Model Assignment

Specimen Internal Assessment Material

OCR Level 1/2 Cambridge National Certificate in Science in the Workplace

R078: The science of production

SPECIMEN INTERNAL ASESSMENT MATERIAL – THIS VERSION SHOULD NOT BE USED FOR LIVE ASSESSMENT

Please note:

This OCR model assignment is to be used to provide evidence for the unit identified above. Alternatively, centres may 'tailor' or modify the assignment within permitted parameters (see Information for Teachers). It is the centre's responsibility to ensure that any modifications made to this assignment allow learners to show that they can meet all of the learning outcomes and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

INSTRUCTIONS TO TEACHERS

The OCR administrative codes associated with this unit are:

- Unit entry code R078
- Certification code J816

The accreditation numbers associated with this unit are:

- Unit reference number A/504/3044
- Qualification reference 600/7042/0

Duration: Approximately 20 hours

Contents

Model Assignment: Learner Information

OCR Level 1/2 Cambridge National Certificate in Science in the Workplace

R078: The science of production

Your tasks

(Note to Ofqual Reviewers - Files from OCR will be made available to centres via the OCR Website/Interchange for download by the centres. Full details will be available in time for first teaching. Centres will be required to give learners access to them and give them instructions as to how to access them).

Read through all of the tasks carefully, so that you know what you will need to do to complete this assignment.

Task 1 - Research/practical task: Using neutralisation reactions

a) There are a number of chemicals that can be produced by neutralisation. Produce a report identifying commercially important chemicals produced by neutralisation reactions.

You need to

- explain how the chemicals are made
- describe how they are used
- say why they are commercially important.

b) Select the appropriate equipment and produce a fertiliser by neutralisation.

You should test the fertiliser, to compare the theoretical and actual yield of your product.

Comment on the suitability of your fertiliser for use with a crop.

Task 2 - Analytical/practical task: Monitor the growth of a plant

Maximising commercial plant growth is extremely important in ensuring our growing population has enough food.

a) You should produce an information leaflet on how to maximise commercial plant growth.

b) Based on the information in your leaflet you should choose one growing condition to test.

Grow a plant that has a commercial application, testing the effect of varying your chosen growing condition.

Task 3 - Analytical/practical task: Determine optimum production conditions

a) Products produced by microorganisms can be both helpful and unhelpful to humans.

You should produce a presentation to explain how microorganisms can be used to produce a range of **useful** products and the conditions needed for the production of these products.

b) Produce a product using microorganisms.

You should select appropriate equipment and determine the optimum production conditions.

Task 4 - Research task: The purpose, structure and roles within a producer organisation

A production company needs to recruit new staff for technical roles within the company.

Choose a production company. You should produce a recruitment brochure to explain how the production company operates and the roles of some of the people within it.

RECOGNISING ACHIEVEMENT

Information for Teachers

OCR Level 1/2 Cambridge National Certificate in Science in the Workplace

R078: The science of production

General guidance on using this assignment

1 General guidance

1.1 OCR assignments are available to download free of charge from our website: www.ocr.org.uk

1.2 OCR assignments are intended to be used for summative assessment of learners. The OCR specification for this qualification gives more information on the arrangements for assessing internally assessed units.

1.3 This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge, understanding and skills of the unit.

1.4 There are 4 assessment tasks:

Task 1 – Practical task: Produce a fertiliser

Task 2 – Analytical/practical task: Monitor the growth of a plant

Task 3 – Analytical/practical task: Determine optimum production conditions for a product made by a microorganism

Task 4 – Research task: The purpose, structure and roles within an organisation that produces products

2 Before carrying out this assignment

2.1 When the skills, knowledge and understanding identified in the specification have been taught, learners should be provided with a copy of the *Learner Information* section of this assignment. Each task is relevant to particular Learning Outcomes, so tasks may be presented to learners when they are judged to be ready to undertake them; they do not all need to be left until the end of the module.

2.2 Learners will not need to carry out any preparations prior to undertaking the assessment tasks, such as collating resources to use in the assessment.

2.3 We have estimated that it will take approximately 20 hours to complete this assignment. This is the recommended time but centres can decide how the time can be allocated between each part or individual task in the assessment. Centres are also permitted to spread the overall assessment time across several sessions and therefore it is permissible for evidence to be produced over several sessions.

