



General Certificate of Education

Applied Science

8771/8773/8776/8777/8779

SC03 Finding out about Substances

Report on the Examination

2010 examination - June series

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Set and published by the Assessment and Qualifications Alliance.

General Comments

The number of candidates entered has again increased this year *for many units* and many centres have continued to guide candidates to achieve well. The award has generated much high quality work from centres. Credit should be given to both teachers and candidates in making every effort to meet the requirements of the award, producing portfolios, many of which demonstrated a commendable standard of content, approach and presentation. The centre accreditation scheme currently numbers 94 centres at AS and 26 centres at A2 level and random sampling of these centres has again confirmed the value of the process – with centre marking being confirmed as in line with AQA standards in the vast majority of cases, but with a small number showing some “slippage” with marks going out of tolerance leading to loss of accreditation.

Portfolio issues

Portfolio construction remains a concern for some candidates, and it is evident that better centre guidance is required in some cases. However, it is very important that centres provide the opportunity for candidates to demonstrate flair and individuality. It is easier for moderation if portfolio structure matches the structure of the unit. Centres are also advised to monitor portfolios during production to identify “cut and paste” styles of working early and to ensure approaches are appropriate. Some centres correctly down-marked candidates’ final portfolio marks due to inappropriately including cut and paste or copied work – but early identification and correction of such work could have avoided these final mark reductions. Other centres missed the inclusion of un-reworded downloads and these were dealt with appropriately by moderators, with most instances resulting in portfolio marks falling out of tolerance, a situation which unfortunately affects the entire entry for that unit. It is essential that these situations are dealt with at centre level before submission of marks in order that all candidates are treated fairly.

Some candidates continue to produce unreasonably large portfolios and it is rare for such portfolios not to include irrelevant material or be repetitive or, indeed, to have omitted some areas that would benefit from additional time and consideration.

For some units, it appears that the levels of expectation of the quality of portfolio content and/or the outcomes that candidates are allowed to produce are set too low. A number of centres are still judged to have marked candidates work too generously and where this was the case, marks were reduced and fell out of tolerance.

Some of the causes of over-generous marking included:

- Misinterpretation of the requirements of unit
- Too much work on non-essential areas and/or too little on required aspects
- Failure to fully complete fundamental aspects of the unit as required in the “Banner”
- Over-lenient interpretation of the assessment grids
- Failure to appreciate that high scores are likely to equate to “A” grade which means very good work in all areas of a unit – marks allocated to students should be matched to the track record and overall ability of students to ensure they are justified. Weak students gaining uncharacteristically high grades could indicate lenient marking.
- Lack of rigour in marking/assessment of work – incorrect science accepted, incorrect calculations marked as correct, incorrect statements accepted, praise for work which is of poor quality, marks allocated for work for which there is no evidence – or no supporting teacher comment (# in the assessment grids).

- The inclusion of materials directly down-loaded from the internet – such work should be awarded NO MARKS as original student work.
- Weak candidate skills in practical activities leading to a lack of precision and unreliability as evidenced in results, but high marks awarded.
- A lack of description by the centre assessor of each candidate's level of practical skills, their awareness of safety procedures and degree of autonomy (marked # in the assessment grids) and resulting inconsistencies between the marks awarded and the portfolio evidence.
- Many units require the use of risk assessments, and whilst many candidates include these, centre assessors are frequently over-generous in their allocation of marks in this area. The following are examples of where candidates are insufficiently accurate or specific and where marking is lenient.
 - Where solutions are used, the concentration is important and this can significantly affect the hazard and subsequent risk factors.
 - Where compounds or solutions are used, it is inappropriate simply to refer to and use the elemental form of the cation component of a compound – sodium has quite a different hazard rating to sodium chloride!
 - Common sense and an understanding of science should be applied when judging risk. Candidates should consider what are the real and sensible hazards and risks and then relate these to the actual compounds used at the concentrations involved as appropriate.

2010 was the first year for Quality of Written Communication (QWC) to feature in all portfolio units. The criteria appear in AO1 of Sc01 and AO3(ii) for all other units. Whilst appearing in particular assessment objectives, the intention is for the QWC statements to be applied across the entire portfolio. As explained at teacher standardising meetings, the intention was that QWC would consist of a cluster of criteria within each mark band and would generally be in line with other criteria at the level in question. As such there would be little change to existing standards. This has proved to be the case and only in a minority of instances did marks move up or down due to QWC alone. It was generally clear that centres had taken into consideration the QWC elements in their assessments. Unfortunately a minority of centres have continued to use the older criteria where QWC statements are not included and all centres are advised that they should be using the correct assessment grids.

Centres are reminded that many issues and points of guidance made in the 2008 and 2009 examination reports are still valid and these remain valuable sources of information.

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Some excellent portfolios were seen, based on a high standard of practical skills across all five required investigations. The best examples demonstrated a detailed and complete consideration of the requirements of the specification and assessment criteria, practical tasks that were set in an applied or vocational setting with specific objectives and good practical skills that had been learnt and practised and then applied accurately in the tasks set. Fully documented and detailed standard procedures and complete risk assessments were included, with the latter targeting the actual concentrations used in the experiments.

Results, including all raw data and with correct units, were recorded to the expected levels of precision (e.g. burette readings and titres to ± 0.05) and evidence of reliability provided by concordancy in titres and repeat measurements where appropriate. Correct calculations, well set out by the candidate and fully explained, with correct levels of precision and units, were also in evidence leading to conclusions which related back to the original objectives. Evaluations considered both qualitative and quantitative errors and also a comparison of the experimental results with expected or known values.

Where portfolios had omissions or weaknesses, they most often appeared in the following areas and with the effects noted:

- Uses of the techniques: a brief outline only and/or omissions, limits marks to MB1 or 2 in AO1 for this strand [Note: the specification lists possible uses to consider]
- Limitations of the qualitative techniques: candidates often omit these or misunderstand what is expected, limiting marks to lower mark bands, or zero, for this strand in AO1. [Note: general discussions concerning the qualitative nature of the inorganic tests and chromatography are expected, together with more specific details relating to flame tests and precipitation tests, and also R_f values; limitations of the other techniques are not required, but may, of course, feature in evaluations].
- Scientific principles: if weakly described and lacking in detail, will restrict marks to MB1 or 2 in AO1 for this aspect.
- Risk assessments: where there are omissions and errors, irrelevant entries, no consideration of concentrations used, hazards not included or incorrect, precautions omitted or only weakly described, combinations of these will restrict marks in AO3(ii) and may also affect marks in AO3(i).
- Calculations: where these are clearly centre led, contain errors, have incorrect precision / inappropriate use of significant figures, incorrect units or no units and/or no explanation of the stages, marks are unlikely to reach the higher mark bands in AO2
- Incorrect precision for recorded measurements, particularly titration data – limits marks in AO3(i)
- Raw data missing e.g. burette readings; units omitted or incorrect for recorded data – limits marks for recording in AO3(i) and also AO3(ii).
- Non-concordant results for titrations indicate low practical skill levels and limit marks in AO3(i)
- Inaccurate colorimetry data and resulting poor calibration curves – indicates low practical skill levels in AO3(i)
- A restricted range of tests for qualitative analysis, poor presentation of results and inferences drawn: limits marks in AO1 and AO3(ii)
- Weak links between the concepts of bond breaking and making, the calculation of theoretical enthalpy changes and the overall practically determined and calculated enthalpy changes: limits marks in AO2.
- Weak evaluations which are often more a comment on practical inexperience than a detailed consideration of qualitative and quantitative errors – limits marks in AO3(ii).

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.