



General Certificate of Education

Applied Science **8771/8773/8776/8779**

SC13 Colour Chemistry

Report on the Examination

2008 examination - June series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2008 AQA and its licensors. All rights reserved.

COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

General Comments

The award has continued to grow in terms of number of candidates entered and centres have continued to guide candidates to achieve well at AS level. The A2 award has generated much high quality work from centres. Due credit should be given to both teachers and candidates in making every effort to meet the requirements of the award, producing portfolios, in many areas, of a commendable standard of content, approach and presentation. Centre administration overall has been good. The centre accreditation scheme has allowed 94 centres for AS and 26 centres for A2 the opportunity to be freed from external moderation. Random sampling of these centres overall confirmed the value of and, unfortunately, in a very small number of cases, the necessity for, the process.

Portfolio issues

A number of centres were found to have marked candidates work too leniently and marks had to be reduced. There were a number of reasons for this inflated mark allocation, these are listed below (and explained throughout the report):

- 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”
- 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
- 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, lack of evidence in portfolios yet marks still allocated
- the inclusion of materials down-loaded from the internet

It is very important that centres guide candidates on portfolio construction, leaving opportunity for candidate flair and individuality. Centres are advised to monitor portfolios during production to see how they are developing. Some centres are continuing to produce unreasonably large portfolios running to over 300 pages per unit. These are really too large and represent an unreasonable amount of candidate effort. It also shows some lack of skill on the part of the candidate in selecting the most appropriate material to include and inappropriate guidance by the centre in allowing the candidate to produce so much work. At the other end of the scale some candidates submitted work that was very poorly organised making moderation difficult and some portfolios were very short containing little of the unit requirements, thus gaining very few marks.

Centres need to consider the assessment and moderation of candidates work during portfolio construction. AQA do not set out any requirements for portfolio construction. In order for assessors and moderators to award marks, it is much easier if the portfolio is structured in such a way that they can work through it and the matching assessment grid simultaneously. It is therefore easier if portfolio structure clearly matches the structure of the unit. Candidates and assessors should ensure that there is evidence in the portfolio for all banner requirements and all areas in the assessment grids. The level of response and the level of understanding, degree of autonomy and practical capability and quality of descriptive accounts shown will allow candidates to be awarded marks from the higher mark bands.

In order to substantiate marks, especially from the higher mark bands, it would be very helpful if assessors could add explanatory comments to the Candidate Record Form, or on any other suitable document, to describe the candidate's level of practical skills, awareness of safety procedures and degree of autonomy, especially in the areas marked # in the assessment grids. Without supporting evidence from the centre, moderators have only the candidates' written responses on which to base a judgement, and it can sometimes prove difficult to justify the centre's marks based on this evidence alone.

Whilst guidance through units is important for candidates, too much guidance, exemplified by all candidates doing the same activity, obtaining the same results and doing the same calculations, suggests over guidance by the teacher.

Allowing candidates to show autonomy in their work does not mean leaving them to do it alone, there is a middle way - helping candidates where they need help, and allowing them freedom – whilst monitoring their work to allow them to gain the higher marks. It is important that tutors ensure unit delivery programmes cover unit specification requirements and that candidates are fully aware of what they should include in portfolios to gain marks.

There are still a significant number of candidates from particular centres who produce portfolios with content that does not match what is required, often including too much material, material that is outside the brief for the unit or targeted at too low a level. Some centres have led candidates through work, which is not required by the specification. This has sometimes been of a good standard and represents considerable candidate effort but it gained no marks. In other cases, candidates included several examples of the same type of activity when only one is required. Where the various examples are of differing quality, this can have the effect of diluting overall standards and reducing marks.

Centres that plan to use published course materials or materials available on the internet must ensure that material chosen for candidate activity matches the AQA GCE Applied Science specification. Centres that follow a course targeted at other specifications or use published materials should establish that they are appropriate, either by checking the AQA specification or by liaising with an AQA portfolio adviser, if there are any concerns. To discover work is inappropriate at moderation is distressing for all concerned and very unfair on hard-working candidates who deserve or who are expected to achieve well.

As stressed at AQA standardising meetings, in communications sent to centres and in last years 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. Candidates sign their CRF to verify that the work is their own. To include work other than their own will be judged to constitute cheating and action will be taken. The assembly of a portfolio by simply downloading material and cutting and pasting it together is not acceptable. It is expected that candidates will use the internet but they should use it as a resource from which they construct their own portfolios by reading, understanding and re-working what they have found to suit their purpose. Candidates may find it helpful to download and use in their portfolios sets of data, photographs, diagrams and other similar items to support their work and this is not a problem providing it is adequately referenced. The unedited use of downloaded text in portfolios, credited as candidate work, is unacceptable. If centres fail to identify this during monitoring and final assessment, their entry could possibly be referred to the AQA malpractice unit and could have marks significantly reduced or even discredited. Moderators are experienced teachers and read many portfolios; they are aware of web-sites and can recognise text content where changes in style of writing are at variance with candidates own.

It is easy for moderators to identify downloaded text in portfolios and find its source using internet search engines.

In a number of portfolios this year there was clear evidence of candidates copying each others work, this work was also penalised. Centre assessors must work with the same vigilance as a moderator and assume that such work will be identified. A few centres were warned this year that some work was very similar to downloaded material. Moderators next year will be alerted to these centres and if the issue arises again, the centre can expect to suffer significant mark reduction and referral to candidate services for malpractice. This year an increased number of centres were referred to the AQA malpractice unit by moderators and candidate marks were significantly reduced as a result.

