



Coursework Information for Centres

2007/2008

**GCSE Applied Science
(Double Award: 4861)**

**GCSE Additional Applied
Science (4863)**

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Dr Michael Cresswell, Director General.



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1. General Information

Key Dates January 2008*	
Entries to be with AQA	21 October 2007
Centres receive all centre-assessment mark sheets/coursework mark sheets and moderator address labels	November/December 2007
Portfolio deadline	10 January 2008
Results published	13 March 2008
Last date for Enquiries About Results	14 April 2008

*For Additional Applied Science coursework assessment is available for **Unit 1 only** in January 2008.

Key Dates Summer 2008	
Entries to be with AQA	21 March 2008
Centres receive all centre-assessment mark sheets/coursework mark sheets and moderator address labels	March/April 2008
Portfolio deadline	15 May 2008
Results published	21 August 2008
Last date for Enquiries About Results	20 September 2008

Contact Points at AQA	
<i>For all subject and specification queries</i>	Jane Bryant (Subject Officer) Tel: 01483 477753 email: jbryant@aqa.org.uk
<i>To obtain publications</i>	AQA Logistics Centre (Manchester), Unit 2, Wheel Forge Way, Ashburton Park, Trafford Park, Manchester M17 1EH Tel: 0870 410 1036 Fax: 0161 953 1177 email: publications@aqa.org.uk
<i>For enquiries about entries</i>	entries@aqa.org.uk
<i>For key dates, administrative procedures, etc</i>	check the AQA website (www.aqa.org.uk)

2. Coursework Administration 2007/2008

<i>Entries to be with AQA</i>	21 October 2007 (January series) 21 March 2008 (Summer series) <i>You must submit entries for each centre-assessed unit as well as the examined unit. Failure to do so is one of the main causes for delay in moderation.</i>
<i>Marks for centre-assessed units to be with AQA and assigned moderator</i>	10 January 2008/15 May 2008
<i>Preparation for moderation</i>	<ul style="list-style-type: none"> • All the work must be ready for the moderator on 10 January/15 May, with no further annotation or other work remaining to be done when the sample request arrives. • Candidate Record Forms for all candidates should be filled in and signed by the candidates before the sample request arrives. • The Centre Declaration Sheet should be completed and ready to send with the sample.
<i>What to send to the moderator by the coursework deadline</i>	<ul style="list-style-type: none"> • The pink and yellow copies of the Centre Mark Form (or two copies of the EDI Printout) with marks for all candidates. • If you have 10 or fewer candidates taking a unit, send the work with the mark sheet. You should also include the completed Centre Declaration Sheet. • If there are more than 10 candidates for the unit, send only the marks. Your moderator will contact you to tell you which pieces they need to see. • The work of each candidate must be accompanied by a Candidate Record Form, signed by both the candidate and the teacher.
<i>What to do if you have not received moderator details by 1 January/1 May</i>	Contact Entries (see page 4) to ensure that AQA has received entries for your candidates for the coursework units.
<i>Where to find forms for 2008: Candidate Record Forms Centre Declaration Sheets Other information for centres (coursework form codes/lost coursework/private candidates etc)</i>	http://www.aqa.org.uk/admin/crf_appgcese_2008.html http://www.aqa.org.uk/admin/p_course_cds_2008.php http://www.aqa.org.uk/admin/p_course_crf_2008.php
<i>Unit entry codes:</i>	<p>Double Award: Unit 1: APSC1 Unit 3: APSC3 Unit 4: APSC4</p> <p>Additional Applied: Unit 1: AASC1 Unit 3: AASC3</p>

3. Portfolio Advisers

<p><i>Portfolio Adviser details</i></p>	<ul style="list-style-type: none"> • All centres registered with AQA for the specification will be allocated a Portfolio Adviser. Portfolio Advisers are all experienced moderators. Centres are advised early in the Autumn term of each year of the details of their Adviser for that year. Please note that a centre's Adviser for one academic year may not be the same person the next year. • Teachers who do not know the details of their Portfolio Adviser should contact the Subject Department (see page 4). • When you contact your Portfolio Adviser, please give them your centre number, and be very clear on the specification to which your query applies (Double Award or Additional Applied). • To maintain communications, a copy of any written advice the Portfolio Adviser has given your centre over the year will be sent to the moderator to inform his/her judgement. • A moderator who is also a Portfolio Adviser will not moderate work from any centres they advise.
<p><i>What can a Portfolio Adviser do?</i></p>	<p>Your Portfolio Adviser can:</p> <ul style="list-style-type: none"> • Advise on coursework, mainly by telephone or email. • Say whether or not suggested topics are suitable – eg whether they cover the specification, whether they're likely to give students access to all areas of the assessment grid, whether they're suitable for low-ability students. • Suggest other investigations that may be suitable. • Advise on how to carry out investigations in practical situations. This could include problems of organisation as well as those of supervision. • Advise on internal moderation procedures. It often turns out that problems concerning summer moderation can be traced back to poor or non-existent internal moderation. Centres should use published exemplar material to ensure that all teachers at the centre are marking to the same standard. • Confirm the arrangements for preparing material for the moderator.
<p><i>What can a Portfolio Advisor not do?</i></p>	<p>There are a number of things that are outside the remit of a Portfolio Advisor, and they may politely decline if requested.</p> <ul style="list-style-type: none"> • Portfolio Advisors do not allocate marks for coursework. They will not pre-judge what the moderator will decide: doing so could lead to conflict with the moderator's judgement. • Except in rare circumstances, Portfolio Advisors do not look at examples of students' work – primarily for the reason stated above. • Portfolio Advisors will not give opinions on work previously submitted for moderation, or on feedback forms after results have been issued. They can only advise on work not yet submitted for an examination. If you have queries or complaints about the moderation of work you should use AQA's Enquiry After Results service . • Portfolio Advisers will not normally go into a centre to discuss coursework issues. If you feel that you need someone to come into your centre, please contact the Subject Department (see page 4).

4. Resources and support from AQA

<i>Teachers' Guide</i>	<p>For each specification there is a Teachers' Guide, which may be downloaded from the AQA website:</p> <p>Double Award http://www.aqa.org.uk/qual/appliedgcse/new_sci_teach.php</p> <p>Additional Applied http://www.aqa.org.uk/qual/appliedgcse/adappscience_teach.php</p>
<i>Student Guide to Assessment</i>	<p>For each specification there is a Student Guide to Assessment, which may be downloaded from the AQA website. These include checklists that students can use to track their progress. The Guide for Additional Applied Science also includes a section on preparing the report for AASC3.</p> <p>Double Award http://www.aqa.org.uk/qual/appliedgcse/new_sci_teach.php</p> <p>Additional Applied http://www.aqa.org.uk/qual/appliedgcse/adappscience_teach.php</p>
<i>GCSE Applied Science Teacher Network Group</i>	<p>The Subject Department has set up a Teacher Network Group for the GCSE Applied Science specifications to enable teachers to share ideas and teaching strategies. The list of centres participating will be updated regularly, and there will be an annual despatch to group members.</p> <p>Teachers who would like to join the Teacher Network Group should contact the Subject Officer (details on page 4) for further information.</p>
<i>Ask AQA for Teachers</i>	<ul style="list-style-type: none"> • Ask AQA for Teachers is an easy to use online service that enables you to search for answers to questions. • Ask AQA is a web-based service, so it available 24/7. • Most questions are of a general nature, but more and more subject-specific questions are being added. If you cannot find the answer you require you can use the 'Ask a Question' facility to make further enquiries.

