OCR
Oxford Cambridge and RSA

CAMBRIDGE TECHNICALS LEVEL 3 (2016)

Moderators' report

APPLIED SCIENCE

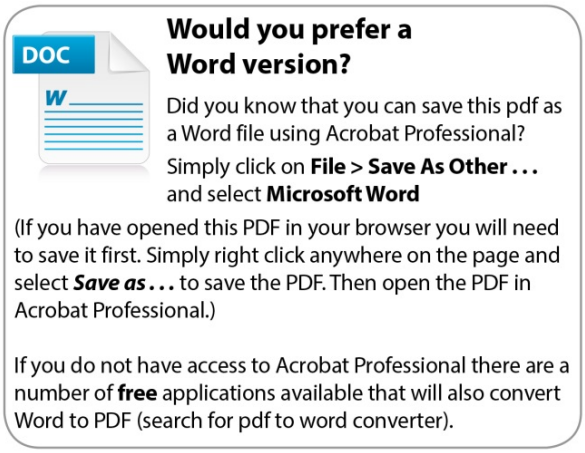
Cambridge TECHNICALS

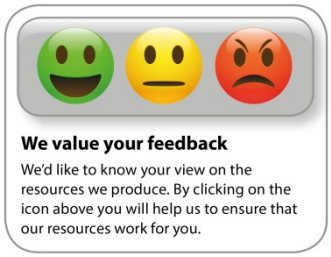
05847–05849, 05879, 05874

2019 series

Version 1

Contents





Introduction

Our Moderators' reports are produced to offer constructive feedback on centres' assessment of moderated work, based on what has been observed by our moderation team. These reports include a general commentary of accuracy of internal assessment judgements; identify good practice in relation to evidence collation and presentation and comments on the quality of centre assessment decisions against individual Learning Outcomes. This report also highlights areas where requirements have been misinterpreted and provides guidance to centre assessors on requirements for accessing higher mark bands. Where appropriate, the report will also signpost to other sources of information that centre assessors will find helpful.

General overview

Centres ensured claims for units were submitted on OCR Interchange prior to the moderation visit with the initials of the assessor who assessed the candidate's work included where relevant. Centre assessors are now only submitting whole units when making a claim on interchange and realise that they do not need to make a claim when the whole cohort have completed but are submitting when the candidate is ready.

Most centres ensured the URS sheets were accurately completed. However, not all candidates page numbered their portfolios; consequently when the assessor completed the URS sheet they could not enter the page numbers for the different criteria onto the URS. This in turn hampers moderation as specific evidence is not easily located. Unit page numbering on the URS comes more important when units are combined as a project. Cross unit projects are being seen more often as assessors are aware of cross unit linkage. Within each unit specification unit linkage is indicated within a table.

Most assessor comments on the URS were personal to the candidate's quality of evidence. However in a few cases, comments were just a repeat of the criteria.

As centres become more experienced interpreting the content and grade criteria, evidence submitted has become more detailed and focused on the grade criteria.

The assessors should annotate the appropriate evidence in the portfolios. This guidance will indicate if the candidate has achieved the relevant grade criteria. If not, this feedback will indicate to the candidate that the evidence is either missing or needs to be improved. It also helps the moderator if the grades for the various learning outcomes are indicated on the portfolios at the appropriate place.

Verbal presentation by candidates would be useful especially when carrying out investigations and discussions. A witness statement giving exactly the competences displayed by the candidates would evidence this. Again, witnessed audit trails of candidates' online interactive activities could be used to show the breadth and depth of candidates' competence.

All research was well referenced throughout by candidates.

Candidate results for the externally assessed Unit 2 tend to be higher if candidates have carried out the relevant practical experiments before sitting the external exam. It is recommended that candidates maintain an experimental logbook for Unit 2 and Unit 3 as not only will it help candidates in external exams, but it can be used to support grading in the internal units.

At this stage of the qualification most centres were only presenting evidence for the Extended Certificate.

Unit 6

Consider the order of delivering LOs/criteria. If D1 and D3 are introduced first by investigating different bio-hazard labs then the relevance of legislation and regulations become apparent.

Evidence for D1 (Evaluate the effectiveness of current legislation in safe working practices in the control of diseases) can be supported by researching accidents before and after July 2011; such as the foot and mouth disease outbreak in Surrey, UK in August 2007 and the Health and Safety Executive investigations into more than 40 incidents at specialist labs between June 2015 and July 2017. Evidence for D2 (Evaluate the potential impact of poor procedures and practices on individuals and the environment) can be supported by researching the accidents due to human error and the impact on environment; such as live anthrax being sent from a government facility to unsuspecting labs across the UK, a mistake that exposed other scientists to the disease.

For LO3, candidates will be used to working in a centre laboratory but not realise the detailed procedures required when handling very contagious microorganisms. There are different designed laboratories for different levels of biohazards There are four levels of containment laboratories to work with different levels of biohazards.

