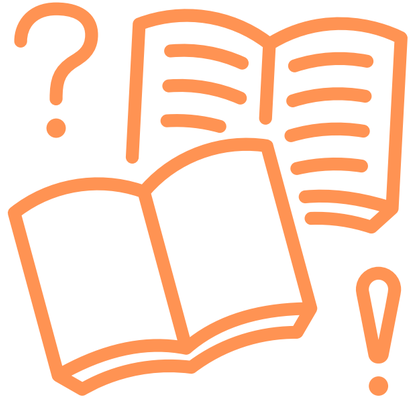
Classroom 42

Exam Success: AQA GCSE Chemistry Paper 1: Triple and Combined

- What to expect
- Triple & Combined students
- Key content, tips and strategies
- Exam questions for you to try!



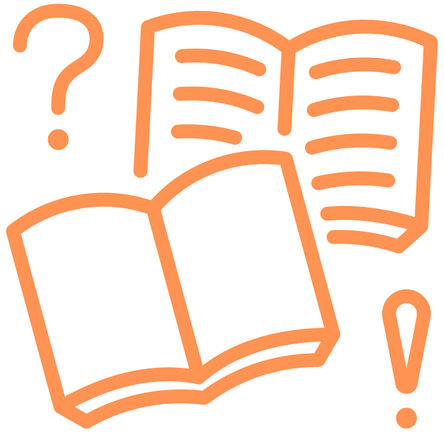
Exam Overview: Which Paper Are You Sitting?

	Triple Chemistry Paper 1 (Higher and Foundation)	Combined Science Trilogy Paper 1 (Higher and Foundation)
Duration	1 hour 45 minutes	1 hour 15 minutes
Marks	100 marks	70 marks
Weighting	50% of GCSE	16.7% of GCSE
Question Types	Multiple choice, short answer, structured, open response	

Paper 1: Exam Overview

Topics Covered

- C1 - Atomic structure and the periodic table
- C2 - Bonding, structure, and the properties of matter
- C3 - Quantitative chemistry
- C4 - Chemical changes
- C5 - Energy changes



The specification is your best friend!

Paper 1: Exam Overview

Required Practicals

For Each Required Practical, Revise:

1. **Hypothesis**
2. **Variables**: independent, dependent, control
3. **Equipment** and their purposes
4. **Method**
5. **Data collection** methods
6. **Data visualization** (e.g., graph types)
7. **Evaluation**: errors, limitations, improvements for validity and reliability, conclusion.

Practical	Triple?	Combined?
Soluble salt preparation	✓	✓
Neutralisation (Titrations)	✓	✗
Electrolysis	✓	✓
Temperature change in reactions	✓	✓

Paper 1: Exam Overview

Key Ideas

- "Matter is composed of tiny particles called atoms and there are about 100 different naturally occurring types of atoms called elements
- Elements show periodic relationships in their chemical and physical properties
- These periodic properties can be explained in terms of the atomic structure of the elements
- Atoms bond by either transferring electrons from one atom to another or by sharing electrons
- The shapes of molecules (groups of atoms bonded together) and the way giant structures are arranged is of great importance in terms of the way they behave.
- There are barriers to reaction so reactions occur at different rates
- Chemical reactions take place in only three different ways: proton transfer, electron transfer and electron sharing
- Energy is conserved in chemical reactions so can therefore be neither created or destroyed."

Paper 1: Exam Overview

Key Ideas

- "The use of conceptual models and theories to make sense of the observed diversity of natural phenomena,
- The assumption that every effect has one or more cause,
- That change is driven by differences between different objects and systems when they interact,
- That many such interactions occur over a distance without direct contact,
- That science progresses through a cycle of hypothesis, practical experimentation, observation, theory development and review,
- That quantitative analysis is a central element both of many theories and of scientific methods of inquiry."

How am I assessed?

AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. (40% of GCSE)

AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. (40% of GCSE)

AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures. (20% of GCSE)

Command Words

AO1	Identify, Give, State, How/Who/When/Where/Which/Define/Describe/Name
AO2	Complete, Calculate, Compare, Explain, Use, Describe
AO3	Analyse, Determine, Predict, Justify, Evaluate, Suggest, Plan (also Use of Graphs or Figures

AO1 & AO2 marks can be within an AO3 question

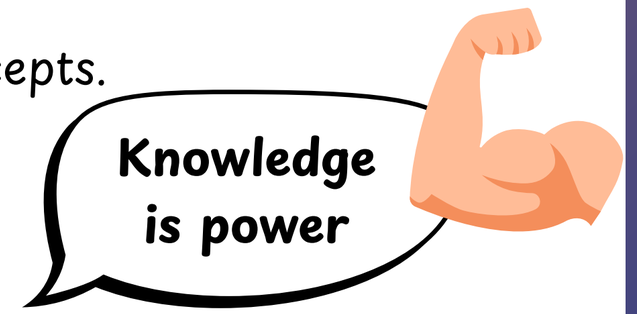
AO1 & AO2 marks will each make up to approximately 37-42% marks of Paper 1.

AO3 will make up 17-23% marks.

AO1 Questions

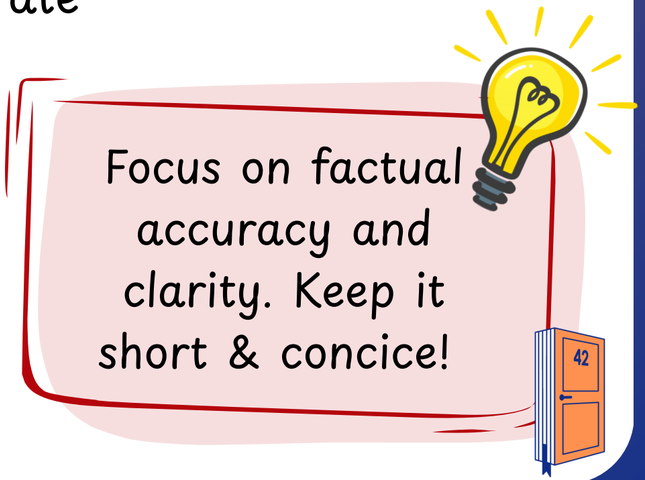
What does it assess?

- Recall of facts, structures, functions, definitions, and key concepts.
- Demonstrate your knowledge of the topic



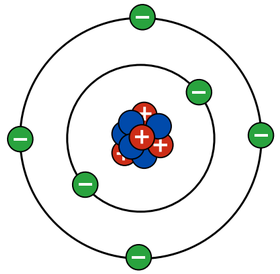
What might the question look like?

- Multiple choice
- One word/short 1 mark answer
- Alongside AO2/AO3 questions (will show some examples).
- If within a more complex question - you will need to demonstrate your knowledge first, before applying it to a porting example/going into more detail.



How do I answer it?

With one word/ a short phrase/ a concise description/ definition.



Examples of AO1 Questions (1x AO1 mark)

Example Question 1:

State the relative charge of a proton. (1 mark)

What do I need to do?

Recall the basic subatomic particle charges from atomic structure. Give a one-word, accurate answer.

Answer: +1.

Example Question 2:

Name the type of bonding in sodium chloride. (1 mark)

What do I need to do?

Identify the correct bonding type based on the substances involved (metal + non-metal = ionic).

Answer: Ionic

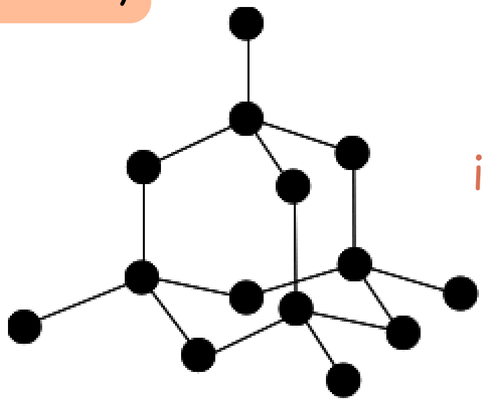
Examples of AO1 Questions (Multiple AO1 marks)

Example Question 1:

Describe the structure of a diamond. (2 marks)

What do I need to do?