5. General Coursework Issues

<p><i>Why is annotation of students' work so important?</i></p>	<ul style="list-style-type: none"> • Clear annotation helps the moderator see where and why you have given certain marks, why and how you have used compensatory marking. It is especially important in ephemeral skills, such as Criteria A for APSC3. Your moderator wants to be able to agree your marking – comprehensive annotation on the work will make it much easier for them to do so. • Some teachers attach their own annotation grids to the front of their candidates' work, in addition to clearly annotating the work itself. This is often very helpful, although it is very important to make sure that the marks given match those on the CRF and Centre Mark Forms. • Do include copies of any worksheets, prompt sheets or instructions that you have issued to students.
<p><i>Can students submit their portfolios on disk?</i></p>	<p>There is no real reason why not – except that the moderator will need to be assured that the work is entirely that of the student, that the version on disk they are getting is the version that you saw and marked, and will need some evidence from you that you have seen it, marked it and made annotations as appropriate. To make sure that all this is clear, it would be preferable to print out the student's work and supply the moderator with a clearly annotated copy.</p>
<p><i>How should portfolios be presented to the moderator?</i></p>	<p>Every year, moderators spend huge amounts of time trying to sort out the work they've received from centres that have not presented the work clearly. Following the guidelines below will help the moderators immensely.</p> <ul style="list-style-type: none"> • The best way to present each candidate's work is to hole punch the top left hand corner of all sheets and tie them together securely with a treasury tag. • Please organise work so that the moderator can easily identify which work belongs to which candidate, and which work relates to which unit. • It is helpful to the moderator if work is presented in the order in which it appears on the Candidate Record Form. • Supply each unit's work separately – the units are moderated against different criteria, and a student may be sampled for one unit but not for the other(s). • Do not supply work in bulky folders or ring binders. If students have submitted their work in folders, please remove it from the folder. • Do not supply work as loose sheets in a plastic folder – there is a great risk of pages being lost or muddled. • Do not rely on paperclips to hold work together – these easily become detached, and the work then just becomes a pile of loose sheets. • Encourage your students to number each page of their coursework. • Remember to get your students to sign their Candidate Record Forms, and attach the appropriate form firmly to each portfolio. • Send the material by first class post only. Delays occur when moderators have to make special trips to the sorting office to collect/sign for parcels. • Please use sufficient postage, as incorrect postage will delay delivery.

<p><i>Filling in the Candidate Record Form</i></p>	<p>The correct version of the Candidate Record Form (see http://www.aqa.org.uk/admin/crf_appgcse_2008.html for the 2008 forms) should be completed and attached to each student's portfolios by the coursework deadline so that there is no delay once the moderator has called for the sample. For each one, please check that:</p> <ul style="list-style-type: none"> • the student has completed and signed the declaration to authenticate the work as their own • the marks are recorded accurately and clearly, and the arithmetic is correct • the student's total mark on the CRF is identical to the mark recorded on the Centre Mark Form • the title of the student's work in each area is given – it is not always clear from the titles students give which piece of work belongs to which section of the specification, and work is often supplied in a different order from that on the CRF, which can make it very difficult for the moderator to work out which marks are being given to which area • the marks for all the criteria for all the pieces of work are given, not just the best marks (Double Award Unit 3) – moderators need to know where marks have been given so that if they can not agree with the mark for one strand they can see where else to look • penalties have been applied correctly. <p>If the CRF is not supplied or has not been signed, you will be chased.</p>
<p><i>What about use of material downloaded from the internet?</i></p>	<p>There is no reason not to use material from the internet – it is an extremely useful resource. However, there must be evidence that the student has used the material (eg interpreted it in their own words, highlighted or annotated it in some way); simply presenting downloaded web pages without such evidence will not gain any credit.</p>
<p><i>How does compensatory marking work?</i></p>	<ul style="list-style-type: none"> • This is an area that often causes confusion. Marking of the stages is hierarchical: marks in Stage 2 should not be awarded unless a student has fulfilled all of the criteria for Stage 1; similarly, a student should not be awarded Stage 3 marks unless all of the Stage 2 criteria have been fulfilled. • If a student has missed up to a maximum of two criteria at Stage 1 or Stage 2 this may be compensated by work completed at the stage above. However, the maximum mark that may be awarded in such cases is the maximum mark available at the lower stage. • Any compensatory marking should be justified by clear annotation on the student's work.
<p><i>Use of Templates</i></p>	<p>Generally, templates and writing frames are not acceptable for students working at higher levels – these students would normally be expected to work in a more unstructured frame.</p> <p>The one exception to this is in the preparation of risk assessments, where it is appropriate for students to use a headed risk assessment template.</p>

6. Double Award Applied Science Principal Moderators' Report Summer 2007

General comments

Activities

Most centres undertook a good range of activities that covered the specification, although a small number of submitted tasks were not appropriate. There were some excellent examples of activities set in interesting vocational contexts, which candidates clearly found interesting.

Assessment

In all three units there were instances of centres being over-generous in their marking, especially at the higher end. Assessor annotations, showing where and how marks had been awarded, were generally evident, but some centres still need to address this issue. It is imperative, especially in APSC3 and APSC4, that teacher annotation clearly shows how much guidance a candidate has been given and the level of independence at which he/she is working.

There was some misinterpretation of the requirements of the specification in APSC3 and APSC4.

There was evidence that many centres had carried out thorough internal standardisation, which was very encouraging.

Penalties for incomplete portfolios were correctly applied in most cases, although it was disappointing to see a relatively large proportion of centres submitting incomplete material. Whilst it is not a requirement that every candidate completes every strand of APSC3, to do so allows candidates access to higher marks and is strongly encouraged.

Candidates may submit more than one piece of work for each strand of APSC3. For example, the section on Chemical Analysis Techniques may include a piece on qualitative and a piece on quantitative analysis and marks may be taken from both pieces. However, there was some confusion where part of the marks for a strand were taken from two pieces of work. Each individual mark must come from the same piece of work – eg the mark for Strand A in the above example must come from either the qualitative or the quantitative piece, but not some from each.

Presentation of the work to the moderator

Work was generally well presented. Plastic wallets and cardboard folders were in evidence, but most centres followed the guidance to simply hole punch and hold candidates' work together using treasury tags. The use of paper clips or staples to hold work together is to be discouraged, as work can easily become detached and muddled. Few centres sent in class work or theory work that was not marked or part of a candidate's assessed work.

Most centres sent their Centre Mark Forms and samples promptly (some were even early, which did help with the moderator workload). However, a number were very slow in submitting marks and sending the sample requested, which severely hindered moderation.

Generally, the Centre Declaration Sheets and Candidate Record Forms were completed correctly. Some centres, however, did not complete the 'title of candidate's work' sections, did not fill in all the marks on the grid, or gave marks on the CRF that did not tally with the mark on the CMF or the candidate's work. It is important to complete these forms correctly as they help the moderator navigate the work and find out, quickly, where all the marks are.

