Cambridge Technicals (2012)

Level 2

Science

05783, 05785, 05788

Moderators' report 2019 series

About this Moderators' report

This report on the 2019 series assessments aims to highlight:

- areas where students were more successful

- main areas where students may need additional support and some reflection

- points of advice for future assessment/moderation

It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

The report also includes links and brief information on:

- A reminder of our **post-results services** including **reviews of moderation**

- **Further support that you can expect from OCR**, such as our CPD programme

Reviews of moderation

If you disagree with the outcome of moderation then you may wish to consider a Service 3 post-results review of moderation; this is a review of the original moderation to ensure the assessment criteria have been fairly, reliably and consistently applied. This service is not available for individual candidates. Requests must be made by Unit for all candidates at your centre who have submitted centre-assessed work.

Further information about reviews of moderation can be found on the OCR website at https://www.ocr.org.uk/administration/stage-5-post-results-services/reviews-of-results/service-3-moderation-review/

Further support from OCR

CPD Training

Attend one of our popular CPD courses to hear exam feedback directly from a senior assessor or drop in to an online Q&A session.

Please find details for all our courses on the relevant subject page on our website.

www.ocr.org.uk

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Overview

Centres are using a number of delivery models: some centres are delivering one Unit at a time sequentially; others are delivering more than one Unit at a time using subject-specialist teaching staff.

Evidence has generally been presented in the form of written work produced by the candidate. This has taken the form of *PowerPoint* presentations, leaflets, posters, and reports. Where witness statements are used to support assessment evidence, it is important that the witness statement is detailed and provides sufficient evidence and justification for the award of credit. Witness statements should be unique and specific to individual candidates.

Centres are encouraged to provide both formative and summative feedback to candidates as part of the delivery process, but no formative feedback should be provided while completion of an assignment task is in process. Once candidate work has been submitted for marking clear and constructive feedback on the criteria successfully achieved should be provided, together with justification and explanation of the assessment decisions. Where a candidate has not achieved a performance criterion targeted by an assessment task, feedback should not provide explicit instructions on how the candidate can improve their work to achieve that criterion but should identify weaknesses in the evidence provided such that candidates can identify for themselves the improvements required.

OCR Unit Recording Sheets (URSs) must be used to record candidate achievement. These are available in the qualification area of the OCR website. These should be fully completed, to include the following:

- the individual Assessment Criteria (AC) given for each Learning Outcome (LO) (P1, P2, M1, M2, D1, D2, etc.)
- the grade given for each LO
- some comments to justify the AC/grade given (this can assist the Visiting Moderator in understanding how assessment decisions have been reached)
- an indication as to the page number/location within the portfolio where the evidence can be found

Some centres provide very detailed URSs but this standard is not being achieved consistently across all centres. Where candidate work is submitted electronically, for example through *Turnitin*, it is still a requirement that OCR URSs are completed at the point of final summative assessment.

The majority of assessors are annotating candidate work to indicate where credit towards ACs has been given alongside the signposting of evidence location on the URS. This is very helpful to both Visiting Moderators and for internal standardisation. Visiting Moderators should not have to "re-mark" candidate's work to locate assessment evidence. A combination of signposting relevant pages in the URS and annotation of those pages should direct the Visiting Moderator to the location of the assessment evidence.

It is a requirement of the qualification that internal standardisation of assessment decisions takes place. A guide to internal standardisation is available on the qualification area of the OCR website. Internal standardisation must cover all Units delivered, every assessor in a unit, and all grades given. There is a field on the URS which should be completed to indicate which portfolios have been subject to internal standardisation. Records of internal moderation should be kept

and should be made available to the Visiting Moderator. For each unit these should include dates of internal standardisation, candidates' names, name of internal moderator, outcomes of standardisation and feedback to assessors. In many centres, it is impossible for Visiting Moderators to see an overview of the internal standardisation process as there is no documentation kept tracking the process, beyond annotating the relevant URSs. In a small number of centres, there is no evidence of any internal standardisation process at all. Suitable proformas for tracking internal standardisation activity and for recording internal standardisation decisions are available, as appendices to the internal standardisation guide, in the qualification area of the OCR website.

Centres are reminded that claims for moderation must be uploaded onto *Interchange* at least two weeks before the agreed moderation visit date. This is to allow the Visiting Moderator time to select an appropriate initial moderation sample and for the centre to collate the initial moderation sample. When entering candidate grades, the member of staff responsible for assessing the evidence must be identified as every assessor within a unit must be sampled as part of the visiting moderation process. Some centres are still entering the initials of the programme leader against every candidate.

Where candidate work has been submitted for moderation a Candidate Authentication Statement, available in the qualification area of the OCR website, must be completed for each candidate. It is not necessary to complete a separate Candidate Authentication Statement for every unit for each candidate. One Candidate Authentication Statement can be completed for each candidate as long as the relevant Units are stated.

