
ELC SCIENCE

5960/U

Report on the Examination

5960

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General

2022 is the first return to previous procedures in terms of moderation of portfolios following the two years in which marks have been decided by centres. There are some important points made in this report relating to the adjustments made over this period of time.

The subject content for this specification is based on the specification for GCSE Combined Science: Trilogy (8464). Assessments for ELC Science are undertaken at a time chosen to suit the centre and students. Both single (5961) and a double (5962) awards are available.

The subject content is split into six components from each of the three subject disciplines:

- Biology (components 1 and 2)
- Chemistry (components 3 and 4)
- Physics (components 5 and 6)

For each component, the student is assessed by means of an Externally Set Assignment (ESA) and a Teacher Devise Assignments (TDA). For the Double Award, work from all six components must be submitted. For the Single Award, work from three components, one across each discipline must be submitted. In the Single Award, the ESA and the TDA for each subject discipline do not need to be taken from the same component. For example, for Biology the ESA could be from Component 1 and the TDA from Component 2.

For awarding in 2022, three sets of ESAs were available. These ESAs are downloaded from the secure Centre Services section of the AQA website and are password protected. They will remain operational for the duration of the specification and should only be downloaded at point of use and copies made as required at that time. Students may attempt all three versions for each component and the one that has resulted in the best mark used for inclusion in the total. These ESAs must be kept secure and never returned to students. If a centre wishes to practise ESAs then they should use the specimen ESAs. These ESAs, along with their mark schemes, are found under the Assessment section of the ELC page of the AQA website.

The comments in this report are supplied for the guidance of teachers and centres and should not be taken to imply criticism. Most centres operate to a high standard in terms of both their marking of the ESAs and TDAs and their compliance with the administrative procedures; some of the shortcomings this year may be attributed to the return to previous practice after the period of self-regulation.

AQA provides support and guidance for centres in a variety of ways. These include:

- Feedback forms (CAW/FB) from moderators to centres available on results day
- ELC Coursework Adviser
- Specification Support Material and Teachers' Guide to be found on the AQA website
- Lead Moderator's Reports on previous series: these can be found on the AQA website
- Teacher on-line standardisation (T-OLS)
- On-line CPD: details can be found on the AQA website including Network meetings
- Guidance on preparing for moderation

Administration

Centre Marks are submitted electronically; this has proved to be beneficial to both centres and moderators and helps to speed up the moderation process. Likewise, the introduction of the electronic forms of communication with centres eg MOD/CEN/ADM/E-SUBS has made it much quicker to inform centres and AQA of any mark changes or shortcomings in administration.

It has been a challenging year for both centres and moderators alike. Many experienced centres navigated the new systems well and entered data on time or even ahead of schedule, which was very helpful to the moderating team, and responded promptly to queries raised by their moderator.

Points to consider for future moderation series:

- Some Centres did not act on MOD/CEN/ADM/E-SUBS forms and did not go back to amend marks. This means that moderators cannot enter their marks and the centre may then wrongly go out of tolerance.
- Some Centres withdrew all students but did not amend this on E-subs. The centre then sits in the 'Awaiting Centre Marks' section of the system and the process cannot be completed. There are also issues if students are registered to one centre but are taught at a different institution where a lack of liaison between the two centres leads to inaccuracies or lack of information about the status of a student.
- This year there were issues for many centres in meeting the 15 May deadline for submission of marks and in subsequently providing materials to moderators. Centres are reminded that they can upload marks and submit the sample to the moderator before this deadline. If they do so, this greatly helps the moderation process. If there are problems in meeting the deadline, AQA should be informed and consideration can then be made if there is a need for an extension to be granted.
- Most centres supplied the Centre Declaration Sheet. For NEA (Non-exam Assessment), this is essential to authenticate students' internally-assessed work and confirm the internal standardisation of marking.
- Most students signed the CRF. Failure to do so can result in a delay in the moderation process; centres are advised not to leave this until work is required for moderation to avoid difficulties in acquiring student signatures; as this is also a check on authentication, a typed name is not appropriate.
- Some centres were still sending bulky folders containing the complete portfolio of notes, worksheets, etc. These are not only superfluous to the moderation process but hamper the moderator's work; moderators require only the marked ESAs and TDAs which have contributed to the subject total mark. Some centres need reminding that the portfolios should be presented with the ESAs and TDAs collated for each student with the CRF showing the mark analysis at the front either in a card folder or held together with a treasury tag and not submitted in A4 plastic wallets. Sadly, in some cases, only paper clips were used meaning the moderator was presented with a collection of un-named loose sheets. If work is not presented appropriately, it will be returned to the centre, delaying the moderation process.
- Centres should ensure that the student's name and number and the centre number appear on all the pages of the student's work.
- For the Single Award, almost all centres correctly submitted evidence from three different complete components. Students who did fail to complete any of the required components may

