my-GCSEscience.com
The leading source of online video tutorials dedicated to the new 9-1 Science GCSEs

Chemistry GCSE 2018
Summary of Examiners Reports

The introduction of the new '9-1' Science GCSEs of 2018 has been a challenging experience for students and teachers alike. This year, therefore, the examiners' reports are more useful than ever as a diagnostic tool, to help teachers provide targeted guidance to students taking these exams in future.

This blog provides a summary of the examiner's reports for the 2018 Chemistry papers. It covers both combined science and the separate sciences, foundation tier and higher tier. We have used the examiner reports prepared for the AQA exam board, but the same lessons apply to students taking Edexcel and OCR exams.

The links below provide tables of grade boundaries for all three sciences.

- Grade Boundaries – Combined Science
- Grade Boundaries – Separate Sciences

In Chemistry, according to the examiners, students coped well with many standard topics and skills, such as completing diagrams of covalent bonding and answering questions on energy profile diagrams. However, the examiners added that lack of exposure to *basic terminology* made it difficult for some students to access questions. For example, there was confusion regarding the difference between a liquid and a solution. Importantly, several *new* topics on the specification presented significant problems.

We've split the examiners comments into two categories: 'Key exam skills' and 'Subject areas for development'.

Key exam skills

Key exam skills were lacking and accounted for a large share of lost marks, according to the examiners. The examiners commented regularly on errors that could have been addressed by improving students' exam technique.

Specifically:

- Students often repeated the stem of the question in their answers, rather than either adding value to what they had been given or using their own knowledge to answer the question. This resulted in the loss of considerable marks for many students.

- Where asked to '*explain'*, students often *described* in preference to explaining for exam questions. This limited the number of marks they were able to achieve.

- Students often used pronouns such as "it" and "they" in their answers to questions. This wasn't specific enough for the mark scheme and students lost marks as result. For example, in a question about what would be observed in a reaction between copper and silver chloride, answering "it would turn blue" or "it would turn black" is not specific enough for the examiner to know if the student is talking about the copper or the silver, the solid or the solution. An answer such as "the solution would change colour from colourless to blue" or "a black solid would be produced" would be much better, and would gain all the possible marks.

- Students would benefit from use of more specific terminology. For example, students rarely used the term ‘giant lattice structure’ to describe the structure of potassium chloride and this cost them marks.

- Students would benefit from practising unit conversions, such as cm^3 to dm^3 or kg to g for mole calculations.

- Students must ensure they round answers at the *end* of a calculation, not at each stage. These maths skills errors caused many students to lose marks.

- As ever, students would have gained more marks if they had shown their working out in calculations where they did not arrive at the correct answer. This is particularly important in unstructured calculation questions, in which partial marks are often awarded for clear working. Examiners also reported that students’ working was often difficult to follow.

- Calculation answers should always be given in decimals, *never* fractions, even if fractions are the default answers on the student’s calculator.

- Examiners noted that students would benefit from practising how to *describe* graphs by breaking them down into different stages, such as “for the first 10 seconds” and “between 10 and 30 seconds”, etc. Students lost marks by failing to do this.

- Students had particular difficulty with describing trends in curved graphs. The idea of a gas being collected at an increasing rate (which could be expressed as “faster and faster”) was very rarely seen.

- Finally, in ‘*evaluate’* questions, which were usually extended response, “level marked” questions, many students limited themselves to level 2. Students often used only the knowledge given in the question, without bringing in any of their own knowledge. When asked, students sometimes failed to give a judgement on which method was better; a judgement is an essential part of an answer where the command word is ‘evaluate’.

The errors above can be addressed by using My GCSE Science to help improve students’ exam technique. My GCSE Science long-form exam-style questions (and corresponding mark schemes) help students build an in-depth understanding of each topic while at the same time developing exam technique.

My GCSE Science teachers have also prepared blogs that deal directly with exam skills and maths skills in Biology. These blogs cover all of the issues raised by the examiners and are freely available on www.my-GCSEscience.com.

- Blog: Command words in GCSE Chemistry
- Blog: Decimal places and significant figures
- Blog: Describing, explaining and comparing graphs

Subject areas for development

Below we outline specific topics in the curriculum which examiners identified as requiring further development.

- Examiners noted that students particularly struggled with *new* topics on the specification, such as formulations, potable water and life cycle assessments.
    - Purity and formulations
    - Potable water
    - Life Cycle Assessment

- Students had difficulty writing balanced equations where they had to determine the formulae of the products.
    - Blog: Top tips for writing chemical formulae
    - Blog: Using brackets in chemical formulae

- Several questions tested students' understanding of how the structure and bonding of substances relates to properties such as electrical conductivity, melting point or boiling point. Only a very small proportion of students gained full marks in these questions. Examiners reported weakly expressed ideas, such as "graphite has three covalent bonds" and vague statements such as "it has weak intermolecular forces so little energy is needed to break the bonds". Mark schemes required precise scientific language, such as "each carbon atom makes three covalent bonds", "delocalised electrons carry charge through the structure" or "little energy is needed to break the weak intermolecular forces between molecules."

- In the required practical on testing for cations and anions, more precision was required in the use of terminology, for example, distinguishing between bromide and bromine.
    - Tests for cations
    - Tests for anions

- In required practical questions which asked for a method description, students most often lost marks by failing to consider variables that needed to be controlled in order to ensure valid results. Credit was not given for expressing variables such as volume or mass simply as “amount”.

- While most students were able to correctly draw a line of best fit, many didn’t plot the point at the origin (0,0). Others were not aware that a line of best fit can be a curve.

- Students need practice in calculating a tangent (change in y / change in x). The majority of students were unable to correctly draw a tangent in order to determine the rate of reaction (gradient of the graph) at a given value.
    - Interpreting rate graphs

- Examiners reported that students clearly needed more practice in applying collision theory to explain the result of a reaction. That is, students must be aware that increasing the concentration increases the rate of reaction because there are more particles per unit volume, so there are more frequent collisions (or more collisions per second). Simply saying there were more particles was insufficient. Higher-attaining students were able to state that catalysts reduce the activation energy by providing an alternative route or pathway, though the second point was less well known than the first.
    - Collision theory and activation energy

- Students found the equilibrium section of the paper especially difficult. Most students struggled to explain why an equilibrium might be reached and how it can be affected. There was also confusion between rate and equilibrium. Many students did not know that rate is the speed of a reaction whereas equilibrium relates to how much of the product is produced (known as the *yield* of a reaction). The effects of temperature, pressure and catalysts on both the yield and rate in a reversible reaction were poorly understood, in particular, in relation to explaining these effects using collision theory.
    - Factors affecting equilibrium

- In organic chemistry, the drawing of displayed formulae was often problematic, such as the drawing of ethanol, or the polymer formed in addition polymerisation.
    - Addition polymerisation

- Students offered a variety of incorrect answers for the small molecule lost during condensation polymerisation (and some of the answers weren't molecules). More than half of students knew the answer was water, however.
    - Condensation polymerisation

- Many students were not aware of the disadvantages of pollution from unburnt hydrocarbons nor were they able to correctly describe the reaction between nitrogen and oxygen to produce nitrogen oxides.
    - Atmospheric pollutants

All of this subject matter is of comprehensively covered by My GCSE Science video tutorials (linked above) and the associated exam-preparation resources.

In addition, My GCSE Science teachers have prepared blogs that deal directly with the areas for improvement as outlined above. These blogs are freely available on www.my-GCSEscience.com.

- Blog: Making observations in chemistry
- Blog: Balancing chemical equations
- Blog: Top tips for writing chemical formulae
- Blog: Using brackets in chemical formulae