AQA
Realising potential

insights

GCSE COMBINED SCIENCE: SYNERGY

Insight report:

2019 results at a glance

September 2019

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 four terminal exams. Each paper has 100 marks and students have 105 minutes in which to complete them. 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 and made a good attempt at all the questions but imprecise language caused issues in some responses. Students not reading the question properly or not following instructions were both common themes across all papers. Students still find it difficult to understand the difference between 'describe' and 'explain' and what is required when the command word 'compare' is used.

Mathematical questions seem to have been attempted more frequently this year relative to last year. It appears that many students didn't have calculators, or were not familiar with the one provided in the exam, and so were unable to complete calculations.

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)								
Synergy, 8465 (Higher)	400	9-9	9-8	8-8	8-7	7-7	7-6	6-6	6-5	5-5*
		259	237	216	195	174	158	142	126	111
		5-5*	5-4	4-4	4-3	3-3	3-2	2-2	2-1	1-1
		111	96	81	73	-	-	-	-	-

*Note the Higher Tier 5-5 grade boundary is deliberately shown in all rows of the above table.

Subject or paper	Max mark	Summer 2019 grade boundaries (raw mark)								
Synergy, 8465 (Foundation)	400	5-5*	5-4	4-4	4-3	3-3	3-2	2-2	2-1	1-1
		237	217	198	172	146	120	94	69	44

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.

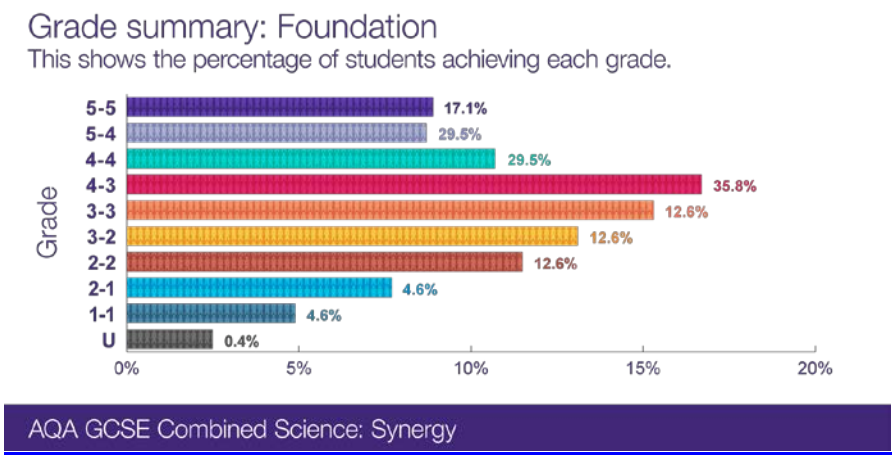
Watch our two-minute team stories to find out more about how we set grade boundaries and ensure fairness. Visit aqa.org.uk/team-stories

Performance overview

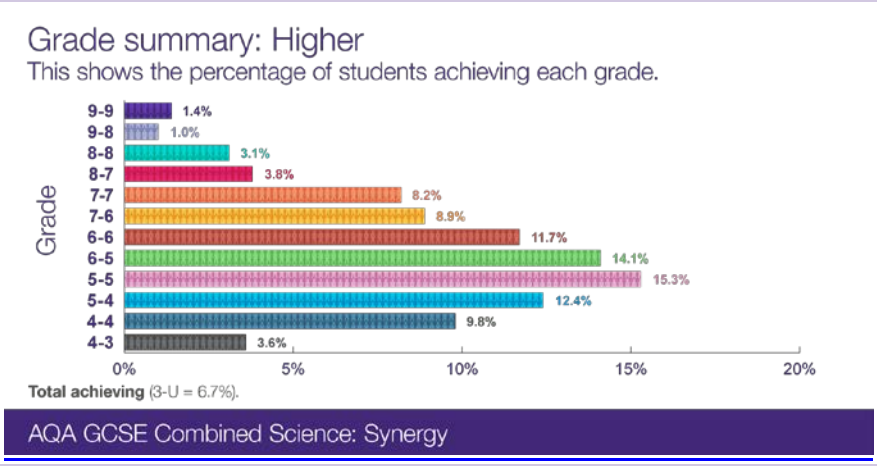
Grade summaries

The figures below represent the performance of those students who entered each tier in Combined Science: Synergy 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.