still be entered for an award – they simply score zero for any missing component.

- Page 44 of the Specification (Section 4.3) and the CRF outline the requirements for the evidence that needs to be submitted.
- If a student is missing a number of pieces of evidence for the double award, an entry for single award could well be advantageous. This can be done free of charge up until the date stated in the Exams Administration part of the AQA website.

Marking of the ESAs

The standard of marking of the ESAs was generally good this year. The great majority of centres adhered closely to the published mark scheme. There were very few errors of judgement in evidence.

It is important to follow the procedure below. Failure to do so often led to incorrect totals on the CMF.

- ESAs should be marked in red, using one tick for each mark awarded.
- Subtotals should be put in the right-hand margin at the end of each part of each question.
- Incorrect answers should be marked with a cross.

Moderators need to be sure that all student responses have been seen and marked accordingly.

Centres are reminded that guidance on marking the ESAs is found in the same area as ESA masters.

Students should be given verbal feedback only about their achievement and the ESAs then stored securely until required for moderation.

It is acceptable for a centre to credit a response which is not on the mark scheme; however, this must be correct and there should be annotation so that the moderator is in a position to support the centre's mark. For example, this year, the response to the question asking students to complete a chromatogram was credited when the outcomes of lateral flow tests were given.

A number of centres made the mistake of using specimen ESAs. Specimen papers may be used for practice but they cannot be used in submission for an award. Most centres affected by this managed to arrange for students to sit live papers; it must be acknowledged that the marks from these may not represent the same levels of achievement as ESAs taken at the appropriate time during the course.

Centres are reminded that ESAs must be undertaken in a high control setting; the full range of access arrangements is available for those students who meet the criteria for them. In these cases, centres should remember to include the appropriate JCQ cover sheet. Moderators also appreciate transcription of poor handwriting in scripts which prove difficult to an unaccustomed eye.

Marking and annotation of the TDAs

2022 changes

For 2022, adjustments were made to the marking of the TDAs to take cognisance of the effects of lockdown.

As it was difficult for some centres to provide ‘hands on’ practical opportunities for all students, guidance was issued in the autumn term stating that the assessment of the Teacher-Devised Assignments (TDAs) was changed for 2022 so students no longer had to carry out the practical activities to gain marks for Skill B. The Candidate Record Form was edited to remind teachers that full marks should be awarded for B3 where appropriate.

This adjustment meant that marks for the other skill areas, ie planning, recording, presenting data and identifying patterns and relationships in the data, could still be gained using data collected from teacher demonstrations or simulations from which students recorded the data. It was stated to gain these marks for Skill B, students had to provide evidence of their planning for assessment of Skill A (experimental design) even though their method would not be carried out.

Most centres followed this guidance and it was pleasing to note how many were able to complete TDAs in the usual way; however, a number of centres mistakenly claimed the marks although no evidence was submitted in support and the marks for students had to be amended accordingly.

Annotation

Most teachers annotated work to indicate where and why they had made their judgements of the students’ levels in each skill area. This annotation is extremely helpful for the moderators where borderline judgements were made. The simplest way to record marks on the script is to write, for example, ‘C2’ to indicate that an award of 2 marks has been given in skill area C. If this is written at the point where the student has met the criterion, the moderator can then easily verify whether the mark is appropriate.

Annotation must be provided to justify the award of marks in a skill area. This is particularly important to justify the award of 3 marks for Skills C and D for a student’s unaided work where the moderator cannot judge the amount of help that the student has been given.