Further support

Teachers are encouraged to make full use of the guidance available from AQA, which includes:

- The Teachers' Guide for the specification
- The Student Guide to Assessment
- Coursework Information for Centres 2007/2008 (sent out by the Subject Department at the beginning of each academic year)
- Portfolio Advisers
- Teacher Support Network
- Ask AQA for Teachers

Unit 1 Science in the Workplace**Strand A: The Use of Science in the Workplace**

Guidance clearly states that 'a range' should be **at least three** organisations. A small number of centres gave full Stage 1 marks or more for a study of only two organisations. In a minority of centres candidates were confused as to whether an organisation was local, national or international – and some centres had allowed candidates to choose almost identical organisations (eg three different pharmacies).

At Stage 2, the qualifications and skills listed did not always relate to the actual jobs within the organisations studied.

The description of location should not just be a map: an actual description is needed (accompanying a map is even better). To attain Stage 3, there should be a full explanation of why the organisation is located where it is. This should be very specific to the organisation and the area, and not simply consist of vague statements such as 'good transport links'.

The in-depth study required at Stage 3 should be distinguishable from the other two organisations by the amount of detail included.

The amount of material downloaded from the internet could be a problem. Downloaded material can be given credit only if the candidate has used it – preferably by interpreting in their own words. A few centres encouraged candidates to add their own comments and annotations to downloaded pages, where they had also highlighted text – this was very nicely done in some instances. However, much unedited material was marked or annotated by the internal assessor.

Strand B: Working Safely in Science

In general, centres have followed the guidance that there must be thorough coverage of all three aspects of the specification (hazards, fire safety and first aid) in the school or college laboratory to achieve Stage 1. This strand is easier to mark than in the old specification, and there was far less generosity of marking than in previous years. Centres are reminded, however, that risk assessment is now included in the 'hazards' section.

A second workplace needs to be studied to achieve marks at Stage 2, and the same areas of the specification as listed for Stage 1 should be covered. Some centres were giving Stage 2 marks where none of the specified hazards had been discussed for the workplace.

Candidates capable of achieving high marks should be given opportunities to undertake some independent work, rather than just completing worksheets and pro-formas (although these can direct less able candidates very well).

As in Strand A, centres must be very careful to ensure that downloaded material, with no evidence that a candidate has used it, should not be credited.

Strand C: Research and Communication

This section was generally assessed well and in line with AQA expectations: candidates who had done very little work achieving 1 mark, those using several sources of information 2 and those who had used many sources and showing good understanding being awarded 3 marks. There were a few instances of candidates doing very little and scoring low marks for Strand A and Strand B but still being given 3 marks for Strand C. This is not acceptable. It should also be noted that, to achieve 3 marks in this strand, candidates must clearly identify their sources of information.

Unit 3 Developing Scientific Skills

Strand A: Planning and Following Instructions

Teacher annotation in this strand is vital to show the moderator how much guidance a candidate has been given.

In most cases, risk assessments were specific to the tasks undertaken, although there was some confusion between 'hazard' and 'risk'. The amount of guidance given in preparing the risk assessment is not the only factor to be taken into account when marking: a risk assessment must also be complete, comprehensive and include all risks associated with the equipment and materials used in the task.

To achieve Stage 3 marks, the task must be comprehensive so that 3A.2 and 3A.3 are covered. Simple investigations would not allow access to these marks.

Strand B: Obtaining Evidence by Experimenting

In a number of instances, candidates were awarded marks for headings and units in pre-prepared tables, which they should not have been.

There was some confusion in awarding marks for repeats. At Stage 2, a comment from the teacher is sufficient for the marks, unless no repeats have been done, in which case the candidate should say why repeats were unnecessary. At Stage 3 a comment from the candidate is required, along with clear annotation from the teacher to state that the candidate repeated their measurements independently.

Graphs with lines of best fit were generally good, although a small number of centres awarded marks for computer-generated graphs, or for work with no graph (and no compensatory marking from Stage 3). This is the only instance in the specification where a mark in Stage 3 can be awarded if Stage 2 is incomplete, but centres must follow the guidance (Teachers' Guide, page 40) very carefully.

Strand C: Analysing and Considering Evidence

Generally, marks in this section were close to the AQA standard. Some centres awarded marks in Stage 2 where there were no calculations or, conversely, awarded marks for calculations alone. To award 3C.2 calculations must be sophisticated and consistent, and there must be evidence from the candidate (teacher annotation is not sufficient). Marks should not be awarded for simply substituting numbers into an equation that has been provided.

Strand D: Evaluating Evidence

Occasionally marks were awarded for generic statements that were not creditworthy (eg 'it went well' or 'I could repeat it'). To award 2D.2, the improvements suggested **must** be justified, and at Stage 3 a detailed discussion is required, with explanations rather than a simple list of strengths and weaknesses.

Strand E: Vocational Application

Generally, if the entire investigation was set in a vocational context, this was covered well. However, some centres tagged the vocational application on at the end of an investigation, and therefore did not give candidates as much opportunity to achieve the marks. At Stage 2, a specific workplace should be mentioned rather than a general one.

Unit 4 Using Scientific Skills for the Benefit of Society

Very few candidates were entered for this unit. Of the few portfolios seen, other than misinterpretation of the marking criteria, marking was generally in line with the AQA standard. The main concern was that very few candidates completed a risk assessment for each task. Centres are reminded that this is a requirement of the specification.

Monitoring Living Organisms

There was misinterpretation in the marking of 1A.1. Candidates should write their plan in the future tense (ie not simply write what they have done), and any 'plans' written in the past tense will limit a candidate to a maximum of 6 marks.

Teacher annotation is imperative to show the guidance given in preparing the plan and monitoring task.

The time scale of the monitoring period should be appropriate to the organism studied.

Making a Useful Product

Teacher annotation to show the amount of guidance a candidate has received in preparing the sample and writing the equations is vital. Teachers should check that equations and calculations are correct and complete before awarding marks – in a number of cases marks were awarded for unbalanced equations or incorrect calculations. There was some confusion in distinguishing between 'give' or 'state' (Stage 1), 'describe' (Stage 2) and 'explain' (Stage 3) the uses of a product and factors that affect the rate of reaction.

Assembling an Electronic/Electrical Device

Teacher annotation is required to show how much guidance has been given in making the device. To award 1C.2, 2C.2 and 3C.2 there must be evidence from the candidate that they have tested the device – a results table or some sort of discussion. It is important to remember that, for 2C.4, candidates must evaluate the effectiveness of the device they have made, **not** how well their experiment went.