When planning a laboratory, candidates could consider information provided by the A.S.E. as well as relevant health and safety legislation affecting the control of diseases in a laboratory and NERC guidance on design of safe laboratories. http://www.nerc.ac.uk/about/policy/safety/procedures/guidance-laboratories/

An initial introduction examining the different level of containment laboratory might enhance candidates' approach to compiling evidence. Candidates' experience of science laboratories has been mainly limited to a centre laboratory. Their experience can be enhanced by the use of the videos in OCR's Sanger Project, which will allow candidates to 'visit/see/experience' a range of bio-laboratories.

The laboratory designs varied with some tending to be general and lacking detail as well as explanation. The types of material used could have been included. There needs to be more detail of the materials that would be used for the furniture, flooring, work benches etc. and how the design could minimise risks.

Others were more detailed, as a scenario had been set so the laboratory was designed with a specific purpose.

Make sure assessment of P4 evidence includes comments relating to the design specification to control risks i.e. does the candidate's design control risks.

For D3, by listing containment control regulations and control of diseases in a laboratory legislation will introduce candidates to the idea that in most career situations there are relevant regulations and legislation.

When presenting designs for a bio-lab, candidates should explain the design brief; this in turn will support their knowledge of hazards and safe working procedures.

For LO2, a risk assessment is simply a means of determining the risk associated with work with a particular hazard. In the workplace, this is most often broken down into five steps.

The methods chosen to control the risks identified by the risk assessment should follow the hierarchical approach which is common to both MHSWR and COSHH.

Candidates should consider how laboratory acquired infections can be prevented the as well as legislation and guidance for working with biological agents and how it influences procedures and practices.

When evaluating the effectiveness of current legislation and procedures, candidates could analyse data from infections in various types of laboratory.

For P2, the approach to risk assessing should be developed so that it could be applied to a broad range of circumstance i.e. COSHH's 5 Steps to risk assessment, an hierarchical approach to eliminating and controlling risk. This will mean that candidates could assess risk in any situation.

Candidates need to broaden the range of risk assessments to disposal of waste and the actual chemicals used. Candidates might view a procedure following good practice and another following bad. They may notice simple things such as space or setting up of equipment so it is safe and easy to reach as well as 'protecting' the environment. This should introduce candidates to real life bio-hazard level laboratories.

Centres should make sure the risk assessments are carried out using a formal risk assessment document which is then checked and signed off.

For LO1, candidates need to know how organisms cause disease and how pathogens are transmitted to be able to reduce risks in a laboratory as well as to categorise hazard substances.

For M1, the detail of the transmission of pathogens needs to be expanded. This could be done with examples, which in turn will give candidates a broader understanding for possible situations in the future.

Unit 18

For LO1, Be able to classify and identify microorganisms, centres tended to use detailed descriptions with downloaded images. If candidates use downloaded images by adding their own labels, it will indicate the knowledge of the grade criteria. A few centres approached the learning objective with a more practical approach, candidates were given a range of slides of microorganisms which they identified giving an analysis of their findings. This was linked to Unit 2, LO4, Be able to examine and record features of biological samples, with candidates recording relevant data and making biological drawings while using a microscope. This approach gave a greater 'hands-on' scientific approach as candidates will be using Gram Staining and DNA extraction methods.

For LO2, Understand the use of microorganisms in agriculture, centres tended to approach this in two ways. One approach was to give a global view allowing discussion and presentations with the use of witness statements supporting candidates' notes and in one case, videos of the presentations supported grading. It may help candidates in presenting their evidence logically if they order their evidence under subheadings. Statements from the specifications would be a useful starting point for this or another way is to analyse and evaluate the introduction of two or more crops. If time allowed, this second approach would allow candidates to undertake visits and record data which could then be analysed.

For LO3, Be able to use microbiology in food production, centres gave a general overview of the four industries given in the specifications.

The grade criteria, requires only one food to be produced– consideration could be given to linking with Unit 21 Product testing techniques. Evidence needs only be presented once and can cover several units.

Centres produced a range of food products, however, some foods allowed a greater depth of knowledge to be shown. This was reflected in M4, Describe the biochemical processes involved in the production of a food from microorganisms, with some candidates giving little evidence for biochemical processes.

For LO4, Understand the action of antimicrobials on microorganisms, a few centres linked this learning objective to Unit 6. Centres were able to give detailed evidence supported with images and the use of case studies to broaden their evidence with summaries from The World Health Organisation and England, the Health and Social Care Act 2008 Code of Practice.

Unit 21

Some centres linked activities across units to produce a project approach; linking testing practicals in Unit 21 to production in unit 18. Also the laboratory logbooks used by centres in Unit 2 can be linked to the other units in the qualification, displaying a great understanding of a 'real' scientific approach to learning.

