AQA
Realising potential

GCSE CHEMISTRY

Insight report:

2019 results at a glance

September 2019

insights

2019

aqa.org.uk

How to use this report

This report provides a snapshot of this summer's results. It contains information on grade boundaries and performance by paper. This report is part of our full results insight series. For extra information on results:

- Join your Head of Curriculum for a video breakdown.
- Access our free Enhanced Results Analysis tool. We've created two-minute tutorials to show you how.
- Navigate to e-AQA to download the full report on the exam for a detailed breakdown.
- Book on to one of our Live lessons webinars. The Head of Curriculum for your subject will take you through this year's results and answer your questions.
- Book on to a Feedback event. See examples from real scripts from the summer to highlight common areas where students did well and where there's room for improvement.

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Qualification summary

This was the second year of the reformed specification, which is assessed by two terminal exams. Each paper has 100 marks and students have 105 minutes in which to complete it. There are three Assessment Objectives (AOs). Approximately 40% of the marks are for demonstrating knowledge and understanding of: scientific ideas, scientific techniques and procedures (AO1), another 40% on application of knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures (AO2) and 20% for analysing information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures (AO3).

Students appear to have been well prepared. Students made a good attempt at all the questions but the imprecise use of scientific language caused issues in some responses, eg the use of 'amount' when 'volume' or 'mass' was required. Most students were able to answer questions that required basic maths skills.

A common issue was students not reading and understanding the importance of both the question and the information given. There were many examples of students simply repeating what they had been told, or answering a different question to that which has been asked; this was particularly noticeable in questions set in contexts beyond those stated in the specification.

Levels of demand

Questions are set at four levels of demand for this specification with different levels of demand within each of the tiers:

Foundation tier

- Low demand questions are targeted at students working at grades 1–3.
- Standard demand questions are targeted at students working at grades 4–5.

Higher tier

- Standard demand questions are targeted at students working at grades 4–5.
- Standard/high demand questions are targeted at students working at grades 6–7.
- High demand questions are targeted at students working at grades 8–9.

A student's final grade is based on their attainment across the qualification as a whole, not just on questions that may have been targeted at the level they are working to.

Enhanced results analysis

Conduct your own analysis using data relevant to you. Watch short tutorials on using Enhanced Results Analysis (ERA) for school, subject, group or student performance; or log straight in through aqa.org.uk/log-in

Grade boundaries

Subject or paper	Max mark	Summer 2019 grade boundaries (raw mark)								
		9	8	7	6	5	4	3	2	1
Chemistry - 8462 (Foundation)	200	–	–	–	–	133	115	83	52	21

Subject or paper	Max mark	Summer 2019 grade boundaries (raw mark)								
		9	8	7	6	5	4	3	2	1
Chemistry - 8462 (Higher)	200	144	125	107	88	69	50	40	—	—

How to interpret grade boundaries

Grade boundaries are set using a mix of statistics and expert judgement

Our research team uses a range of statistics to make predictions that suggest the most appropriate grade boundaries. The statistical evidence considers the prior attainment of the given cohort as well as the distribution of marks. Senior examiners then review a script sample to confirm the statistically recommended marks are sensible for the grade.

Boundary setting is overseen by Ofqual.

Please note: Grade boundaries are set during the awarding process, as a result of the performance of the cohort taking each exam on the papers that were set in a particular year. Grade boundaries can go up or down, depending upon the characteristics of the cohort and their response to the demand of the papers in that year.

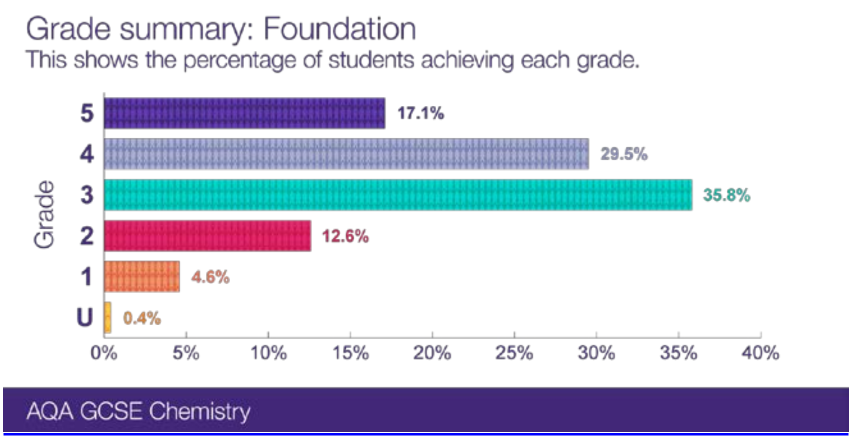
Watch our two-minute team stories to find out more about how we set grade boundaries and ensure fairness. Visit aqa.org.uk/team-stories