Using Machines

Generally, Stage 1 and Stage 2 marks were given appropriately. However, at Stage 3, candidates need to show at least once how they have used the equations to carry out the calculations before they can be awarded the marks for 3D.2

7. Notes for APSC1/AASC1 – Science in the Workplace

<p><i>Skill Area A</i></p>	<ul style="list-style-type: none"> • Base this activity on local organisations, if possible, as this will be more relevant for students. • This activity could be a literature or internet survey, although students will find visits to, and contacts with, local industry and business more relevant. • ‘A range’ of organisations means at least three. If only two organisations are studied the maximum mark available, even with compensatory marking, is 3 (top of Stage 1) • The three companies in the range should be one local, one national and one international, and should reflect a range of scientific jobs, uses, etc. • To obtain marks in Stage 2, the qualifications and skills listed must relate to the jobs within the organisations studied, not to work in science in general. • The description of location (2A.2) should not simply be a map or an address. There should be a description in words – accompanying a map is better. • The explanation of location (3A.2) should be specific to the organisation and the area, stating why the organisation is located where it is. Vague statements such as ‘good transport links’ are not sufficient to gain the mark. • The Stage 3 criteria refer to one of the organisations used at Stages 1 and 2. • Criteria 1A.1 to 2A.5 may be awarded 1 mark each. • At Stage 3, if both criterion 3A.2 and criterion 3A.3 are met then 9 marks may be awarded. Criteria 3A.4 and 3A.5 attract 1 mark each. • Examples of the effects on the local environment (3A.5) include pollution (light, noise, etc), social effects and economic effects. These could be positive as well as negative effects. Students working at this level would be expected to provide more than just a list – the criterion asks for a description.
<p><i>Skill Area B</i></p>	<ul style="list-style-type: none"> • To complete each stage of this report and obtain maximum marks students must address each of the three categories listed in the specification: <ul style="list-style-type: none"> – hazards and risks – first aid – fire prevention although greater emphasis could be placed on one of the areas. • Note that risk assessments should be covered in the ‘hazards’ section. • Worksheets and pro-formas can help to direct less able students but will restrict the higher ability students, who need to be able to show some independence of working to attain in the higher stages. • A student who has not reported on the school or college laboratory can not obtain a mark of 5 or above (ie is limited to the top of Stage 1), regardless of the amount of work on another workplace. • To reach stages 2 and 3 students should consider an alternative workplace or workplaces. • The school/college prep. room, or the laboratory at another school or FE college, are not acceptable ‘alternative’ workplaces. • To obtain marks in Stage 3 students should appreciate the similarities with and the differences from the school/college situation.

<i>Skill Area B (cont.)</i>	<ul style="list-style-type: none"> • At Stage 1, 1 mark may be awarded for some basic research, and then 1 mark given each for the three categories. • A student cannot obtain a mark of 5 or above (ie into Stage 2) unless he or she has included a report on a scientific workplace other than the school laboratory. • At Stage 2 students may be awarded 5 marks for basic research on the issues. One further mark may be added for each of the three categories, to take the total to 8. • To achieve marks of 9 or above the report must include a comparison of the similarities and differences between the school/college and the workplace. Comparison in each of the categories will take the marks through 9 to 11. • This might be a good area to start practising preparation of risk assessments in preparation for Unit 3 and Unit 4.
<i>Skill Area C</i>	<ul style="list-style-type: none"> • A student's ability to research and communicate is assessed across the portfolio as a whole (not any one particular area), using the assessment evidence grid. • There is a total of three marks available. • To make a mark at Stage 3 secure, students should clearly identify their sources of information (eg in a bibliography) and should note what they have done with them. • Students who score low marks for skill areas A and B are very unlikely to achieve 3 marks for Skill Area C. • This is the only unit where research and communication is assessed. • Compensatory marking is not appropriate in this skill area.
<i>What penalties apply in APSCI/AASCI?</i>	<ul style="list-style-type: none"> • Students who do not submit work for 'The Use of Science in the Workplace' should be awarded zero for that strand. Similarly, if no work is submitted for 'Working Safely in the Workplace' the mark for that strand is zero. • Teachers are encouraged to use the optional record forms shown on page 109 of the Teachers' Guide to track a student's progress. • Students could also use the checklists in the Student Guide to Assessment to check their own progress.

Summary of Guidance on Applying Marks for APSC1/AASC1

Notes on the allocation of marks in each stage of the assessment evidence grid are given in brackets at the relevant point

Stage 1		Stage 2		Stage 3	
<p>1A. Candidates should be able to:</p> <p>1A.1 produce a simple study on a range of organisations that use science</p> <p>1A.2 state the products made or services provided</p> <p>1A.3 identify the jobs of those employed.</p> <p style="text-align: right;">(1 mark per point)</p>	<p>2A. Candidates should be able to:</p> <p>2A.1 identify organisations as local, national or international</p> <p>2A.2 describe their location</p> <p>2A.3 describe the products made or services provided</p> <p>2A.4 describe the jobs and qualifications of the employees and how they use science</p> <p>2A.5 describe the types of skills scientists need in addition to their qualifications, and a range of careers that are available in science.</p> <p style="text-align: right;">(1 mark per point)</p>	<p>3A. Candidates should be able to:</p> <p>3A.1 produce an in-depth study of one particular organisation</p> <p>3A.2 explain its location</p> <p>3A.3 describe the products made or services provided and explain their importance to society (3A.2 and 3A.3 combined: 1 mark)</p> <p>3A.4 give a detailed account of the skills and qualifications needed by scientists who work there (1 mark)</p> <p>3A.5 describe the effect on the local environment of the organisation (1 mark)</p>			
<p>1B. Candidates should be able to:</p> <p>1B.1 carry out research into working safely in the school or college laboratory (1 mark), including:</p> <ul style="list-style-type: none"> – hazards and risks and their assessment (1 mark) – first aid (1 mark) – fire prevention (1 mark) 	<p>2B. Candidates should be able to:</p> <p>2B.1 carry out research into the issues of working safely in a workplace that uses science or scientific skills (1 mark; NOT school), including:</p> <ul style="list-style-type: none"> – hazards and risks and their assessment (1 mark) – first aid (1 mark) – fire prevention (1 mark) 	<p>3B. Candidates should be able to:</p> <p>3B.1 carry out research into the issues of working safely in a scientific workplace and compare these with the school or college laboratory, including (no marks here for the research as it has already been done):</p> <ul style="list-style-type: none"> – hazards and risks and their assessment (1 mark) – first aid (1 mark) – fire prevention (1 mark) 			
<p>1C. Candidates should be able to:</p> <p>1C.1 use a limited range of sources and information to present findings in their portfolio (one or two sources: 1 mark)</p>	<p>2C. Candidates should be able to:</p> <p>2C.1 use a range of sources and information to present findings clearly in their portfolio (three sources: 2 marks)</p>	<p>3C. Candidates should be able to:</p> <p>3C.1 identify and use a wide range of sources and information to present findings clearly and logically throughout their portfolio (more than three sources: 3 marks)</p>			