General comments

In general, evidence presented for moderation was appropriate for Level 2 in both depth and breadth and met the content requirements of the specification. However, there remains a tendency for centres to be lenient in their interpretation of the ACs when assessing candidates' work, and so some over-grading of candidates' work was yet again noted by Visiting Moderators. In particular, centres are awarding Assessment Criteria (ACs) which require candidates to evaluate a topic when there is minimal or no evaluation present. Evaluation requires that candidates review relevant information or evidence, including strengths or weaknesses, then reach a supported justified judgement or conclusion about the topic concerned. It was evident again this year that some centres had still not referred to the Teaching Content within the unit specifications when delivering content. As a result, candidates' evidence did not fully match in terms of breadth of the requirements of particular ACs.

Centres are reminded that the use of writing-frames, worksheets, and other scaffolding is not permitted in the generation of assessment evidence. Although, they may be used for teaching purposes. There continues to be a reduction in the use of such scaffolding by centres year-on-year, perhaps reflecting changes in assessment practice following comments in moderation reports. Another reason could be a greater confidence within centres, as familiarity with the specification increases, in assisting candidates to generate assessment evidence independently.

The majority of centres take care to make sure the authenticity of candidates' work. Although, Visiting Moderators have reported instances where candidates have downloaded material from the Internet and presented it as their own. Centres must make sure that candidates properly reference sources of information, and credit sources where diagrams or pictures are sourced from the Internet.

Comments on individual units

Unit 1 – Science of the Earth (Core/Mandatory)

A model assignment, available in the qualification area of the OCR website, has been produced for this unit. This is being used by nearly all centres in the generation of assessment evidence for this unit.

A detailed delivery guide, resources link, and introductory presentation have also been produced for this unit; they are available under "Teaching & Leaning Resources" in the qualification area of the OCR website.

AC M1 (LO1) requires candidates to consider different ideas/theories about changes to the Earth's surface. No credit can be given for consideration of creation theories. Where alternative theories about changes are considered, they are frequently described without any consideration of the supporting evidence available at the time of their currency.

AC M2 (LO2) requires candidates to describe how scientists minimise the impacts of changes to the Earth's surface/lithosphere in populated areas. The reference to scientists is often limited to making predictions, and the assessment evidence then focuses on how this can be used to assist in the response of the emergency services. There is a need for centres to place greater emphasis on the development of modelling and the development of materials and structures in the built environment that can withstand catastrophic impacts. Evidence for AC P3 (LO2) is often lacking in both depth and breadth. It tends to be an outline rather than a description of the composition of the Earth's atmosphere and its ability to support life. Similarly, evidence for AC M3 (LO2) is frequently limited in terms of both the number of processes considered and the detail of each process.

ACs P6 and M5 (LO3) both require consideration of water treatment before and after use. The latter is often omitted or given very cursory treatment. Often M5 is given where P6 would have been more appropriate as the level of detail in the candidates evidence was more in line with an "outline" than an "explanation". Very rarely is there any historical or quantitative reference when considering why water treatment is necessary, and consideration of economising on the use of water invariably references only domestic consumption or recycling with no reference to the energy costs involved in water processing. Although the use of the atmosphere as a natural resource in the context of wind power is listed in the teaching content, this is not a good example for candidates to use as it is difficult for candidates to address issues such as disposal of waste products or sustainability. This makes it hard for candidates to access M6 and D3 respectively.

ACs D1 (LO1) and D3 (LO3) require candidates to evaluate rather than describe the topics concerned. Centres are awarding these Assessment Criteria when there is minimal or no evaluation present (see General Comments above).

Unit 2 – Processing and Presenting Data in Science (Optional)

A detailed delivery guide, resources link, and introductory presentation have been produced for this unit. They are available under "Teaching & Leaning Resources" in the qualification area of the OCR website.

Evidence for this unit can be generated by collecting data from a series of experiments or investigations. The data should be processed and presented in the most appropriate format. The use of graphical approaches and the reliability or repeatability of the data should be discussed or "defended".

Centres could select a range of experiments or investigations from other Level-2 specifications (e.g. GCSE science or OCR Level-2 Nationals or OCR Level-2 Cambridge National Certificates in Science/Science in the Workplace) and map the evidence provided against the ACs. By selecting appropriate experiments or investigations, it should be possible to provide candidates with more than one opportunity to address each AC. To allow candidates to access ACs M1, M2, D1 (LO1), and M3 and D2 (LO2), it is important that the experiments chosen show variation of a continuous variable.

To generate evidence for AC P3 (LO2), candidates could give a commentary on different types of tables, charts, and graphs sourced from websites or printed publications. The commentary should explain why each method of data presentation is suitable for different types of data or a different audience. Candidates should not be limited to merely using tables, charts, and graphs from their own experimental activities. The use of secondary material will allow consideration of how the intended audience influences data presentation, and may allow consideration of a wider number of examples.