Performance overview

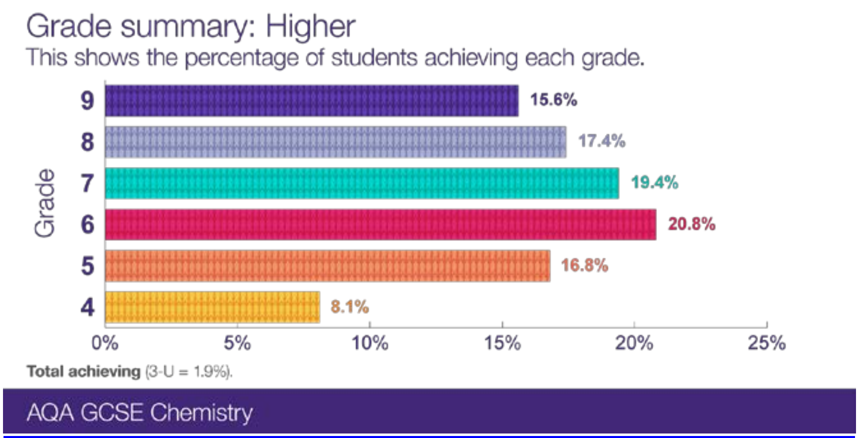
Grade summaries

The figures below represent the performance of those students who entered each tier in Chemistry in 2019. The performance of those students gaining a grade 4 or grade 5 on either tier is equivalent, though the number of marks they will have needed to gain to get each grade will be different, as will their experience of the paper they sat.

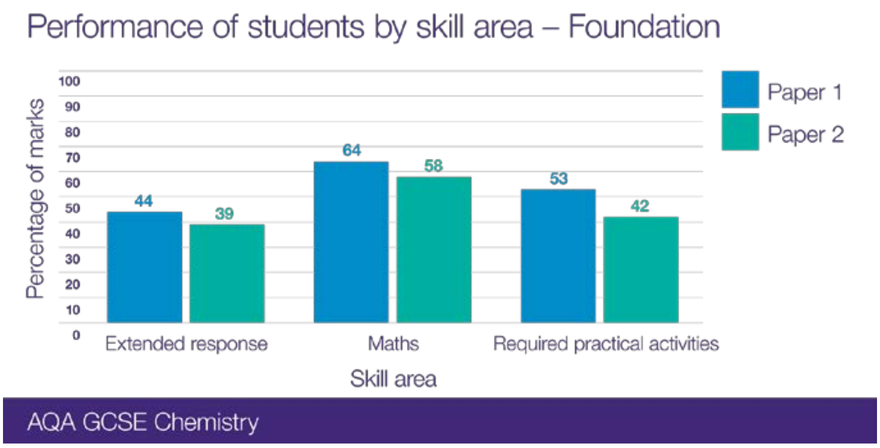
Grade summary



Grade summary



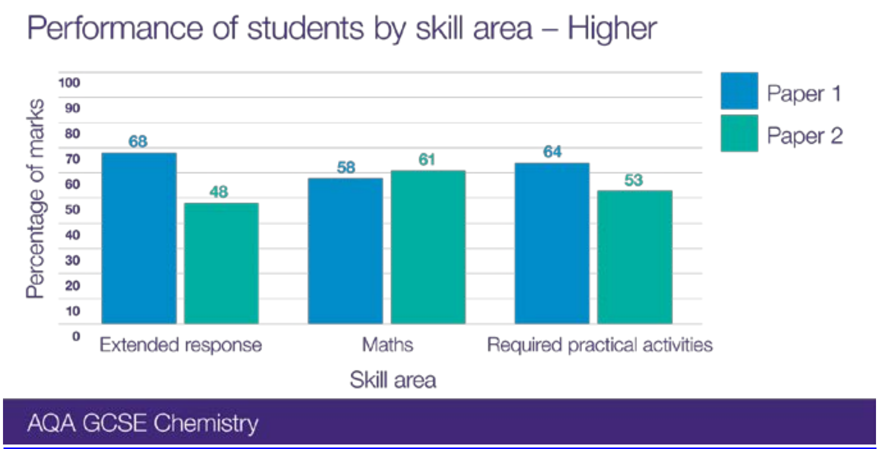
Performance by skill area



Performance of students by skill area – Foundation

On each paper, a number of marks are allocated to test the following skill areas: extended response, maths and practical skills.

This graphic shows the mean percentage of marks achieved for each skill area.



Performance of students by skill area – Higher

On each paper, a number of marks are allocated to test the following skill areas: extended response, maths and practical skills.

This graphic shows the mean percentage of marks achieved for each skill area.

Paper 1 insights

This is a snapshot. Learn more about every question from the summer 2019 series in our reports on the exam. Visit aqa.org.uk/log-in and follow:

e-AQA > Secure Key Materials > GCSE > Science/PE > Chemistry (new specification) > Reports on the exam

Highlights from summer 2019

Foundation

Students appear to have been well prepared for this paper. A wide range of marks were achieved and most questions had good differentiation.