8. Notes for APSC3 – Developing Scientific Skills

<p><i>Appropriate tasks</i></p>	<p>The following tasks have been used successfully in recent portfolios. All were set in a clear vocational context throughout, which enabled students to achieve marks in all stages of the assessment grid.</p> <p>Investigating Living Organisms</p> <ul style="list-style-type: none"> • The effects of different salt solutions on turgidity of onion cells (in the context of food preparation and preservation). • The effect of different growth conditions on microbes in milk when making yoghurt (food standards context). • The effect of different mouthwashes on growth of microorganisms (dental hygiene context). • The effect of different antibiotics on microorganisms (in the context of preventing spread of infection in hospital). • The effect of various antiseptic wipes (in the context of food hygiene). • The effect of different growth conditions on yeast cultures (in context of improvements in bread making in a local bakery). <p>Using Chemical Analysis Techniques</p> <ul style="list-style-type: none"> • Qualitative tests for ions. Contexts seen: forensic (analysis of substances at a crime scene), agricultural (analysis of soil samples to find best growing conditions) and environmental science (analysis of soil samples to identify contamination). • Investigation of acid rain using volumetric techniques (environmental science context). • Analysis of concentration of various vinegars or acidity of various fruit drinks (quality control/trading standards contexts). • Titrations of acid samples (in medical context of finding treatments for stomach acidity). • Titrations of various drain cleaners (NaOH concentrations) in context of effectiveness in hygiene. <p>Investigating Properties of Materials</p> <ul style="list-style-type: none"> • Electrical properties of materials/metal wires and their uses in different situations (eg best wiring for school computer network, wiring for use by ‘roadies’ on a concert tour). • Specific heat capacity of various metals (context of designing cooking pans). • Tensile strength of various plastic bags (context of supermarket buyer).
<p><i>The importance of vocational context</i></p>	<p>The importance of the vocational context cannot be over emphasised. It is advised that the investigations are set using a ‘real’ situation, which will enable students to more easily obtain marks in Strand E. Students should be able to clearly relate their work to the ‘real’ situation in order to explain the use of their laboratory investigation.</p>

<p><i>What work should go in a student's portfolio to the moderator?</i></p>	<ul style="list-style-type: none"> • Any work from which a mark has been taken and put in the assessment grid on the CRF, even if it is not the best mark for the strand and therefore might not contribute to the overall mark, must be included. • Do not only send the work for which the best mark was given. If, for example, a student's best marks came from only one or two of the investigations (eg Chemical Analysis Techniques) and only this work was sent to the moderator that portfolio would be incomplete (an investigation is missing) and a penalty would be applied – even though the student had in fact carried out all the work required. • If a moderator cannot agree the best mark, he or she will look for other marks to agree with – and if there is no work to back up the marks a penalty might be applied.
<p><i>Skill Area A – Planning and Following Instructions</i></p>	<p>Risk assessments</p> <ul style="list-style-type: none"> • Risk assessments should include all the relevant risks in the activity. • Students need to be clear on the difference between hazard and risk. • A maximum of 2 marks may be awarded for criterion 1A.1 if the risk assessment is comprehensive. • An assessor comment stating the level of guidance given is essential in helping the moderator assess the pieces of work. • The amount of guidance given in preparing a risk assessment is not the only factor in achieving Stage 3 marks. Risk assessments must be comprehensive as well as done independently. (Sources of research such as 'Hazcards' are acceptable.) • Up to 2 marks may be awarded for criterion 2A.1 if the risk assessment is comprehensive. One mark may be awarded for each of criteria 2A.2 and 2A.3. • Giving an example to follow (eg the completion of one horizontal row including a substance to be assessed, the hazard, risk and control measure) may be considered as 'some guidelines' at Stage 2. • 'Clear guidelines' (Stage 1) could be considered as the above, plus supplying all the materials/activities to be 'risk assessed'. • If the risk assessment at Stage 3 is complete 2 marks may be awarded for 3A.1; if it is not complete then only 1 mark should be given. <p>Following instructions and use of equipment</p> <ul style="list-style-type: none"> • To ensure that it is clear how a student has achieved the mark for 'following instructions' it is essential to have assessor annotation indicating a particular stage (similarly for 'the use of equipment'). • Up to 2 marks may be awarded for 1A.2 if the student has followed instructions for carrying out the experiment. • The activity must be complex enough for the student to be able to demonstrate their abilities. A very simple task will not give opportunities to achieve 3A.2 and 3A.3, so even a good student might not achieve Stage 3 for all activities.

<p><i>Skill Area B – Obtaining Evidence by Experimenting</i></p>	<ul style="list-style-type: none"> • Up to 2 marks may be awarded for each of criteria 1B.1 and 1B.2. • To achieve 2B.1 ‘careful and accurate measurements’ should include the appropriate number of decimal places, and ‘observations’ should include the appropriate descriptive detail. • Students must recognise the necessity for repeats to be awarded the mark for 2B.2. If it is not necessary to repeat a measurement/observation, a suitable comment made by the student to explain this will obtain the mark. • To achieve the first mark for 3B.2 the student must recognise the need for repeats independently (teacher annotation is not sufficient here). • Recording results accurately in tables (2B.3) will allow students to achieve 7 marks. The eighth mark may be awarded if an accurate graph is produced as a result. • Recording results ‘accurately’ includes using a suitable table and the correct units. To achieve Stage 3 students should be able to do this consistently. Note that the mark should not be given if students have simply filled in a pre-prepared table in which the units have been given. • Students should produce at least one hand-drawn graph to demonstrate that they can select appropriate scales and plot points for themselves. If it is not appropriate to draw a graph of the results, or if a graph has not been completed where it is appropriate, then the maximum mark that can be achieved for that activity is 10, because criteria 2B.3 and 3B.3 could not be achieved completely. Teachers should ensure that within the different practical activities undertaken there are sufficient opportunities for drawing graphs. This is the only area in the specification where compensatory marking will allow a student to progress to a higher level (see Teachers’ Guide page 40). • Stage 3 marks are awarded for consistency and independent working. Consistently accurate measurements (3B.1) will receive 1 mark. • Students should independently recognise the need for repeats to receive the second mark for 3B.2. • 3B.3 may be awarded if the student has independently recorded and presented the data appropriately. Units should be given correctly and consistently in table headings (not at various places within the table), and data should be presented consistently to the same number of decimal places throughout.
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<p><i>Skill Area C – Analysing and Considering Evidence</i></p>	<p>Patterns and relationships</p> <ul style="list-style-type: none"> Students should comment on trends or patterns in results to access Stage 2, and should be able to identify a numerical relationship between variables to achieve Stage 3 (3C.1). <p>Calculations</p> <ul style="list-style-type: none"> A maximum of 4 marks may be awarded if both 1C.1 and 1C.2 are fully achieved. ‘Simple calculations’ (stages 1 and 2) include such procedures as averages, percentages and substitution into equations. Simple calculations that are carried out consistently and accurately may be awarded up to 2 marks for 2C.2. ‘Sophisticated techniques’ (3C.2) include rearranging equations and calculations of reacting quantities and percentage yields. There must be evidence from the student that he or she is capable of rearranging equations – teacher annotation is not sufficient. At Stage 3, manipulation of data (3C.2) may be awarded up to 2 marks, depending on consistency and accuracy. Teachers should take care to check that calculations are correct before awarding the mark. Calculations of resistance from voltage and current cannot be classified as ‘sophisticated techniques’ if there is no evidence that the student has rearranged an equation. Marks should not be awarded for substituting numbers into an equation that has been provided. <p>Conclusions</p> <ul style="list-style-type: none"> At Stage 2, correctly identifying and explaining patterns within the data (2C.1) receives 1 mark. Students must draw conclusions consistent with the evidence (criterion 2C.3) to achieve the eighth mark. Students should be able to explain their conclusions by, perhaps, comparing their findings with literature values to achieve the twelfth mark (3C.3).
<p><i>Skill Area D – Evaluating Evidence</i></p>	<p>Evaluation</p> <ul style="list-style-type: none"> Students should be taught how to evaluate by asking questions such as ‘What went well and why?’ ‘What did not go well?’ ‘What could I do to get more reliable data when carrying out the investigations?’ ‘What are the strengths and weaknesses of the technique?’ Basic comments about how well the experiment went and how ‘good or not’ the results were are not worth more than 2 marks (1D.1). A comment such as ‘my experiment went well’ is not worth any marks. Even at Stage 1, students need to make comments specific to the activity. Generally, to access marks at Stage 2 and Stage 3, students should explain how results could be improved. Students should be able to discuss the strengths and weaknesses of the technique or their method of completing the investigation (3D.1) for 5 marks.