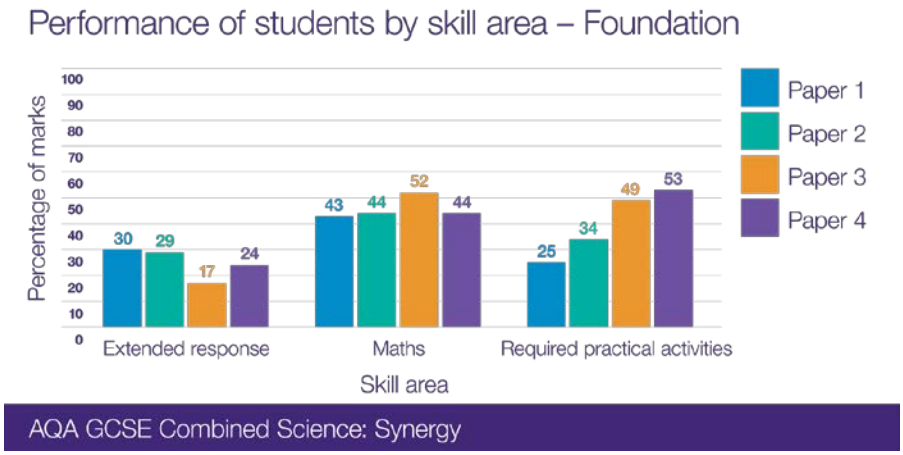
Grade summary



Grade summary



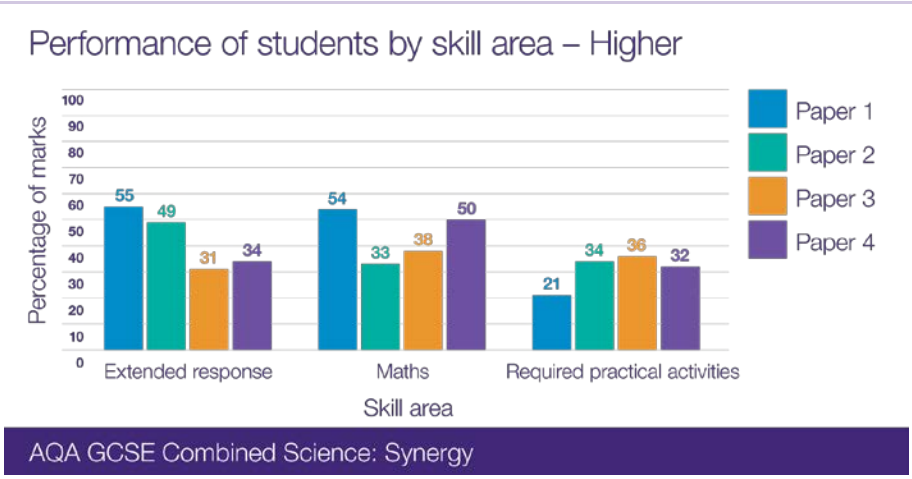
Performance by skill area



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 > Combined Science: Synergy (new specification) > Reports on the exam

Highlights from summer 2019

Foundation

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Many more students than last year are attempting the maths questions, gaining some, if not all, marks for a question, which shows more confidence in attempting maths questions. There were some good attempts at graph plotting and data interpretation. • **Knowledge and understanding:** Many students attempted all questions across the paper. There were many excellent attempts to use the food web to explain the effects of reducing one population on other populations.	• **Mathematical skills:** It appears that many students didn't have calculators and so were unable to complete calculations. Students often missed unit conversions, or were unable to convert units correctly and so could not gain full marks. Understanding and correct use of significant figures was lacking, and so many students missed out on the final mark for a question. • **Practical based questions:** Many students struggled with the questions drawing on knowledge from Required Practical Activities. • **Use of scientific terminology:** A lot of vague terms were used in answers that could not be awarded marks, eg 'sickness' was insufficient for a symptom of measles, and unqualified use of 'it'. • **Understanding of command words:** Many students appeared confused in interpreting command words, especially 'describe' and 'explain', and so ended up answering a different question from the one actually set.