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Most students demonstrated a general competence in the questions requiring mathematical skills. This included their ability to calculate means, percentages and surface area. They were also able to plot points and draw and extend lines of best fit. Students could read the intercept of a line with the y-axis. • **Knowledge and understanding:** At this level, many students demonstrated secure knowledge and understanding. They were able to recognise the difference between elements, compounds and mixtures and demonstrated a good understanding of separation processes. Students could apply their understanding of electronic structure and group number and of atomic structure and bonding. Many were able to complete dot and cross diagrams to represent the bonding electrons.	• **Practical based questions:** Students appeared to have a limited knowledge of or confidence in answering questions relating to practical activities. Whilst the name 'burette' was not well known (phonetic equivalents were allowed), there was a range of apparatus which was confused with this item. Students were imprecise when describing control variables, using terms such as 'amount' rather than volume or mass. • **Mathematical skills:** The use of significant figures and standard form was not securely demonstrated. When calculating a mean, some students did not exclude the anomalous result. • **Use of information from the questions:** When asked to compare the properties of materials, some students just quoted the data in the table without drawing any conclusion about the question asked. When asked about the work of Mendeleev, many simply repeated the information provided in the stem of the question.

Higher

Themes where students did best	Themes where students did less well
• **Knowledge and understanding:** Students were able to compare the properties of materials when asked and many were able to give a justified conclusion from their comparison. Students were aware of the work of Mendeleev and had a secure knowledge of 'relative atomic mass', 'atomic number' and 'isotopes'. • **Practical based questions:** Students appeared to be better prepared for questions requiring knowledge of practical situations than their peers who sat the Foundation tier paper. Most Higher tier students were able to identify and logically sequence all of the key steps in a titration.	• **Practical based questions:** Those students who did not gain much credit in these questions tended to focus on what they expected the outcome to be, rather than being able to talk about what actually happened in the experiment presented to them. • **Mathematical skills:** The use of significant figures and standard form was not securely demonstrated; conversion between different units was weak, including kg to g. • **Knowledge and understanding:** Students were not able to demonstrate a secure understanding of the nature of bonding between atoms, nor the force between molecules; this included the use of general but incorrect terms such as 'More energy was **needed** for making bonds than used for breaking bonds.' There was little evidence of secure knowledge of hydrogen fuel cells, as was understanding of the processes involved in the extraction of aluminium, with most students being unable to complete the required half-equation well enough.

Paper 2 insights

Foundation

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Most students could calculate a mean. Those who could rearrange equations usually went on to gain full marks for the remainder of the calculation. Many students could plot points on a graph accurately. • **Knowledge and understanding:** Students were able to identify reversible reactions and give at least one benefit of the use of catalysts. Knowledge and understanding of composite materials was strong, though the identification of a composite was less so.	• **Practical based questions:** Few students could use common tests for ions to identify unknown reagents; many students struggled to describe how to collect and test for carbon dioxide. When asked to name apparatus to measure the rate of a volume or mass change, many students forgot about the need to measure time. An extended response question on the standard rusting experiment indicated that many students were not familiar with the setup and purpose of the selection of the different conditions explored in this experiment. • **Mathematical skills:** Few students could interpret percentages given in a table; many students struggled to re-arrange a given equation and even stronger students failed to round to three significant figures correctly when asked. The ability to convert between common units was weak. Many students struggled when trying to draw an appropriate line of best fit – pencil should be strongly encouraged as it makes it easier for students to correct errors when they are drawing the line.

Higher

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Many students were able to plot data accurately in graphs. • **Knowledge and understanding:** Students demonstrated confidence in questions relating to topics which were common to the previous specifications, such as equilibrium and qualitative analysis. Most students were able to balance equations correctly. Polymerisation was generally well understood, though some students made careless mistakes when drawing bonds around carbon. Many students understood the impact of pressure on the yield in the manufacture of ammonia. • **Practical based questions:** Students were able to suggest a variety of ways to conduct an investigation into the composition of water samples, suggesting a good understanding of a range of experimental techniques and processes.	• **Practical based questions:** Some students provided detailed additional information that did not contribute to a fully answered question. When asked to name apparatus to measure the rate of a volume or mass change, many students forgot about the need to measure time. • **Mathematical skills:** Conversion between common units, eg some students think there are only 100 mg in 1 g and 100 cm^3 in 1 dm^3. Many students could not calculate an average rate from experimental data. Many students struggled when trying to draw an appropriate line of best fit – pencil should be strongly encouraged as it makes it easier for students to correct errors when they are drawing the line. • **Knowledge and understanding:** Many students have the misconception that fuels need energy to burn, particularly those that do not ignite easily. Knowledge and understanding of the protection of iron from rusting was not secure, even though students could describe the basic conditions required for rusting to occur. Many students seemed unaware that the volume of any gas is proportional to the number of moles present. Some students revealed a lack of understanding of the relative strength of bonds between atoms and weaker forces between molecules. A question about potential life on Titan showed that the mechanism by which greenhouse gases cause the greenhouse effect is poorly understood by many students.

Next steps

Access our full suite of insight resources:

- Results insight video series
- Enhanced Results Analysis
- Reports on the exam
- Live lessons webinars
- Feedback events
- Visit Exampro for past papers, related mark schemes and examiner comments.

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Responsible for multiple sciences?

Results insights are available for all our GCSE specifications:

- Biology
- Physics
- Combined Science: Synergy
- Combined Science: Trilogy