Although the criteria for marking the TDAs appear hierarchical, it is possible to award marks on a ‘best-fit’ basis. Therefore, if a student has matched the criteria for Level 1 and for Level 3 but has missed out some of the requirements for Level 2, two marks could be awarded on a ‘best-fit’ basis.

If a student has a scribe/reader, this should be noted on the CRF and relevant work, and the appropriate JCQ form should be included in the portfolio.

Centres are reminded that, although there may be discussion about how to go about an investigation, and students may work collaboratively to obtain results, the individual contribution of a student to a set of shared results must be evident and the write-up of an investigation must be individual work. Once completed and marked, students may be given verbal feedback about their achievement but the work must not be returned to them but stored securely until required for moderation.

Choice of Suitable investigations

Most centres used an appropriate context for the practical investigation, ie one that was related to the subject content of the specification. The majority of teachers used the suggestions given in the specification or through discussion during an AQA online training session or with an adviser. Centres continue to be encouraged to develop new ideas for TDAs so that they fit in with the centre's teaching and learning programme.

Some centres include photographs showing students at work. Although it is pleasing to see evidence that students are enjoying their practical work, such material alone is not mark-worthy.

It is evident that a number of centres are co-teaching ELC with the Trilogy specification and therefore submitted TDAs based on the Required Practicals for the Double Science programme. These are, as stated, practicals, not investigations. Care needs to be taken that the practical is adapted so that it does allow ELC candidates to demonstrate achievement in all the Skill areas, particularly in Skill areas A, C and D. The work must be part of the ELC specification: neither Hooke's Law nor Electrolysis are part of the ELC specification and should not be submitted.

A number of centres undertook the paper chromatography Required Practical. In this instance, the investigation must be devised to enable students to gather numerical values in order to score in Skill areas C and D. This does not need to be the calculation of R_f values and can be as simple as recording the number of colours in particular inks/dyes. Merely including a chromatogram can gain no more than C1. Similarly, microbiology investigations tended to yield qualitative results which limited access to Skills C and D. Please note that it is also important that microbiology investigations comply with recommended procedures to ensure safe practice.

In addition, a number of centres presented practical tasks such as microscopy as TDAs which did not address the criteria.

Worksheets

- Some centres produced excellent worksheets for their students. These can be very useful providing that they are generic and not specific to a particular investigation. In a few cases the worksheets were over-prescriptive: this limits access to higher marks in some skill areas.
- It is helpful if the task is phrased as a question that can be answered by carrying out the experiment; the worksheet/template may include some information from the specification to set the scene for the student and which can be used in formulating a prediction with a reason and in drawing a conclusion.
- Many centres used or adapted the templates available on the AQA website. These do demonstrate the appropriate level of prompting that can still access the full mark range.
- Where worksheets were not used, students generally scored fewer marks.
- If a centre is unsure of the suitability of a given worksheet or investigation or needs assistance in planning a TDA for their situation, they should contact their coursework adviser who can provide guidance.

Skill Area A: Experimental design

Level 1 (1 mark): students should be able to identify the technique or equipment that can be used

to investigate the chosen problem. This may be done by using a worksheet which lists or shows diagrams of different items of equipment. The students can then tick or circle the ones which they think appropriate to use. The list should be generic in nature so that there is an active selection on the part of the student. There should be an opportunity to add investigation-specific equipment.

Level 2 (2 marks): students need to describe the way in which the technique or equipment could be used. The student's method should be capable of producing sensible and meaningful results. The method should enable another person to carry out the experiment.

Some students find extended writing a challenging task and may need structured support to gain marks. Students may not gain marks for copying out a given method; however, they may achieve this level for ordering a set of randomised instructions correctly or by use of a flow chart showing the different steps in the method. Students can then join up the different steps in the correct order to show the method.

A labelled diagram showing how equipment was set up may also enable them to demonstrate achievement at this level without extended writing.

If none of the above are sufficient to enable the student to gain marks, a given method would still allow progress to achievement in the other skill areas.

Level 3 (3 marks): students need to make a simple prediction and give a reason for this so that it is more than a guess. Most students made a good attempt at a prediction. Teachers are asked to encourage their students to make a prediction based on either scientific understanding or general knowledge not just a guess.

