have drawn.
13. Explain why metals conduct electricity in terms of bonding and structure.
14. Explain why aluminium has a higher melting point than sodium

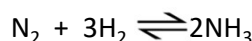
Complete the activities below to consolidate your understanding of quantitative chemistry from GCSE.

Use this link to help you: [Link](#)

- What is the relative formula mass of
 - MgF_2
 - $\text{C}_6\text{H}_{12}\text{O}_6$
- How many moles of helium atoms are there in 0.02g of helium?
- How many moles of sulphur atoms are there in:
 - 9.6g of Sulfur
 - 16 tonnes of sulphur (where 1 tonne= 1000kg)
- What is the mass of
 - 50 moles of calcium carbonate CaCO_3
 - 0.05 moles of hydrogen
 - 0.6 moles of Phosphorus
- Magnesium burns in oxygen with a bright white flame, what mass of oxygen will react exactly with 6.0g of magnesium, use the equation below to help you.



- List some factors that can affect the % yield of a reaction
- Ammonia gas NH_3 is made by heating the gases nitrogen and hydrogen under pressure in the presence of an iron catalyst. If 7.0g of nitrogen are reacted with excess hydrogen and 1.8g of ammonia is collected, what is the % yield?



- Write down the formula that chemists use to calculate the percentage atom economy of a reaction
- Work out the percentage atom economy of the reaction below where $\text{C}_2\text{H}_5\text{Cl}$ is the desired product
$$\text{C}_2\text{H}_5\text{OH} + \text{HCl} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{H}_2\text{O}$$
- Calculate the concentration for the following in g/dm^3 **AND** mol/dm^3
 - 50g of sodium chloride in 2500cm^3 of water
 - 1.8g of sodium carbonate in 862cm^3 of water
- Describe how to carry out a titration between dilute nitric acid of known concentration and sodium hydroxide of unknown concentration. Make sure you list all equipment needed.
- In a titration a 12.5cm^3 sample of nitric acid HNO_3 , REACTED EXACTLY WITH 10.0cm^3 of 0.4mol/dm^3 potassium hydroxide solution. Answer the questions below:
 - Write down a balanced symbol equation including state symbols for this reaction
 - Calculate the number of moles of potassium hydroxide used
 - How many moles of nitric acid react?
 - Calculate the concentration fo the nitric acid in mol/dm^3
 - Calculate the concentration of the nitric acid in g/dm^3
- How many moles of gas are in the following?
 - 36dm^3 of carbon dioxide CO_2
 - 10000dm^3 of hydrogen
- What volume of gas would be occupied by
 - 36.0 of helium
 - 13.8g of nitrogen dioxide
- Calcium reacts with hydrochloric acid vigorously giving off hydrogen gas, What volume of hydrogen would be produced when 0.80g of calcium is added to excess dilute acid

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Consolidation of GCSE

Use the information below to guide your revision around key topics from GCSE which will be vital for you to access the A level course.

Topic from combined science	Link	Topics from separate science	Link
Atomic structure	link	Atom economy, percentage yields	link
Groups in the periodic table	link	titrations	link
Ionic compounds	link	More organic chemistry	link
Small molecules	link	Analysing substances	link
Giant covalent molecules	link	Haber process	link
Metals and alloys	link		
Calculations in chemistry	link		
Acids, alkalis and salts	link		
Rates of reaction	link		
Energy changes	link		
equilibrium	link		
Organic chemistry	Link		

Knowledge Quiz



Use this [link](#) to learn about 20 critical facts that you will need for the A-level course, left QR code. Once you have completed it follow this [link](#) or right QR code to complete the self-marking knowledge quiz (**N.B.** you can only complete this in one go, there are **20** questions).



Wider Reading

There are lots of Chemistry related books out there. They also overlap with Medicine (particularly pharmaceuticals), Geography (climate change, pollution), Physics (atomic structure), Engineering and Materials Science (material development, Chemical Engineering).

Some include:

Mendeleev's Dream: Strathern

The Chemical Elements: Nechaev & Jenkins

Elementary, The Periodic Table Explained: Russell

Severn Years to Save the Planet: McGuire

Level 4 Virus Hunters of the CDC, McCormick & Fisher-Hoch

Silent Spring: Carson

Genome: Ridley

Biohazard: Alibek

Royal Society of Chemistry (www.rsc.org) has:

How chemistry is helping the fight Covid19.

Chemistry: Making the difference has careers advice.

Chemistry World is their monthly magazine which is available online

Lots of Universities, especially in the US, publish lectures online. Find some that interest you!