<i>Skill Area D – Evaluating Evidence (cont.)</i>	<p>Suggestion for improvement</p> <ul style="list-style-type: none"> • The suggestion for improvement in 2D.2 must be accompanied by a reason to receive 4 marks. If there is no justification or explanation for the improvement, the maximum mark is 3. Simple suggestions such as ‘repeat it’ or ‘work more carefully’, given without qualification, are not creditworthy. • A description of the improvements that could be made and how these would allow the collection of more reliable data is required to obtain 6 marks (3D.2). The justification for these improvements would attract the seventh mark.
<i>Skill Area E – Vocational Application</i>	<ul style="list-style-type: none"> • It is easier for students to gain these marks if the whole investigation is set within a vocational context. • Students should appreciate the vocational significance of the activity. • At Stage 1 the student should be able to link the activity with its use in a scientific workplace for 2 marks. Simply naming the workplace is worth only 1 mark; it is the link that brings the second mark. • At Stage 2 students should be able to describe the use of the activity (3 marks) and link it to a specified workplace (4 marks). • At Stage 3 students should be able to explain how the results of their investigation might be used (5 marks) and what the benefits of the results obtained may be to the organisation or to society (6 marks). • The seventh mark may be awarded to those who are specific about the types of organisation that would use the technique.
<i>What penalties apply in APSC3?</i>	<ul style="list-style-type: none"> • Work must be submitted in all three areas mentioned in the banner of the grid. • For each skill area missing the total of the best marks for criteria A, B, C, D, E should be reduced by one-third. It is therefore important to encourage candidates to provide some work in all three areas, even if the mark for that particular experiment/task is low. • Teachers are encouraged to use the optional record forms shown on page 110 of the Teachers’ Guide to track a student’s progress.

Summary of Guidance on Applying Marks for APSC3

Notes on the allocation of marks in each stage of the assessment evidence grid are given in brackets at the relevant point

Stage 1		Stage 2		Stage 3	
1A.	Candidates for each investigation should be able to:	2A.	Candidates for each investigation should be able to:	3A.	Candidates for each investigation should be able to:
1A.1	carry out a risk assessment, given clear guidelines (1–2 marks)	2A.1	carry out a risk assessment, given some guidelines (1–2 marks)	3A.1	independently carry out a risk assessment (1–2 marks)
1A.2	follow instructions, with guidance, in simple standard procedures, one step at a time (1–2 marks)	2A.2	follow instructions in standard procedures, with little guidance for the more complex tasks (1 mark)	3A.2	independently follow instructions in standard procedures (1 mark)
		2A.3	select and prepare appropriate laboratory equipment and use it correctly and safely (1 mark).	3A.3	select and prepare laboratory equipment of appropriate precision and use it correctly and safely (1 mark)
1B.	Candidates for each investigation should be able to:	2B.	Candidates for each investigation should be able to:	3B.	Candidates for each investigation should be able to:
1B.1	make simple observations and measurements (1–2 marks)	2B.1	make careful and accurate measurements and observations (1 mark)	3B.1	make careful and accurate measurements and observations consistently (1 mark)
1B.2	record them in tables and in charts or graphs with guidance (1–2 marks)	2B.2	recognise with some guidance when it is necessary to repeat measurements and observations (1 mark)	3B.2	independently repeat measurements and observations, when necessary (must be a student comment: 1–2 marks)
		2B.3	record results accurately in tables and graphs where appropriate and using lines of best fit where appropriate (1–2 marks)	3B.3	independently record and present data in an appropriate form (ie no guidance: 1 mark)
1C.	Candidates for each investigation should be able to:	2C.	Candidates for each investigation should be able to:	3C.	Candidates for each investigation should be able to:
1C.1	carry out simple calculations with guidance (1–2 marks)	2C.1	identify and explain patterns within data (1 mark)	3C.1	identify relationships where appropriate (1 mark)
1C.2	offer simple explanations for their findings (1–2 marks)	2C.2	carry out simple calculations (1 mark for consistency, 1 mark for accuracy)	3C.2	manipulate data using a variety of sophisticated techniques (1–2 marks)
		2C.3	draw conclusions which are consistent with the evidence (1 mark)	3C.3	draw and present well-structured and accurate conclusions from the data which illustrate an in-depth understanding (1 mark)

Summary of Guidance on Applying Marks for APSC3 (cont.)

Stage 1		Stage 2		Stage 3	
1D.	Candidates for each investigation should be able to:	2D.	Candidates for each investigation should be able to:	3D.	Candidates for each investigation should be able to:
1D.1	give a simple evaluation of their practical activity (1–2 marks)	2D.1	give an evaluation of their practical activity (1 mark)	3D.1	review their practical activity by presenting a well-structured, logical evaluation of its strengths and weaknesses (1 mark)
		2D.2	suggest an improvement to their method that would allow the collection of more reliable data (must be linked to justification: 1 mark)	3D.2	describe improvements to their method that would allow the collection of more reliable evidence (1 mark for description, 1 mark for justification)
1E.	Candidates for each investigation should be able to:	2E.	Candidates for each investigation should be able to:	3E.	Candidates for each investigation should be able to:
1E.1	give a use for this practical activity in a workplace that uses science (1 mark for name, 1 mark for link)	2E.1	describe how the practical activity is used in a workplace that uses science (1 mark for description, 1 mark for link)	3E.1	explain why the practical activity is useful in a workplace that uses science (1 mark, plus benefits to society 1 mark)
				3E.2	give examples of the types of organisation that use this type of activity (specific organisations: 1 mark)

9. Notes for APSC4 – Using Scientific Skills for the Benefit of Society

<p><i>Appropriate tasks</i></p>	<p>Monitoring Living Organisms This investigation should be carried out over a period of time (at least 1–2 weeks)</p> <ul style="list-style-type: none"> • Monitoring of a plant (eg barley, radishes, tomatoes) in different nutrient regimes. • Monitoring microorganisms under different conditions in the production of foods and drinks. • Monitoring of an animal, for example a human in fitness training. <p>Making a Useful Product</p> <ul style="list-style-type: none"> • Production of ammonium salts. • Extraction of copper or lead. • Manufacture of chrome yellow. <p>Assembling an Electronic/Electrical Device</p> <ul style="list-style-type: none"> • Light, temperature or irrigation control, for example in a greenhouse. • Assembling various types of alarm system. • Making security lights. <p>Using Machines</p> <ul style="list-style-type: none"> • In the first instance this is a workplace activity. The laboratory activities could be based on the machine in the workplace (eg hydraulic jacks) but this is not essential. Activities based on pulleys, ramps, and gears are acceptable.
<p><i>Risk Assessments</i></p>	<p>The banner of the assessment grid for this unit states: ‘Candidates will be expected to undertake a risk assessment before each laboratory investigation and include it in the portfolio’. Students should, therefore, supply a risk assessment for each strand of their Unit 4 portfolio.</p>
<p><i>Applying the Assessment Evidence Grid for APSC4</i></p>	<p>The awarding of marks for this unit is simpler than for units 1 and 3: each point on the assessment evidence grid is worth one mark.</p>