Skill Area B: Working safely and making measurements and observations

For 2022, all students were awarded 3 marks for skill B providing this was in the context of a full investigation.

In returning to conventional procedures, centres are reminded that if students work in small groups and then pool results, it is important the contribution of an individual student is evident in the account of the investigation.

Please ensure that the ephemeral skills (B1 and B2) are supported by annotation in future series.

Skill Area C: Recording data

Level 1 (1 mark): students simply need to record their results. This does not need to be made in any organised way.

Level 2 (2 marks) and Level 3 (3 marks): students need to record their results in a table. If students construct their own table correctly, this would enable the award of three marks. If a teacher deems that a student's constructed table is not adequate, a template with headings and units can be provided: this would then limit the award to a maximum of two marks for correct completion.

For Level 3, tables should have the correct headings and units. Some teachers were too generous in awarding three marks to tables that had incorrect headings or missing units. In addition, if results are inaccurately recorded or calculated the student cannot score full marks against skill area C. This

may be an instance where a 'best fit' of 2 marks may be awarded for an imperfect attempt by the student. Unaided work should be annotated to this effect.

Skill Area D: Presenting data

The criteria for achievement in this skill area are limited to graphical representation. Inclusion of photographic evidence of microbial growth or chromatograms cannot be credited.

Level 1 (1 mark): students simply need to select the most appropriate form of graphically showing the results.

Normally this would be:

- a bar graph if the data is categoric (eg different species of plant or different types of metal)
- a line graph if the data is continuous (eg how temperature is changing with time).

In the AQA template and in other worksheets, students are asked to select the appropriate format: this enables students to gain this mark even if they were unable to produce the actual graph. It was noted that, some centres awarded this mark even when the student had made the wrong choice.

Level 2 (2 marks) and Level 3 (3 marks): students need to display their results graphically.

Most centres gave students the opportunity to draw their own pie chart, bar graph or line graph. If done correctly, this would result in three marks. If a student's attempted graph is not adequate, the teacher may give the student a framework to complete. For example, the teacher could give the student a piece of graph paper with the axes already scaled and labelled. This would then limit the award to a maximum of two marks for correctly plotted data.

If the student draws a line graph, we would normally expect a smooth trend line or line of best fit. Some centres had not supplied their students with graph paper: some used centimetre squared paper, and some used plain paper. This disadvantages the students as they are unable to show that they can plot data correctly. The best choice of paper is 2 mm squares.

It is important that teachers check that students have:

- shown the correct labels and values on each axis
- plotted the values correctly
- and, if appropriate, drawn a line of best fit.

Some centres were awarding Level 3 when graphs or bar charts had incorrect or missing labels, scales or units or when the data had been drawn or plotted incorrectly.

For full marks in skill area D the data needs to be plotted correctly, axes need to be linear, labelled and have units and be annotated as the student's unaided work.

It is acceptable to use computer programs such as Excel to produce graphs. However, it is important that the student include appropriate labels for the axes and in the case of line graphs, do not merely allow the program to 'join the dots'.

Skill Area E: Identifying patterns and relationships

Level 1 (1 mark): students merely need to state their results. In most cases teachers were providing a line on a worksheet that simply said: 'What did you find out?'

Level 2 (2 marks): students need to draw a simple conclusion. Many students found this difficult and moderators noted that in many cases teachers had been too generous in awarding this mark.

The student is required to take a step beyond simply repeating the result and try to say what this means. For example:

Result: *'I found out that the hotter the oil the quicker it ran down the tile'* Conclusion: *'This means hot liquids are less viscous (runnier) than cold liquids'*

A well-constructed worksheet or template may have included some information from the specification in the introduction which would enable the student to draw a sound conclusion. Exemplars may be seen on the AQA website.

Level 3 (3 marks): students need to make a simple evaluation. In some cases moderators found that centres had been too generous by awarding three marks when all the student had said was: 'I think the experiment worked well' or said 'do it again' without giving any justification for this or they had made reference to other investigations that could be done. For full marks in Skill area E, there needs to be an evaluative comment about the success or otherwise of **this** investigation. This evaluation must use results from the investigation eg anomalous results or state that the conclusion is sound as repeats are similar.

Mark Ranges and Award of Grades

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