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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Applied Science 8771/8773/8776/8779

SC13 Colour Chemistry

Report on the Examination

2009 examination - June series

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Registered address: AQA, Devas Street, Manchester M15 6EX
Dr Michael Cresswell Director General

General Comments

The number of candidates entered for the portfolio units has again increased this year and many centres have continued to guide their candidates to achieve well. These units have generated much high quality work from centres. Credit should be given to both teachers and candidates in making considerable effort to meet the expected standards.

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The random sampling of accredited centres confirmed the value of the accreditation process - with centre marking being confirmed as being in line with AQA standards in most cases, but with a small number showing some "slippage" leading to loss of accreditation.

(The accreditation scheme is used were centres have demonstrated that they are able to mark to the required AQA standards. Under the scheme AQA will accept centre marks without the need to complete the moderation process.)

Portfolio issues

Portfolio construction remains a concern with some candidates, and it is evident that further centre guidance is needed. However, it is very important that centres continue to 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 their production as some candidates continue to produce unreasonably large portfolios.

For some units, it appears that the level of expectation of the quality of portfolio content and/or the outcomes that candidates are able 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, centres marks were deemed out of tolerance by the moderator and had to be reduced.

Some of the causes of overgenerous 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 aspects of the unit as required in the "Banner", in such cases work should assesses in line with the guidance given in section 9.2 of the teachers' guide
- Over-lenient interpretation of the assessment grids
- 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)
- Poor candidate skills in practical activities leading to a lack of precision and unreliability in results
- A lack of description by the centre assessor of 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 by the assessor and the portfolio evidence
- The inclusion of materials down-loaded from the internet either passed as the candidates own work or not referenced in the portfolio

As stressed at AQA standardising meetings held in autumn 2008, in communications sent to centres and in last year's Principal Moderators report, it is imperative that centres make it very clear to candidates that the incorporation of text downloaded from the Internet into portfolios is plagiarism and must not be tolerated.

Centres are reminded that many issues and points of guidance made in the 2008 Principal Moderators exam report are still valid and this remains a valuable source of information for centres seeking to improve there portfolios.

Unit 13 – Colour Chemistry

Most centres set tasks that allowed all the objectives to be accessed and allowing candidates to produce well structured portfolios. There are still some weaknesses apparent in candidates' levels of understanding, with the discussions of the reasons behind the differing uptake of dyes by the three fabrics tested proving particularly demanding. It was generally clear where students had benefited from a suitable approach to this theoretical part of the course, but, in other cases, there was an apparent underestimation of the level of approach needed to access the higher mark bands.

Good portfolios contain the following elements:

- Evidence of extensive research into, and a summary of, the methods available to extract a natural dye together with a firm scientific background of the method chosen
- Detailed consideration of the chemical structure and type of the dye selected for extraction
- Extraction of a natural dye, the production of a synthetic dye and application of the dyes to three fabrics. (In some centres it was noted that patterned or already dyed fabrics had been used to test dyes – this clearly makes judgements of effectiveness of dyes more difficult. Candidates should work with clean , white (or natural colour), undyed fabrics to obtain good results
- Completed accounts of the extraction or synthesis of the two dyes with observations and, where applicable, measurements to calculate yields. A wide variety of plant based natural dyes was in evidence this year. The synthetic dye frequently chosen was an azo dye, although this was not always obtained in a pure state and neither was the chemistry of the reactions well understood
- Detailed observations, measurements and comparisons of the dye uptake. This is increasingly supported by tests on fastness under different conditions with some interesting and innovative methods being suggested and used effectively
- Extensive evaluations of the dye uptake by the three fabrics related to fibre structures, the type of dye and an explanation of the intermolecular forces that act in each case. These evaluations include possible modifications of the methods to ensure higher yields and/or purity. This is frequently a weaker area, sometimes with little research apparent into methods that might increase the levels of natural dye extracted or steps that might be taken to ensure a higher yield of the synthetic dye. Careful centre guidance could pay dividends here
- Cost calculations for both dyes based on scaling up quantities, adjusting for the percentage yields obtained practically and a consideration of vessel sizes required for production

- Descriptions which demonstrate comprehensive knowledge and explanations of the origins of colour in pigments, the components (and their functions) of oil-based paints and the concept of hiding power. Fewer examples of the use of other base media such as PVA or white emulsion were seen this year, but some candidates still adopt this strategy and marks are limited accordingly. The origin of colour in pigments should incorporate a discussion of d-d electron transitions in transition metal compounds
- The use of suitable tests of the hiding power of the paint prepared. As with the fastness of dyes tests, some candidates realise the subjectivity of the simple observation methods and are developing semi-quantitative methods to support their initial observations. In these cases, the initial “black cross” approach is supplemented with experiments to test transmission or reflection of light

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.