Recall both the bonding and structure. Use terms like "covalent," "lattice," and state how many bonds.



Answer: Each carbon atom forms 4 covalent bonds (1) in a regular giant lattice (1).

Example Question 2:

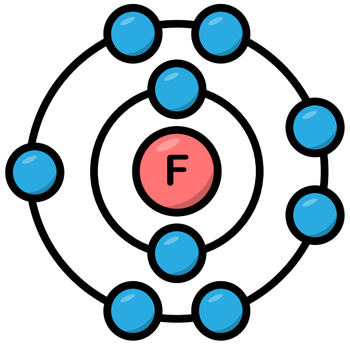
Name two products formed when hydrochloric acid reacts with magnesium. (2 marks)

What do I need to do?

Remember the general acid + metal reaction. Use correct chemical names.

Answer: Magnesium chloride (1) and hydrogen (1)

Examples of AO1 Questions (AO1 mark part of the Q)



Example Question:

Explain why fluorine is a gas at room temperature. (3 marks)

What do I need to do?

Use your knowledge of molecular substances (AO1):
→ Recognise that fluorine is a simple molecular substance.

Apply this to the property of being a gas (AO2):
→ Link weak intermolecular forces to low boiling point and gas state.

Answer:

There are weak intermolecular forces between molecules, which require little energy to overcome.

Now it's your turn!

Pause the video!

Have a go at some AO1 mark questions supplied for you on your course revision hub homepage.

Download it and get instant AI-marks and feedback.

AO2 Questions

What does it assess?

- Apply your knowledge/understanding to a context.
- Use relevant examples to show you understand how concepts work in practice.

Show off your scientific knowledge!

What might the question look like?

- Multiple choice
- One word/short 1 mark answer
- Part of a question alongside an AO1/AO2 point.
- If part of a more complex question - you may need to define/describe something first before you go into more depth.

How do I answer it?

- Consider the amount of points you need to make.
- Does it tell you to relate it to an investigation or case study?
- Consider whether you need to demonstrate knowledge first and then apply it the case study provided.

Think about what you've learned and how it applies to the situation given.

Examples of AO2 Questions (1x AO2 mark)

Example Question 1:

Explain why graphite conducts electricity. (1 mark)

What do I need to do?

Use your knowledge of bonding and structure to explain conductivity in graphite.

Answer: It has delocalised electrons.

Example Question 2:

Iron reacts with oxygen to produce Iron (III) oxide.

Balance the equation:

$\_Fe + \_O_2 \rightarrow \_Fe_2O_3$ (2 marks)

What do I need to do?

Use your knowledge of chemical reactions to recognise the formulas of the reactants and products (AO1). Apply the law of conservation of mass to balance the equation (AO2).

Answer: $4Fe + 3O_2 \rightarrow 2Fe_2O_3$

Example Question 3:

What is the electronic structure of an argon atom?

$^{40}_{18}Ar$

What do I need to do?

Apply rules of electron shell filling (AO2): Fill shells in order: 2 in the 1st, 8 in the 2nd, remaining 8 in the 3rd.

Answer: 2,8,8.

Examples of AO2 Questions (Multiple AO2 marks)

Example Question 3:

The relative formula mass of a metal carbonate: XCO_3 is 84.

A_r: C = 12 O = 16

Calculate the relative atomic mass (Ar) of X (4 marks)

What do I need to do?