Evidence for ACs P4, M4, and D3 (LO2) is frequently presented in an abstract theoretical context. The data used should be related to experimental situations, and at least some should come from the candidates own experimental work within the unit. Provided data may be used to provide additional evidence. Use of experimental data processed during investigations can avoid the need to address the calculation aspect of LO2 as a separate thread, which appears to be challenging for many candidates.

Unit 3 – Research and Development in Science (Optional)

A detailed delivery guide, resources link, and introductory presentation have been produced for this unit. They are available under "Teaching & Leaning Resources" in the qualification area of the OCR website.

Unit 4 – Practical Techniques in Science (Optional)

Evidence towards this unit can, where appropriate, be drawn from other Units within the qualification suite.

For LO1, the generation of evidence towards ACs P1, P2, and M1 can be contextualised within a scenario involving the production of a laboratory manual on the identification and minimisation of risks and hazards within laboratories and the influence of relevant legislation on laboratory practices and procedures.

AC M2 requires that candidates describe and carry out one standard procedure and explain how a linked risk assessment allows the procedure to be conducted safely.

For LO2, the generation of evidence towards ACs P3, M3 and D1 can be contextualised within a scenario involving the production of a report detailing how the integrity of samples and the surrounding environment can be maintained during their collection and subsequent analysis. It is important that the chosen scenario (e.g. collection of samples for forensic analysis, collection of water samples for analysis of contaminants) involves handling of samples both in the field and in the laboratory. The level of AC given (P3/M3/D1) will depend on the level of analysis of the techniques used to avoid contamination and not on the level of detail of the stages involved in processing samples. Some candidates have been given ACs M3 or D1 for detailed staging of samples processing without adequate description or explanation of the techniques involved.

Unit 6 – Careers in Science (Optional)

The focus of evidence generated for this unit should be on careers involving science. This will limit the range of organisations that can be considered, and will also exclude consideration of catering, security, or secretarial positions within scientific organisations. However, the role of scientists in managerial positions is worthy of consideration but is frequently overlooked by candidates.

AC P1 (LO1) simply requires candidates to identify areas of employment within the science sector. There is no requirement to describe the nature of organisations within identified areas of employment. It is suggested that candidates start by identifying areas of employment locally, perhaps by identifying employing organisations, then work up to the national level, and then to the international level (again by identifying employing organisations). For AC M1 (LO1), it is not sufficient to simply state which of the identified areas are in growth or decline, there must be an evaluative or judgemental statement, ideally accompanied by quantitative data, as evidence.

AC P2 (LO2) requires that one organisation is described in outline, and career options within that organisation identified and described in brief. Some centres are developing the evidence provided for AC P1 and so considering more than one organisation, but to the detriment of the detail provided for any one. A selection of a local organisation would allow for employer engagement, which might assist in providing candidates with information which they would otherwise find difficult to access. AC M2 (LO2) should follow on from AC P2, by consideration of one of the career options identified in the selected organisation (some candidates are selecting career options which are not related to evidence provided for ACs P2). There should be consideration of qualifications required for entry, further training or qualifications, professional qualifications, and career progression. AC D2 (LO3) requires candidates to do more than just list the advantages or disadvantages of their chosen career. To assess the advantages or

disadvantages candidates must at least rank advantages and disadvantages in terms of their significance within each category and between categories.

ACs P3 and M3 (LO2) are often poorly differentiated, with the result that the evidence provided for both is confused and lacking in both depth and breadth. For AC P3, candidates should produce a step-by-step plan detailing the stages involved in a job-search (including reference to sources of relevant job advertisements). For AC M3, candidates should produce a plan to apply for an identified job. This should include a skills audit, a plan to address any skills deficits, a CV, back-ground research on the company, and a list of possible interview questions and model answers.

Unit 7 – Food Production (Optional)

A detailed delivery guide, resources link, and introductory presentation have been produced for this unit. They are available under "Teaching & Leaning Resources" in the qualification area of the OCR website.

Unit 8 – Science of Health (Optional)

ACs D3 (LO2), and D4 (LO4) require candidates to evaluate rather than simply explain or describe the topics concerned. Centres have been awarding these ACs when there is minimal or no evaluation present (see General Comments above).

Evidence towards AC D2 (LO2) is often confused. Candidates frequently have trouble distinguishing between the mechanism by which bacteria develop resistance to antibiotics, and how over-prescription of antibiotics leads to prevalence of antibiotic resistant bacteria.

AC M4 (LO3) requires that candidates "illustrate" how education can reduce the effects of STIs on society. This requires that candidates use as a case study one relevant health education campaign. It is not sufficient for candidates to write in general terms about the benefits of health education in the context of STIs.