The approach should be that all measurements and observations should be recorded in tabular form where appropriate. Measurements should be recorded to the degree of accuracy of the equipment used. Candidates should be careful in the use of significant figures and decimal places with the evaluations needing to have depth with a reasoned opinion based on the evidence collected. Candidates should look carefully at using correct science in the evaluations, some were lacking in detail and did not really show

enough understanding. The evaluations should also include comments on the validity and reliability of the investigation as well as how it could be improved.

For LO2, when candidates consider the tests in P2; they should consider the sensitivity, accuracy and repeatability/reproducibility of each test. This would then link into M2 as well as support the development of regulations in LO1.

Some candidates' evidence for M2, explain how the effectiveness of consumer product testing is established, was not full enough.

LO3, in D1, some candidates linked the results in M3 to establish the comparison of results. Again candidates can link to P2 (test selected) when considering the accuracy of their results.

Most common causes of centres not passing

If centres are over generous in their application of the marking criteria, at moderation their grades may be adjusted to reflect this. This tends to happen when the centre's internal standardisation process is ineffective. OCR has an internal standardisation generic guide on their website which promotes good practice.

Common misconceptions

Unit 6

'The laboratory is not really that dangerous'. Accidents can and do happen but can be reduced if correct procedure is followed.

'All bacteria are harmful'. Most bacteria are not harmful, and we have non-harmful bacteria living in our intestines and on our skin. Bacteria are useful to us, used to make food such as cheese and yoghurt, used in biotechnology to make medicines, such as human insulin.

'Health and safety is just governed by 'Laboratory Rules''. Health and safety, COSHH and RIDDOR regulations will apply in all laboratories as well as standard operating procedures. They are dependent on the level of containment necessary when dealing with microorganisms.

Unit 18

'Genetic engineering is always wrong.' There are benefits as well as disadvantages to genetically engineered plants.

'Viruses can be treated with antibiotics.' Antibiotics can only be used to treat bacterial infections and will have no effect on a virus.

'E.coli bacteria are always harmful.' *E.coli* bacteria are mostly harmless and can be found living on our bodies. It is only a small percentage that cause illness.

Unit 21

'Solubility.' Many candidates think that chemical substances are soluble in one solvent, and not in another, and do not necessarily think that substances can have differing solubilities in a range of solvents.

Avoiding potential malpractice

Malpractice in internal units is usually seen as plagiarism which is '*unacknowledged copying from or reproduction of published sources or incomplete referencing'.* Mostly plagiarism occurs when candidates copy and paste from the internet, but it can occur when work is copied from previously submitted assessments by other candidates. As a teacher you must confirm that the work produced is solely that of the candidate concerned. You must not accept work which is not the candidate's own.

Helpful resources

OCR provides on their website: delivery guides; project delivery approaches, teaching activities, teacher guides and resource lists. There are also model assignments provided by OCR which can be used directly or modified to suit the local environment. However, centres can create their own assignments but they must allow the candidate to achieve all grade criteria specified for the relevant unit. Centres do not have to set the same assignment for every candidate in the cohort. You can also cover more than one unit in an assignment.

Additional comments

OCR has a range of support for centres, this includes an assignment checking service as well as advisory support including: entry and assessment administration; qualification structure; assessment methods.

Supporting you

For further details of this qualification please visit the subject webpage.

Review of results

If any of your students' results are not as expected, you may wish to consider one of our review of results services. For full information about the options available visit the OCR website. If university places are at stake you may wish to consider priority service 2 reviews of marking which have an earlier deadline to ensure your reviews are processed in time for university applications.

Mark grade boundaries

Find the grade boundaries for this series on the OCR website.

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

The small print

OCR Resources: *the small print*

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by OCR. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

This resource may be freely copied and distributed, as long as the OCR logo and this small print remain intact and OCR is acknowledged as the originator of this work.

Our documents are updated over time. Whilst every effort is made to check all documents, there may be contradictions between published support and the specification, therefore please use the information on the latest specification at all times. Where changes are made to specifications these will be indicated within the document, there will be a new version number indicated, and a summary of the changes. If you do notice a discrepancy between the specification and a resource please contact us at: resources.feedback@ocr.org.uk.

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here: www.ocr.org.uk/expression-of-interest

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk

Looking for a resource?

There is now a quick and easy search tool to help find **free** resources for your qualification:

www.ocr.org.uk/i-want-to/find-resources/

www.ocr.org.uk

OCR Customer Support Centre

Vocational qualifications

Telephone 02476 851509
Facsimile 02476 851633
Email vocational.qualifications@ocr.org.uk

OCR is part of Cambridge Assessment, a department of the University of Cambridge. *For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored.*

Cambridge Assessment

CERTIFIED ISO 9001 UKAS MANAGEMENT SYSTEMS 001