<p><i>Skill Area A – Monitoring Living Organisms</i></p>	<ul style="list-style-type: none"> • This activity may be marked by awarding each completed criterion (1A.1 to 3A.5) 1 mark. • The activity undertaken should have a clear focus or industrial/commercial application to enable appropriate responses in 1A.6, 2A.6 and 3A.5. • The vocational context is important, and the investigation should be delivered within an appropriate context so that students can see the purpose of the monitoring exercise. • Students must write their plan in the future tense, not simply write down what they have done – even at Stage 1. ‘Plans’ that are written in the past tense do not achieve 1A.1 and will limit the student to a maximum of 6 marks. • Teacher annotation is essential to show the level of guidance given in preparing the plan (1A.1, 2A.1 and 3A.1) and the monitoring task (1A.2, 2A.2, 3A.2). • Measurements need to contain a number of variables in order to be demanding enough to reach Stage 3 for the more able candidates (counting bubbles from a fermentation would not, therefore, be appropriate). • The time taken for the investigation must be appropriate to the organism being studied. A study of plants growing, or developing a fitness plan, would both obviously take at least two weeks to obtain sufficient information (and possibly much longer). A study of microorganisms might be possible over a few hours or a couple of days; study of an organism such as <i>Daphnia</i> might be possible in an hour or so. • Candidates should have the opportunity to discuss their investigation before undertaking the practical work so that they can produce a plan. Criterion 3A.4 provides candidates with the opportunity to modify their plan. • At Stage 2 and Stage 3, candidates should be able to demonstrate an understanding of the science underlying the investigation. Opportunities to demonstrate understanding exist in 2A.4, 3A.3 and 3A.5.
<p><i>Skill Area B – Making a Useful Product</i></p>	<ul style="list-style-type: none"> • Only one product is needed – but care needs to be taken to choose a product and reaction type that will allow students to address all the points of the assessment grid. • The product produced should have real use that students can appreciate and, ideally, should be chosen to enhance the delivery of an appropriate section in Unit 2 (although this is not essential). • The type of reaction to be used is not stipulated within the specification but it should allow students to address all points of the assessment grid, including those involving the rate of chemical reaction. • Prussian blue would not be an appropriate substance to make, owing to the complexity of the formula. • Some evidence is needed that the products have been made – photographs or teacher annotation are appropriate • Do not send the product samples to the moderator. You should, however, keep them safely until after the enquiry after results deadline, as AQA may ask to see them. • This activity may be marked by awarding each completed criterion (1B.1 to 3B.6) 1 mark. • Appropriate assessor annotation is needed to obtain the mark at 1B.1, 2B.1 and 3B.1.

<p><i>Skill Area B – Making a Useful Product (cont.)</i></p>	<ul style="list-style-type: none"> • To achieve 3B.2 the equation a student writes must be balanced, and he or she should demonstrate knowledge of the underlying reaction type. • At Stage 2 students should be able to calculate the percentage yield of the product given the theoretical yield and using the actual mass obtained. The difference between 2B.3 and 3B.3 is the precision with which the calculation is carried out and the correct use of units. • To achieve 2B.3, 2B.4, 3B.3 and 3B.4 the calculations must be correct. • When calculating costs at Stage 2 (criterion 2B.4) it is not necessary to consider overheads such as heat, light, etc. • At Stage 3 students should be able to provide some brief kinetic explanation concerning rates of reaction (3B.6).
<p><i>Skill Area C – Assembling an Electronic/Electrical Device</i></p>	<ul style="list-style-type: none"> • This activity may be marked by awarding each completed criterion (1C.1 to 3C.3) 1 mark. • Teacher annotation is required to show how much guidance has been given in assembling the device (1C.1, 2C.1, 3C.1). • There must be evidence from the student that they have tested their device for marks to be awarded at 1C.2, 2C.2 and 3C.2 – a results table or some sort of discussion. Teacher annotation alone is not sufficient. • For 2C.3 students should be able to explain the function of the components (eg ‘it does this because ...’). • To achieve 2C.4 students must be able to evaluate the effectiveness of the device – not the experiment/test – under appropriate conditions. Simple statements such as ‘My device worked’ are not creditworthy. • To be awarded 3C.3 the evaluation should include improvements to the device, not the experiment/test.
<p><i>Skill Area D – Using Machines</i></p>	<ul style="list-style-type: none"> • Criteria 1D.1 to 3D.1 may each be awarded 1 mark on completion. • In 3D.2 the three calculations are worth 1 mark each. • For 1D.1 students should be able to describe the use of a machine in the workplace and what it does. • The advantage of machines in the workplace should be described at Stage 2 with reference to the selected machine. • To achieve 3D.2 students need to show at least once that they have used the equations to carry out the calculations. • The machine used in Stage 1 and Stage 2 would be the ideal example to use at Stage 3. However, an independently based series of laboratory investigations is acceptable. Care should be taken not neglect stages 1 and 2 if students are to progress beyond 1 mark.
<p><i>What penalties apply in APSC4?</i></p>	<ul style="list-style-type: none"> • Students who do not submit work for any one of the strands A–D in this unit should be awarded zero marks for that strand.

10. Notes AASC3 – Using Scientific Skills

<i>Content of AASC3</i>	In this unit there is no content extra to Unit 1 and Unit 2. Students will use the skills and knowledge they have acquired in the earlier units to undertake an investigation in one area: Food Science, Forensic Science, Sports Science.
<i>Number of investigations</i>	<ul style="list-style-type: none"> Teachers may wish to do several investigations in order to give students practice, although only one should be submitted. The Student Guide to Assessment for Additional Applied Science contains a suggested framework for producing the report for Unit 3. This guide may be downloaded from the AQA website (http://www.aqa.org.uk/qual/appliedgcse/adappscience_teach.php).
<i>Appropriate scenarios</i>	Some possible scenarios for this unit are given in the Teachers' Guide for the specification, and in the exemplar materials presented at Teacher Standardising meetings.
<i>Skill Area A – Vocational Application</i>	<ul style="list-style-type: none"> At Stage 1 students simply need to state the purpose of their investigation. At Stage 3 students would be expected to research the type of organisation that would use similar techniques and the purpose for which they would use them. In order to gain 4 marks students should have some evidence of their own research in their portfolio.
<i>Skill Area B – Planning and Risk Assessment</i>	<p>Planning</p> <ul style="list-style-type: none"> Students must write their plan in the future tense, not simply write down what they have done – even at Stage 1. 'Plans' that are written in the past tense do not achieve 1B.1 and will limit the student to a maximum of 2 marks. Plans should be considered as 'statements of intent' (ie how the investigation will be carried out). At Stage 1 it may be considered appropriate to provide students with a structured framework within which to work. Teacher annotation is essential to show the level of guidance given in criteria B and C. <p>Risk assessments</p> <ul style="list-style-type: none"> Risk assessments should be comprehensive and include all relevant risks in the activity, including the use of general laboratory equipment. To achieve 3B.2, a student's risk assessments must be comprehensive as well as being done independently (sources of research such as 'Hazard cards' are acceptable). Ideally, students will have been given the opportunity to practice preparing risk assessments in Unit 1, so that they are prepared when they come to the investigations in Unit 1. Giving a student an example to follow (eg the completion of one horizontal row including a substance to be assessed, the hazard, risk and control measure) may be considered as 'some guidelines' (Stage 2). 'Clear guidelines' (Stage 1) could be considered as the above, plus supplying all the materials/activities to be 'risk assessed'. An assessor comment stating the level of guidance is essential in helping the moderator to assess the pieces of work. Note: templates are appropriate at all stages.