Recall how to calculate relative formula mass (Mr) using A_r values and rearrange and solve to find the missing Ar (AO2)

Answer:

Oxygen atoms: 3 x 16 = 48 (1)

Carbon atoms: 12

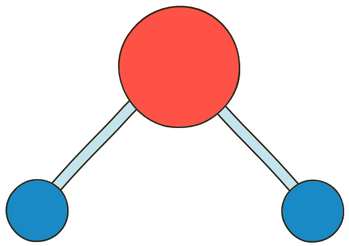
48 + 12 = 60 (1)

84 - 60 = 24 (1)

X = Magnesium (Mg) (1)

Example Question 2:

Describe two limitations of using a ball and stick model for a water molecule.

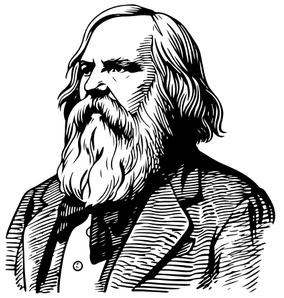


What do I need to do?

Apply your knowledge of particle models: Think about what is unrealistic or misleading in the model.

Answer: not to scale / not 3 dimensional / D / incorrect arrangement in space / electrons / shells not shown / size of atoms incorrect / atoms are separated

Examples of AO2 Questions (AO2 mark part of the Q)



Example Question 1:

Explain why the early periodic tables placed iodine (I) (Ar = 127) before tellurium (Te) (Ar = 128), but then Mendeleev placed tellurium before iodine.

What do I need to do?

Recall how elements were originally arranged (AO1): and apply how Mendeleev used patterns and properties to this example. (AO2)

Answer: Early periodic tables were arranged with elements in order of their atomic weights (1) iodine has a lower atomic weight than tellurium (1), however Mendeleev placed iodine with elements with similar properties (1)

Example Question 2:

Explain why copper is formed at the cathode during the electrolysis of its salts. (2 marks)

What do I need to do?

Recall the charges of ions and electrodes (AO1) and apply that knowledge to explain movement of ions (AO2)

Answer: Copper ions are positive so the copper ions are attracted to the negative cathode.

Examples of AO2 Questions

Graph Skill Question

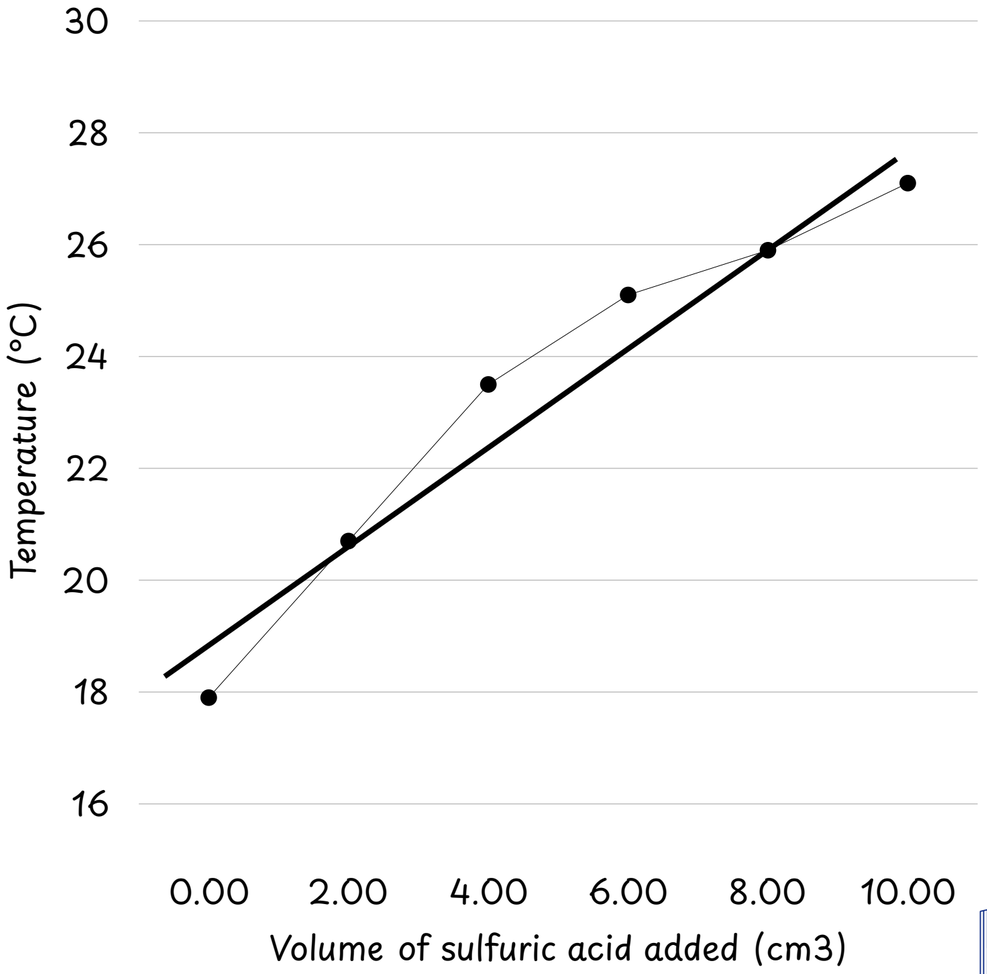
Example Question:

