



General Certificate of Secondary Education

**Applied Science (Double Award)
4861**

**APSC4 Using Scientific Skills for the
Benefit of Society**

Report on the Examination

2009 examination – June series

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General

A large number of centres still do not include the required risk assessments with each piece of work in this unit. Risk assessments are required for **all** work where a practical has been carried out even if there are no apparent hazards. The good practice developed in APSC3 should be carried through into APSC4, including completion of risk assessments for each investigation. Lack of a risk assessment for an investigation may result in a candidate not receiving credit for working safely in future series

Strand A: Monitoring Living Organism

Some nice examples of investigations were seen and centres are getting much better at studying the organism over an appropriate time period.

Generally this was done well although some candidates wrote their 'plans' in the past tense. A plan is an intention to carry out an experiment and should be written in the future tense. At Stages 2 and 3 the plan should be step by step and be clear enough to allow another person to follow it. This should include details of quantities, how to take measurements and how often. Annotation is essential for the guidance given with both the plan and monitoring of the organism.

Teachers should ensure that variables are changed so that the candidate looks at the effect of, for example, different fertilisers on plant growth or different temperatures on the growth of organisms for the food industry. Looking at one variable, for example the hatching and subsequent development of chicks, limits candidates to the lower stages since they cannot discuss patterns in results. Looking at the effect of a variety of different diets once hatched would allow access to all areas. The Information for Centres booklet sets out suitable investigations.

Strand B: Making a Useful Product

Annotation is essential for the amount of guidance given making the product and writing the word equation. One of the main problems still seen is that 2B6 is awarded without being related to the investigation carried out, which limits candidates to a maximum mark of 11. The factors chosen must be specific, for example, in a reaction to make zinc sulphate candidates could suggest increasing the concentration of the *sulphuric acid* or warming the *sulphuric acid*. The factors chosen must also be appropriate: only gaseous reactions are affected by pressure.

At Stage 3, the chemical equation must be correctly balanced and the correct formulae and format used. For example, ZnSO_4 should not be credited because the correct formula is ZnSO_4 . Sometimes credit was given for an equation that was incorrect. The equation should also be accompanied by an explanation of the type of reaction and this should be related to the reaction carried out. The equation alone cannot be given credit.

A number of centres are awarding marks in Stage 2 and Stage 3 even though Stage 1 is incomplete, for example, word equations or work on rates of reaction were not included. In these cases, maximum mark that can be awarded with some compensation from the higher stages is 5.

Strand C: Assembling an Electronic/Electrical Device

Generally there was clear annotation for making the device' although evidence was still missing for testing it. There must be evidence that the candidate has tested the device by including, for example, a comment or preferably, if appropriate, a table of results. Teacher annotation alone is not acceptable.

More centres are now correctly crediting the evaluation of the effectiveness of the device now rather than the experiment. However at Stage 3 there was sometimes too much leniency where very little evaluation had been credited. Some centres had awarded 3C2 for independently making the device even though alternative tests had not been suggested.

Strand D: Using Machines

An example of a machine and its use in the workplace must be provided in order for candidates to achieve more than 1 mark. Many were including lots of basic machines but these were not related to a use in a named workplace. For example, candidates discussed levers as machines, but should have gone on to say for example a spanner is an example of a lever and is used by a mechanic in a garage.

Some centres were awarding 2D1 for calculations alone or for the briefest mention of force multipliers. Preferably, this bullet point should be related to the machines studied at Stage 1 to help the candidates understanding.

2D2 was often credited without any mention of the required keywords. Candidates must discuss the effect of friction on machines including production of heat, energy wastage and the subsequent effect on the efficiency of the machine. For both 2D1 and 2D2 some centres were crediting just a couple of sentences.

Most candidates had completed an experiment to gain credit for 3D1 and carried out calculations. The calculations do need to be clearer. Candidates need to include the formulae they have used and give at least one worked example of each. A spreadsheet or table with calculations included were not credited unless it was clear that the candidate had carried these out themselves and shown understanding.

Mark Ranges and Award of Grades

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