	• **Knowledge and understanding:** Students particularly struggled with the classification question, with understanding of binomial nomenclature being weak.

Higher

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Students showed more confidence this year in attempting maths questions. There were many good attempts at graph plotting and calculations using numbers taken from graphs and tables. • **Knowledge and understanding:** Many students attempted all questions across the paper. There were many excellent attempts to use the food web to explain the effects of reducing one population on other populations.	• **Mathematical skills:** It appears that many students didn't have calculators and so were unable to complete calculations. A significant number of students were rounding intermediate values in calculations, leading to answers that fell outside the acceptable range or which couldn't be quoted to the correct number of significant figures, which meant that they couldn't gain full marks. Students should be advised to carry out the entire calculation and then round the final answer. Many students struggled with basic mathematical skills such as percentage calculations, unit conversions and use of significant figures. • **Practical based questions:** Questions that drew on knowledge and understanding from Required Practical Activities were often poorly answered. • **Understanding of command words:** Many students appeared confused in interpreting command words, especially 'describe' and 'explain', and so ended up answering a different question from the one actually set. • **Knowledge and understanding:** Students particularly struggled with the classification question, with understanding of binomial nomenclature being weak.

Paper 2 insights

Foundation

Themes where students did best	Themes where students did less well
• **Knowledge and understanding:** Many students demonstrated a good knowledge of waves in question 1. Students also had a good knowledge of missing plant cell parts.	• **Practical based questions:** Many students struggled with the questions drawing on knowledge from Required Practical Activities. • **Mathematical skills:** Many students struggled with basic mathematical processes such as calculation of a mean, unit conversions and percentage calculations. • **Use of language:** There were very many vague answers given, with many students struggling to convey their understanding of key terms. Students need to be able to use the correct scientific terms: although phonetic spelling is usually accepted, some answers could not be accepted (eg chloroplast instead of chlorophyll).

Higher

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Students taking this paper generally tackled maths questions much better than those taking the Foundation tier paper. • **Knowledge and understanding:** Question 1 was generally well done, especially the calculation and extended response question requiring a method.	• **Mathematical skills:** The inability to correctly carry out unit conversions was a common issue, causing many students to not gain full marks. • **Practical based questions:** Many students struggled with applying knowledge gained from Required Practical Activities.

	• **Use of language:** To access the higher level marks, students need to be able to use the correct scientific terms. A lot of answers were too vague or poorly expressed to be awarded the mark, with many students struggling to convey their understanding of key terms.

Paper 3 insights

Foundation

Themes where students did best	Themes where students did less well
• **Mathematical skills:** The arithmetical ability of the students attempting the calculations was generally good at this level. • **Completion of table:** Most students could correctly complete the left-hand column of the table showing the time in seconds, although a few tried converting the time into minutes. • **Graph plotting and use of data:** Plotting of points was generally well done, although students were less clear on when a line of best fit should be a curve rather than a straight line. Most students could correctly read data from the graph and then calculate the correct answer, although several then failed to select the correct unit.	• **Mathematical skills:** Students were often let down by weaknesses in basic maths skills such as percentage calculations and calculation of means. A significant number of students could not rearrange equations and struggled with unit conversions (eg grams to kilograms). • **Practical based questions:** In spite of the Required Practical Activities in the specification, many students seemed unfamiliar with laboratory techniques and equipment. This was particularly evident in questions 5 and 7. • **Following instructions:** Some of the multiple choice questions required students to tick two boxes; however, in many cases the student only ticked one box, so missed marks. Although most students could plot the two bars correctly in question 03.2, more than half did not label either axis, despite the instruction. When asked to write or complete a word equation many students tried to use symbols instead of words, but invariably did so incorrectly and so couldn't gain the marks. • **Use of language:** Many students used vague or confused language such as unqualified use of 'it' or confusion of key terms such as conduct/insulate, or ionic/covalent.