The table shows the change in temperature during the reaction between dilute sulfuric acid and potassium hydroxide solution when different volume of dilute sulfuric acid (cm^3) is added.

Draw a graph to show the results. You should:

- Label and add the scales to the axes
- Plot the results
- Draw a line of best fit

Volume of dilute sulfuric acid added (cm^3)	Temperature (˚C)
0.00	17.9
2.00	20.7
4.00	23.5
6.00	25.1
8.00	25.9
10.00	27.1



Now it's your turn!

Pause the video!

Have a go at some AO2 mark questions supplied for you on your course revision hub homepage.

Download it and get instant AI-marks and feedback.

AO3 Questions

Back yourself up!

What does it assess?

- Analyse a situation/performance (break it down and explain what's happening).
- Evaluate the effectiveness of something.
- Justify decisions with reasoning and draw conclusions based on evidence.

What might the question look like?

- Analysing an action/movement/data
- Giving your opinion and backing it up with evidence.
- Part of a question alongside an AO1/AO2 point.

How do I answer it?

- Consider the amount of points you need to make.
- Does it tell you to relate it to a Figure or practical?
- Consider whether you need to demonstrate knowledge first and then apply it to the context provided.

Always back up your points and remember to answer the question!

Examples of AO3 Questions

Example Question 1:

A student wants to make a fair comparison of the reactivity of the metals with hydrochloric acid.

Name two variables that must be kept constant (2 marks)

What do I need to do?

Evaluate how to make an investigation fair (AO3): Think about what could affect the results other than the metal type to identify key variables

Answer: mass of metal / surface area metal / concentration of acid / volume of acid / temperature of acid

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Example Question 2:

Predict the reactivity of beryllium compared with magnesium. Give a reason for your answer. (2 marks)

What do I need to do?

Analyse atomic structure and reactivity (AO3):

→ Compare nuclear charge, shielding, and atomic radius.

→ Use this to explain how easily an atom can lose electrons.

Answer: Beryllium is less reactive because there is a greater attraction between nucleus and outer electron/ more energy is needed to remove electrons / loss of electrons is more difficult / outer electrons closer to nucleus / less shielding

Examples of AO3 Questions (Multiple AO3 marks)

Example Question 1:

Suggest two safety precautions that should be taken when heating magnesium and oxygen. (2 marks)

What do I need to do?

Assess risks and apply safety knowledge (AO3):

→ Identify hazards like bright light, high temperature, and reactive metals.

→ Suggest appropriate precautions to reduce those risks during practicals.

Answer: Wear safety goggles / wear a heat proof gloves / use tongs / tie hair back / look through blue glass / do not look directly at the burning magnesium,.

Example Question 2:

Green copper carbonate and sulfuric acid can be used to produce blue copper sulfate crystals.

Excess copper carbonate is added to sulfuric acid. **Give** three observations you would make (3 marks)

What do I need to do?

