



General Certificate of Education

Applied Science

8771/8773/8776/8777/8779

SC13 Colour Chemistry

Report on the Examination

2010 examination - June series

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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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This is a well established unit in a number of centres and the approaches adopted allowed good access to the higher mark bands. This can be a demanding unit in terms of the scientific background to certain elements of the work required, and candidates benefit from guidance from centres in the organisation of portfolios and the depth of study required.

Good portfolios were in evidence where a systematic approach was adopted, fully linked to the programme of study indicated by the Specification. High scoring portfolios clearly demonstrated thorough research into methods of extraction of natural plant dyes, a summary of methods, and their scientific basis. This followed through to the synthesis of synthetic dyes.

A detailed knowledge of the origins of colour in pigments used in oil based paints was seen only in the very best portfolios – but this is an important component of this aspect of the unit. The consideration of the ingredients of oil based paints and hiding power, similarly, was an area which many candidates treated too superficially and was only researched in sufficient depth by a small number of candidates.

There was evidence of good application of scientific ideas to the structure, intermolecular interactions and bonding relating to dye and fabric molecules this year, but it remains an area where the majority of candidates did not score well and would have benefited from developing a much more solid understanding of the scientific concepts involved.

Practical preparative work was often at a good or high standard and many, but by no means all, candidates also provided excellent evidence of dye application to the three chosen fabrics. Where candidates work in pairs or groups, however, it is imperative that each candidate is able to provide this evidence and to refer to it in subsequent evaluations. This is also true for hiding power tests, where evidence was omitted in a significant number of portfolios, but the work seemed to have been carried out. Many centres are now adopting more detailed investigations into dye uptake by fabrics including work on colour fastness during washing and the use of mordants; this is to be commended. Hiding power is more difficult to expand or extend, but there were some good methods evident in some centres based on work that could be related to commercial determination methods. Candidates should investigate these potentially more sophisticated methods rather than relying on a purely subjective test based on a black cross!

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

- A lack of research into workable methods for plant dye extraction and/or dye synthesis and/or no summary of methods: limits marks in AO1.
- Little scientific basis to the methods of extraction and preparation: limits marks in AO1.
- No consideration of the origins of colour in pigments or weak/incorrect science in this respect: restricts marks in AO1.
- Scientific knowledge relating to types of dyes, bonding and structure of dyes and fabrics is weakly considered and poorly applied: restricts marks in AO1 and AO3(ii).
- Observations from the dye applications and hiding power tests limited or even absent; observations lack clarity: this significantly restricts marks in AO3(i) and (ii).
- Modifications to the methods of extraction and/or synthesis are only weakly based in science and are not related to the evaluation of dye uptake: 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.