



## **General Certificate of Education**

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

**SC10      Physics of Performance Effects**

# **Report on the Examination**

*2008 examination - June series*

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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 10 – Physics of Performance Effects**

There continues to be a wide range of levels of approach to this Unit. It was pleasing to see that many candidates actually had the opportunity to participate in the design and setting up of a lighting system for a performance. Such things as a school play, school prom, GCSE music evening or other public or internal performance were all appropriate.

The designing of a sound and lighting system was not well presented by many candidates. This ranged from the use of a CD player, through the established system in a small school hall to a complex system in a main event, none of these was strictly appropriate. The first needed little design, and the second was designed by someone else. What is required are reasonable designs using a number of speakers and lights (with appropriate controls) to work in a particular venue for a performance. The candidate does not have to execute the designs but they have to be appropriate for the venue and performance. It would be expected that the “design” is clear in portfolios. It would prove useful if as part of the design some kind of diagram showing features and dimensions of the venue were included. Onto this the candidate could add their proposed lighting system design and sound system design – these could of course be two separate diagrams. Annotations on the diagram would help. The design should be supported by written text explaining why equipment is in particular positions and reference should be made to supporting science based on the findings of the experimental work.

Some very good experimental work on sound was seen, actually working in the venue, in laboratories or outside. It has to be remembered that this is an A2 unit and some work seen was low level and less than that expected at GCSE.

Good work on light was also seen. Many candidates used photographic evidence and some made good use of accurate diagrams, measurements and drawings. Candidates sometimes made good use of appropriate GCE level resources for background science to support their explanations and calculations. Some of the work on coloured lights, filters, reflection and fabrics was not well presented demonstrating inconclusive experimental work and confusion in the minds of candidates. Candidates and centres are reminded that black copies of colour images lose the effect.

The links between the experimental work on sound and light and the design in the venue were not always well made. Some candidates made very good descriptions of the range of sound and lighting equipment that could be used, making good use of photographs or images from the internet. Candidates need to appreciate the difference between permitted use of images and photographs and the restrictions on the use of photocopied and downloaded text.

Most candidates had attended and then evaluated a performance. However many of these were simply accounts of what happened. The candidates clearly need to say what happened but they need to expand on this by explaining the outline design of the sound and lighting systems. They should explain how their use impacted on the performance and also bring into their explanations some of the scientific reasoning behind the effects produced.

Candidates attempted to cost the lighting system of the performance attended. Many made good efforts to do this. Some based this on the number of lights, their power, time used and cost per unit of electricity. Some estimates were appropriate; some were clearly inaccurate, ranging from a few pence to many hundreds of pounds for a short performance. Some candidates followed the route of costing the purchasing or hiring the equipment used. This approach is not precluded by the specification and many find this aspect interesting, however the specification on page 113 clearly targets the cost of the electricity to run the lighting system rather than the cost of the equipment itself.

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

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