<p><i>Skill Area C – Selecting Equipment and Recording Information</i></p>	<ul style="list-style-type: none"> • At Stage 1 students should be able to select, with guidance, appropriate equipment (1 mark) and use it (1 mark) to obtain and record some results (1 mark). • At Stage 2 students should be able select equipment with little help and use it to obtain some results. To obtain 7 marks students should clearly record their results in tables or other suitable format. Tables should have appropriate headings and results the appropriate number of decimal points. Observations should include the appropriate descriptive detail (eg ‘a precipitate’ without mention of colour is not sufficient). • At Stage 3 the recording of results should be accurate and consistent to obtain 11 marks. In cases where repeats are not necessary, students should make a suitable comment to explain why. A student may be awarded 12 marks if he or she recognises the need to repeat results.
<p><i>Skill Area D – Processing Information and Drawing Conclusions</i></p>	<ul style="list-style-type: none"> • At Stage 1 students should be able to briefly state what they have found out for 1 mark. Reference, in a simple conclusion, to the observations made or data collected enables 3 marks to be awarded. • At Stage 2 students should be able to process data using simple calculations such as averages and percentages. Where appropriate, graphs should be completed and lines of best fit drawn for 6 marks (in cases where it is not appropriate to carry out calculations the conclusions made should contain an appropriate account of all observations made before 6 marks may be awarded). Conclusions should be detailed and contain a reasoned analysis of the data collected and processed or observations made (6 marks). • To reach Stage 3 the processed data should be accurate and consistent (eg appropriate number of decimal points throughout) and candidates should have worked independently. Conclusions should be well structured and logically presented as independently made (8 marks). Students should be able to verify their data and observations using secondary sources and make reference to these in their conclusions to merit 10 marks.
<p><i>Skill Area E – Evaluation and Explanation</i></p>	<p>Evaluating</p> <ul style="list-style-type: none"> • Basic comments about how well the experiment went and how ‘good or not’ the results were are not worth more than 2 marks (Stage 1). A comment such as ‘my experiment work went well’ is not worth any marks: even at Stage 1 students need to make their comments specific to the activity. • To access marks at Stage 2 and Stage 3, students should explain how results could be improved. • The suggestion for an improvement at Stage 2 should be accompanied with a reason to obtain 3 marks. Very little credit should be given for simple suggestions such as ‘repeat it’ or ‘work more carefully’ that are given without qualification. • At Stage 3 students should be able to discuss the strengths and weaknesses of the technique or their method of completing the investigation. At this level a description of the improvements that could made and how these would allow the collection of more reliable data should be expected to obtain 5 marks. <p>The vocational setting</p> <ul style="list-style-type: none"> • At Stage 2 students should be able to relate their findings to the vocational setting of their investigation by writing their report in the appropriate context (eg back to the client) to obtain the fourth mark. • At Stage 3 students should be able to suggest (7 marks) and explain how their findings could be used by the client (8 marks).

Summary of Guidance on Applying Marks for AASC3

Notes on the allocation of marks in each stage of the assessment evidence grid are given in brackets at the relevant point

Stage 1		Stage 2		Stage 3	
1A. 1A.1	Candidates should be able to: give a simple vocational application of the practical investigation (1 mark)	2A. 2A.1	Candidates should be able to: describe a vocational application of their practical investigation (1 mark)	3A. 3A.1	Candidates should be able to: research (1 mark) and explain (1 mark) the vocational significance of their practical investigation.
1B. 1B.1	Candidates should be able to: produce a simple plan for the investigation with guidance (1 mark)	2B. 2B.1	Candidates should be able to: produce a plan which, with little guidance, would enable the investigation to be carried out by another person (1 mark)	3B. 3B.1	Candidates should be able to: independently produce a plan, described in a series of well-ordered steps, which would clearly enable the investigation to be carried out by another person (1 mark)
1B.2	carry out a risk assessment for the investigation, given clear guidelines (1 mark)	2B.2	carry out a risk assessment for the investigation, given some guidelines (1 mark)	3B.2	independently carry out a risk assessment for the investigation (1 mark)
1C. 1C.1	Candidates should be able to: select, with guidance, appropriate equipment for the investigation (1 mark) and use it safely (1 mark) to carry out the plan to collect and record some data/information (1 mark)	2C. 2C.1	Candidates should be able to: select, with little guidance, appropriate equipment for the investigation (1 mark) and use it correctly and safely (1 mark) to carry out the plan to collect and record data/information accurately (1 mark) in a suitable format (1 mark)	3C. 3C.1	Candidates should be able to: independently select appropriate equipment for the investigation (1 mark) and use it correctly and safely (1 mark) to carry out the plan to collect and record data/information (1 mark) accurately and precisely in a suitable format (1 mark) , repeating measurements if necessary (1 mark) .
1D. 1D.1	Candidates should be able to: use the data/information collected to draw some simple conclusions (brief statement 1 mark; simple conclusion based on results reaches 3 marks)	2D. 2D.1	Candidates should be able to: use (1 mark) and process (1 mark) the data/information collected to make conclusions (1 mark) .	3D. 3D.1	Candidates should be able to: use and accurately (1 mark) process the data/information obtained (1 mark for consistency) , and data/information obtained from other sources (verification of results 1 mark) , to draw and present well-structured and accurate conclusions (1 mark) .
1E. 1E.1	Candidates should be able to: give a simple evaluation of the practical activity (basic statement 1 mark; need 'because...' for second mark)	2E. 2E.1	Candidates should be able to: give an evaluation of the practical activity and suggest an improvement to their method (need reason for improvement; 1 mark)	3E. 3E.1	Candidates should be able to: review their work, and present a logical evaluation (1 mark) of its strengths and weaknesses
		2E.2	suggest how their findings could be used in the vocational setting (1 mark)	3E.2	suggest improvements to their method that would allow the collection of more accurate, precise and reliable evidence (1 mark)
				3E.3	suggest (1 mark) and explain how (1 mark) their findings could be used in the vocational setting.