It is also worth noting that simple “search and replace” options may change the text or non-key words in places, but where the scientific content remains the same and has clearly not been reworked and applied in candidates’ own words, this remains an issue.

Administratively most centres sent mark sheets off (or sets of portfolios if 10 candidates or fewer) in good time. However some centres were very late. A number of centres forgot to include Centre Declaration Sheets and a significant minority forgot to send Candidate Record Forms signed by the candidate; some of these also had the candidate name or number missing, which again makes finding work more difficult, as both are needed for checking.

Some centres still use plastic wallets or poly-pockets. When not secured these are very slippery and removing and replacing material from them is time consuming and frustrating. The best way to submit final portfolio work is to use double or single treasury tags to secure portfolio pages with the Candidate Record Form and any centre assessment documents at the front.

The A2 Units – 7, 9, 10, 12, 13, 15 and 16

There are still some centres that seem to have failed to appreciate that Units 7, 9, 10, 12, 13, 15, and 16 are targeted at A2 level and are using assignments that are insufficiently challenging for candidates. Activities set at a limited level of challenge can restrict marks from the higher mark bands because candidates find difficulty matching the work to the areas required in the assessment criteria. It is essential that when awarding marks using the assessment grids, in order to gain good marks, candidates should have addressed the area concerned in some detail, not just a mention of it. It should be remembered that when candidates gain marks in the upper 40’s and above, they will be very good candidates who are likely to be gaining at least “B” or even “A” grades for the unit.

A2 builds on the work students are likely to have completed at AS level. Candidates will be at different levels of competence and understanding and centres should aim to build on candidate knowledge, capabilities and interests. The most appropriate school and local facilities should be used to extend AS work to A2 level. As an A2 award, students need to be challenged. The level of demand of an activity affects the level of response from candidates. It is important to match tasks with candidates capabilities so that they can access work and gain marks in an appropriate mark band range. There is a balance to be struck between challenge sufficient to be interesting and too challenging which can create barriers to student progress. For some units, it appears that the expectation of the quality or level of outcomes students are able to produce is set too low. It should be remembered that in mark band 4 there are descriptors that are used such as *clear* and *comprehensive*, these are important and marks should not be awarded from these mark bands where this is not the case.

In higher mark bands, candidates will be expected to produce logical reports which demonstrate sound scientific understanding applied well. The whole portfolio will demonstrate a personal view, which is coherent showing the ability to see relevant links between different aspects of candidate work. The best candidates and centres get this right, knowing their students well, understanding what the specification requires, providing assignments which match both and setting appropriately high expectations of what their students are able to produce. They rigorously identify and take action to prevent the use of non-authentic candidate work in portfolios.

Unit 13 – Colour Chemistry

Many candidates made good attempts to produce well structured portfolios for this unit, providing evidence of research into methods of extraction of a plant dye, the preparation of a synthetic dye and the making of a paint. Candidates then went on to use their researched methods to make their products, although a significant number made little reference to any research they had carried out or describe alternative methods.

Many candidates used their dyes on three different fabrics and tested their effectiveness.

The chemistry underlying the preparation of the synthetic dye was frequently covered well but centres are advised to remind candidates that the use of downloaded materials is not allowed. It appeared that some candidates had a tendency to use more downloaded material than the accepted use for diagrams, charts and data – and quotations of a few lines. The chemical nature of fabrics was also reasonably well described, high scoring candidates clearly explaining how and why different dyes are effective on different fabrics, including the use of mordants.

Centres should ensure that examples chosen for candidates to work on or study should be those that are likely to allow them to cover the areas required by the specification. In this unit, fabrics which dye well should be selected, dyes which work giving opportunities to obtain accurate results, using sensible methods and accurate equipment all help. Centres providing fabrics which are already dyed for candidates to try their dyes on is not good practice. To determine the effectiveness of dyes, un-dyed white fabric should ideally be used.

Most candidates prepared a paint, some providing very good background to the components of an oil-based paint and their function. Some centres simply mixed a pigment into oil and used this to test hiding power – this gave, not surprisingly, somewhat messy and unconvincing results. Some centres used commercially made “base paint” such as white undercoat or primer (or even PVA) into which they stirred pigments. These gave more effective results but the candidates had not really made the paint at all. The aim is for candidates to try to make a paint that more closely meets the composition of a commercial paint and try it out. If they want to compare this to a commercial paint that could prove a means of establishing the comparative hiding power of their paint but this is extending the specification slightly.

AO2 refers to the scaling up of production of dyes. Calculations of a varying level of accuracy and complexity were seen. Most candidates worked on the cost of the material they actually made and just made more. Few mentioned the energy costs involved.

No candidates followed the route of finding out about dye manufacture on an industrial scale by researching dye companies to look at the scale of their operation and relate it to their laboratory practical work. Such a line of approach, if well done, could help gain high marks in AO2.

Areas which were less well covered, but which are requirements of the specification, were those associated with the scientific background and explanations of dye uptake and fastness. This is a complex area of chemistry which needs firm levels of understanding by the candidates if they are to apply their knowledge to the dyes and fabrics used. There were some improvements in candidates' explanations of the origins of colour in paint, although, again, it is still an area for improvement.

Mark Ranges and Award of Grades

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