



Chemistry



Please complete the six tasks from the task list below:

1. Atomic Structure & the Periodic Table - (AQA Spec Link: 3.1.1)

- Define the terms isotope, mass number, and atomic number.
- Calculate the relative atomic mass of chlorine given the following data:
 - 75.8% Cl-35 and 24.2% Cl-37.
- Explain why the first ionisation energy of neon is higher than that of sodium.
- Sketch and label the shape of an s orbital and a p orbital.

Resources:

- ChemRevise – Atomic Structure
- BBC Bitesize – Atomic Structure

2. Amount of Substance - (AQA Spec Link: 3.1.2)

- Calculate the number of moles in:
 - 18g of water (H_2O)
 - 44g of CO_2
- A compound contains 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen by mass. Calculate its empirical formula.
- A student reacts 0.050 mol of magnesium with excess hydrochloric acid. Calculate the volume of hydrogen gas produced at room temperature and pressure ($\text{RTP} = 24 \text{ dm}^3/\text{mol}$).
- Rearrange the equation: $PV=nRT$ to make moles (n) the subject. List the units for each factor in the equation.

Resources:

- Allery Tutors on youtube– Mole Tutorials
- Seneca learning – AQA A Level Chemistry: Moles

3. Bonding and Structure (AQA Spec link: 3.1.3)

- Draw dot-and-cross diagrams for:
 - Sodium chloride (NaCl)
 - Water (H_2O)
 - Ammonia (NH_3)
- Explain why magnesium has a higher melting point than sodium.
- Define *electronegativity* and explain how it leads to polar covalent bonds.
- Describe the structure and bonding in diamond and graphite. Compare their properties.

Resources:

- ChemGuide – Bonding
- YouTube – FuseSchool: Covalent Bonding



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4. Maths Skills in Chemistry (AQA Appendix 6.1)

a) Convert the following into standard form:

- 6020000000000000000000 (Avogadro's number)
- 0.000045

b) Round the following to 3 significant figures:

- 0.0045678
- 123.456

c) A graph shows the volume of gas produced over time. Sketch a curve showing a reaction that slows down over time. Label the axes and explain the shape.

Resources:

AQA Maths Skills Guide (PDF)

Isaac Chemistry – Maths Practice

5. Organic Chemistry Basics (AQA Spec Link 3.3.1)

a) Name and draw the displayed formulae for the first five alkanes (methane to pentane).

b) What is the general formula for alkanes and alkenes?

c) Draw and name the structural formulae for:

- But-1-ene
- Propan-2-ol

d) Define the terms functional group, homologous series, and isomerism.

Resources:

- *BBC Bitesize – Organic Chemistry*
- *ChemGuide – Naming Organic Compounds*

6. Enrichment & Research

a) Research a real-world application of chemistry (e.g., green chemistry, pharmaceuticals, nanotechnology). Write a 300-word summary.

b) Explore the AQA A Level Chemistry specification. List 5 topics you're consider are your strongest and 5 topics you are curious to learn more about.

Resources:

- *AQA A Level Chemistry Specification (7405)*
- *Royal Society of Chemistry – Learn Chemistry*