Higher

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Those students who were able to draw a tangent on the curved line in the graph for 06.3 mostly managed to score all four marks for the question.	• **Mathematical skills:** In calculation questions students often set out their working (if they showed it at all) in a random and unstructured way. If a student makes a mistake early in the calculation, but then goes on to use that incorrect result correctly for the rest of the calculation, the examiner will award marks for the subsequent steps. However, it is very difficult to do this if the examiner cannot clearly follow what the student has set out. Students should show clearly their working when completing calculations. Other weaknesses in mathematical skills involved difficulty in converting units (eg megajoules to joules, nanograms to grams) and difficulty in rearranging equations. • **Practical based questions:** Many students were unable to answer questions that drew on knowledge and understanding of practical work (eg question 01, 05.1, 08). Particular weaknesses were seen in understanding of laboratory techniques and equipment, including how to correctly draw up a table of results. • **Use of language:** Confused and vague terminology often meant that marks were not gained. Examples include use of 'electricity' instead of charge or current, confusion of bonds and forces, use of vague terms such as 'particle' or 'molecule' instead of atom.

Paper 4 insights

Foundation

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Plotting a graph using given data was well done, but some students did not follow the instruction to include a line of best fit. Students were also correctly able to identify the range of values from a given graph and were able to predict a value by extrapolating the line of best fit. Students made good attempts at calculations, but often spoiled answers by incorrectly carrying out unit conversions or rounding numbers when this wasn't asked for. • **Knowledge and understanding:** Students demonstrated quite good understanding of transformers and their role in the National Grid. Evaluations of given data in a 6-mark question were well done, but many students missed out on Level 3 by not following the instruction to include supporting calculations.	• **Practical based questions:** Whilst many could identify which variable a change to a practical method would impact, few students could explain the effect this would have on the results. Some students confused hazards and precautions and appeared to think these were about the control variables for a practical. • **Knowledge and understanding:** Knowledge of the environmental impacts of burning fossil fuels was not good, with many students incorrectly referring to effects on ozone or using vague terms such as 'air pollution'. Students struggled with balancing symbol equations, with only one third managing to correctly balance at least one symbol. Explanations of electrolysis were not good, with references given to magnetic attraction, and students did not seem to be familiar with electrolysis of aluminium oxide. • **Mathematical skills:** Students largely ignored an instruction to ignore the anomalous result when calculating a mean value. Unit conversions using prefixes such as milli were not well done. Calculations of kinetic energy were also not well done, with most students only scoring the mark for rounding to two significant figures. Standard form did not appear to be well understood.

Higher

Themes where students did best	Themes where students did less well
• **Mathematical skills:** Calculations were, on the whole, well done, with good demonstration of equation recall. Many students attempted to give their equation in alphabetical order, making mistakes and not scoring the mark as a result. Equations can be given in any correct rearrangement and don't need to be in the same order as the terms in the question. Plotting a graph from given data was well done, but lines of best-fit should be smooth and not dot-to-dot. • **Knowledge and understanding:** Students gave good answers for an evaluation of life cycle assessments, but many missed Level 3 by not including a judgement with their answer.	• **Practical based questions:** Students struggled to describe how to make accurate measurements for an investigation into gravitational potential energy. Many were unable to identify the dependent variable in a given investigation and reasons for changes to improve the accuracy of the results were generally weak. • **Mathematical skills:** Significant figures were not well understood. Poor explanations of why a graph did not show a directly proportional relationship indicated that students were not confident with this. • **Knowledge and understanding:** Students did not appear confident with conservation of momentum, with answers confusing this with environmental ideas like trees or wildlife. Questions assessing knowledge or calculations set on electrolysis weren't well done. Few students could identify what the area of a velocity-time graph represented.

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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