Interpret chemical changes in a reaction (AO3):

→ Think about what happens visually: colour changes, gas, solids disappearing or remaining.

→ Focus on what you would see and when it happens during the reaction.

Answer:

Any three from:

- green solid / powder
- colourless solution
- blue solution formed
- copper carbonate disappears
- fizzing / effervescence or bubbles (of gas)
- stops fizzing
- solid / powder /copper carbonate left at the end

Now it's your turn!

Pause the video!

Have a go at some AO3 mark questions supplied for you on your course revision hub homepage.

Download it and get instant AI-marks and feedback.

Extended Answer Questions

What does it assess?

- Incorporate AO1, AO2, and AO3 skills - can range from 100% AO1 to equal parts of all three.
- Your ability to demonstrate your knowledge, apply it to real-life contexts, practicals or case studies provided and answer the question to come to a conclusion based on evidence.

What might the question look like?

- Extended question - 6 marks

How do I answer it?

- Underline key information from the question.
- In some cases, it can help to provide a brief introduction and conclusion to summarise.
- Explain, don't just state.
- Use command words as clues.
- Keep it well-organised and easy to follow.
- Only include relevant information.
- Use visual elements effectively.

Briefly plan out your answer into paragraphs - to ensure you have included everything!

Example of Extended Question

Question:

Describe a method to investigate how the temperature changes when different masses of ammonium nitrate are dissolved in water. You do not need to write about safety precautions.

(6 marks) (AQA, June 2019)

Level 3 (5-6 marks):
The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

Level 2 (3-4 marks):
The design/plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

Level 1 (1-2 marks):
The design/plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

Indicative content:
Steps

- Use a suitable container e.g. test tube
- Use insulation
- Add water
- Measure the initial water temperature (with a thermometer)
- Add stated mass e.g. 1g or 1 spatula
- Stir (to dissolve the solid)
- Measure the final (allow lowest or highest) temperature of the solution
- Calculate the temperature difference or determine graphically
- Repeat with different masses
- Repeat with the same volume of water

To access level 3 there must be an indication of how the temperature change is determined using different masses dissolved in the same quantity of water

Level 1 Answer:

Put ammonium nitrate in water and see what happens to the temperature. Use a thermometer. Do it with more and less powder.

📝 Why it's Level 1:

- Some relevant ideas (ammonium nitrate, temperature, different masses)
- Lacks clarity, structure, and sequence
- No indication of repeated steps, volume control, or proper data collection
- No explanation of how to calculate or interpret temperature change

Shows basic understanding, but is vague and disorganised

Level 2 Answer:

"Put a known mass of ammonium nitrate into a test tube of water and measure the temperature before and after. Stir it to dissolve. Repeat with different amounts of ammonium nitrate and compare the temperature changes."

📝 Why it's Level 2:

Includes key steps: mass, temperature measurement before and after, repetition
Refers to stirring (helps dissolve the solute)
No mention of insulation, specific tools, or using same volume of water
Steps are not fully logically sequenced
Mostly correct, but missing detail and structure for a valid scientific method

Level 3 Answer:

Use a test tube or beaker with the same volume of water each time (e.g., 50 cm^3). Measure the starting temperature with a thermometer. Add a known mass of ammonium nitrate (e.g., 1 g) using a spatula. Stir until fully dissolved. Record the final temperature. Calculate the temperature change. Repeat with 2 g and 3 g of ammonium nitrate. Keep other variables constant, and use insulation to reduce heat loss.

📝 Why it's Level 3:

Clear, structured methodRefers to stirring (helps dissolve the solute)
All key steps included: volume control, accurate measurements, stirring, insulation
Logically sequenced and leads to a valid outcome
Shows understanding of the importance of controlling variables
→ Excellent answer demonstrating comprehensive planning and scientific thinking

Now it's your turn!

Have a go at one of our 6 mark questions below and get instant AI-marks and feedback.

Good luck with your revision!