



## **General Certificate of Education**

# **Applied Science**

## **8771/8773/8776/8779**

**SC03      Finding out about Substances**

# **Report on the Examination**

*2008 examination - June series*

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## 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 AS Units – 1, 3, 4 and 6**

There are still some centres that have failed to appreciate that Units 1, 3, 4 and 6 are targeted at AS level and have used 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.

Some centres are using assignments that candidates find too challenging. Less able candidates find difficulty in accessing the work.

AS builds on the work candidates are likely to have completed at GCSE. Candidates will be at different levels of competence and understanding. Centres should aim to build on candidate knowledge, capabilities and interests. The most appropriate school and local facilities should be used to extend GCSE work to AS level.

The level of demand of an activity affects the level of response from candidates. It is important to match tasks with candidate capabilities so that candidates can access work and gain marks in an appropriate mark band. There is a balance to be struck between challenge sufficient to be interesting and too challenging, which can create barriers to candidate progress. For some units, it appears that the expectation of the quality or level of outcomes candidates are able to produce is set too low. Many centres get this right, knowing their candidates well, understanding what the specification requires, providing assignments which match both and setting appropriate high expectations of what their candidates are able to produce.

### Unit 3 – Finding out about Substances

Again, as last year, most centres made good efforts with this unit. Centres are reminded of the need to include 5 pieces of work (the 4 analyses and the enthalpy of combustion). A number of centres did not attempt 5 investigations and this automatically reduced the marks available for candidates. A number of centres guided candidates to carry out more than 5 activities. Whilst these may be interesting and teachers may wish to include these as a part of their teaching programme, if they have time, it is not a requirement of the unit and such additional work may very well detract from candidate effort in the required areas of this or other units. Centres should read the unit and its assessment requirements carefully and guide candidates to study these to an appropriate depth, remembering it is an AS unit. Candidates stand a better chance of gaining higher marks by fully covering the unit requirements, rather than by going outside it with work that cannot be given credit.

Ideally, for each analysis, candidates should learn the standard procedures and then use them for another purpose. Simply carrying out the analyses on known substances to see what the result is, is only half of the idea. Candidates should go on to identify unknowns as appropriate.

Candidates should consider where different types of analysis are appropriate and where their results have limitations – such as inorganic analysis, flame tests, or carbonate tests with acid, these only show what is there, not how much of it there is. Other limitations may involve consideration of the effects of low or high concentrations, the validity of flame test results through differing intensities and so on. It should also be noted that limitations are required for the qualitative tests. They should also find out where these tests are put to use in the work place: the specification gives some ideas as to possible areas for consideration.

Some centres approached this work through the context of a burglary or crime scene where evidence had to be collected and samples identified or muddled compounds that needed identifying. It is important that when using such scenarios that centres do not stray too far from good science, common sense and reality. Some centres carried out too many chromatography analyses and others failed to make adequate conclusions from colorimetry work.

Some candidates do not carry out their data analysis well. Where calculations are carried out it should be clear where values come from, what the stages of the calculation are, what the units are, what the significance of the calculated value is and if the calculated answer is reasonable.

Most centres carried out enthalpy of combustion investigations but some limited this to the use of practically obtained data to calculate the energy yield per gram or mole of fuel. To gain the highest marks it is expected that candidates will calculate the theoretical energy yield using bond energy values and relate this to their own values obtained practically. A few centres this year continued to misinterpret the unit requirements and carried out work on the enthalpy of neutralisation, which limited candidates' marks.

Where candidates carry out analyses or calculations it would be very helpful if assessors could indicate that the analysis findings and calculations are correct. Moderators do not know what should have been identified and do not have time to check all calculations.

## **Mark Ranges and Award of Grades**

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