For AC P6 (LO4), three genetic disorders should be considered. The evidence can be presented in the form of a table. Candidates should be guided in their choice of disorders so that at least two can be diagnosed through screening. These can then be used to generate evidence towards AC M5 (LO4). There is no need for candidates to consider a wide range of disorders when generating evidence towards this AC. Evidence towards AC D4 (LO4) can be considered in the context of the conditions considered for AC M5 or be considered in more general terms. Consideration in the context of AC M5 might provide candidates with more focus when considering the implications of genetic screening.

Unit 10 – Chemistry of Production (Optional)

A detailed delivery guide, resources link, and introductory presentation have been produced for this unit. They are available under "support materials" in the qualification area of the OCR website.

The attention of centres is drawn to a discrepancy between the URS and the assessment and grading criteria in the unit specification on the one hand, and the teaching content, delivery guidance, and suggested assessment scenarios and guidance on assessment in the unit specification, and the information contained in the delivery guide on the other. ACs P6 and M4 (LO4), relating to safe transport of chemicals, have been omitted from both the URS and the assessment and grading criteria in the unit specification. They do appear within other sections of the unit specification and in the delivery guide. Centres are required neither to cover nor assess these components of the specification.

Unit 14 – Physics in Sport (Optional)

A detailed delivery guide, resources link, and introductory presentation have been produced for this unit. They are available under "Teaching & Leaning Resources" in the qualification area of the OCR website.

Unit 15 – Science of Telecommunications (Optional)

ACs P1, M1, and D1 (LO1) can be evidenced by production of a table comparing different communication systems in everyday use. Centres should note that both P1 and D1 only require candidates to describe the communications systems and the factors influencing their choice by customers, but the M1 does require candidates to evaluate the advantages and disadvantages of the different communications systems. ACs P1, M1, and D1 can be linked to LO3 (ACs P3, M3, and D2).

Rather than simply researching a list of definitions of wave properties and their effects on the transmission of information for LO2, candidates should be given the opportunity to carry out a number of short practical investigations on wave properties. From these they could produce notes to address ACs P2 and M2.

LO3 (ACs P3, M3, and D2) builds on LO1 and, for P1, requires candidates to research the parts of the electromagnetic spectrum and describe how each is used in communication system. M3 is addressed by explaining the advantages and disadvantages of different wavelengths of electromagnetic radiation when use for communications. When this is linked back to why different wavelengths are used in specific applications (why the advantages and disadvantages of particular wavelengths fit them for particular purposes), this will address D2.

LO4 requires candidates to consider some of the problems encountered in transmitting messages. P4 is generally well addressed by candidates, who are able identify obstacles to the transmission of signals and their impact on the transmission of the signal. However, attenuation of a signal by the medium through which it is travelling is often not considered. Candidates frequently overlook the need to compare the level of impact of obstacles on the transmission of signals for M4. Without M4 having been addressed D3 cannot be given, but D3 itself presents few problems to candidates (although quantitative considerations are rarely seen).

Sector update

The final deadline for registration of candidates for this qualification has now been extended to 31/12/2024 (from 30/04/2020).

The following resources are available on the qualification are of the OCR website:
- Centre Handbook
- Internal Standardisation Guide and internal standardisation forms
- Unit Recording Sheets (URS)
- Candidate Authentication Statement
- Rules of Combination Calculator
- Learner Progress Tracker
- Student Guide
- Lost Centre-Assessed Work Form
- Unit Specifications
- Skills Guides
- OCR Reports to Centres
- Witness Statement
- Model Assignment – Unit 1
- Delivery Guide – Units 1, 3, 7, 10, 14
- Introductory Presentation – Units 1, 3, 7, 10, 14
- Resources Links – Units 1, 3, 7, 10, 14

Subject specific enquiries may be directed to the Subject Advisers for science at science@ocr.org.uk

All other enquiries relating to administration of the qualification should be directed to the OCR Customer Support Centre.

Notes to Centres

The Level-3 Cambridge Technical in Applied Science (formerly Laboratory Skills) qualifications suite offers a Level 3 progression from this qualification.

Two key changes have occurred in relation to the Level 3 Technicals qualifications, both in relation to the examined units; firstly, an additional re-sit has been allowed, so candidates can have 2 further attempts at an examined unit if they wish to improve their result from the first attempt made. And secondly, a 'near pass' R grade has been introduced, which enables candidates who do not pass but achieve sufficient marks to gain some points for their examined unit outcome, which may mean that it is not necessary to re-sit the exam.

About OCR

OCR (Oxford Cambridge and RSA) is a leading UK awarding body. We provide qualifications which engage people of all ages and abilities at school, college, in work or through part-time learning programmes.

As a not-for-profit organisation, OCR's core purpose is to develop and deliver general and vocational qualifications which equip learners with the knowledge and skills they need for their future, helping them achieve their full potential.

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