2.4 It is expected that before learners attempt assignment tasks, they will have received general preparation in their lessons. For the practical procedures, the details of practical techniques, the development of skills associated with these techniques, and the methods and choice of equipment for the task should be covered when teaching the particular part(s) of the specification which the assignment relates to, and should be completed prior to undertaking the task.

From their learning for LO1, learners will know of a range of chemicals, of importance to society, that are produced on a large scale. They will understand that many soluble salts we use, for instance fertilisers, and made by neutralisation of an acid with an alkali.

From their learning for LO2, learners will be able to make a fertiliser, such as ammonium sulphate, by a neutralisation reaction of ammonia solution and dilute sulphuric acid and also measure the yield of the reaction.

From their learning for LO3, learners will know about the factors that affect the growth of plant crops. They will understand ways in which plant yields can be maximised, and that the selection of the appropriate commercial plant variety is an important factor.

From their learning in LO4, learners will be able grow a plant of commercial importance and monitor its growth. The choice of plant might be limited by the time that learners will have on the timetable and a fast growing plant, such as cress or radish might be chosen.

From their learning in LO5, learners will consider the types of useful products made using microorganisms, and will understand that these are products of the microorganisms' respiration or other metabolic products. Learners will understand that optimum production requires the provision of appropriate conditions for the microorganisms to grow.

From their learning in LO6, learners will use suitable methods for determining the optimum conditions for growth of the microorganism/ production of the product. They may wish to produce products such as yogurt or alcohol. To determine the optimum conditions learners will need to carry out the production process under different conditions to determine the optimum.

From their learning in LO7 and LO8, learners may be able to see a career pathway within the production industry.

2.5 Learners should be made aware of the health and safety issues associated with the practical tasks.

2.6 Learners should also be made aware of the marking criteria for each task.

3 When completing the assignment and producing evidence

3.1 Each learner must produce individual and authentic evidence for each task within the assignment, though when undertaking practical work, learners may work in groups, as specified for the tasks concerned.

3.2 Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them and giving general feedback that enables the learner to take the initiative in making improvements, rather than detailing what amendments should be made. However, where more specific support is provided so that learners are able to make progress with the task or to ensure safety, this must be reflected in the marks awarded. It is not acceptable for teachers/deliverers to provide answers or to work through answers in detail.

3.3 For the practical procedures, teachers are responsible for ensuring appropriate health and safety procedures and all appropriate steps taken to reduce risks are carried out, including a risk assessment for the task, prior to learners attempting the practical work. It is the centre's responsibility to ensure the safety of all learners involved in any investigation.

The work of individual learners may be informed by working with others but each must provide an individual response. Learners should be made aware of the time allowed for carrying out this part of the task. Learners' access to resources is determined by those available to the centre.

3.4 Task 1 covers LO1 and LO2. Learners will produce a description of commercially important chemicals that can be produced by neutralisation. Learners then carry out the neutralisation reaction and explain the theory behind the reaction. From the actual yield produced and the theoretical yield, the percentage yield can be calculated. A qualitative statement of the yield is also made. It will be expected that each learner will carry out the practical procedure as an individual.

Task 1 is expected to take 4 hours.

3.5 Task 2 covers LO3 and LO4. Learners will produce a description of the factors that affect plant growth how they can be altered to optimise growth. Learners then monitor the growth of their chosen plant. It is expected that learners will grow a batch of their chosen plant taking measurements over a period of time.

Task 2 is expected to take 5 hours.

3.6 Task 3 covers LO5 and LO6. Learners will produce a description of the conditions required to produce a wide range of useful products by microorganisms and why conditions affect production. Learners should then carry out an investigation where they monitor the production of products by microorganisms. They are then required to determine the optimum conditions for production by calculating the yield and making a qualitative statement on the yield.

Task 3 is expected to take 4 hours.

3.7 Task 4 covers LO7 and LO8. Learners will describe the purpose and structure of an organisation in the production sector and the careers roles within it. Research should be carried out independently; if guidance is given then this should be reflected in the learner's marks. The use of guest speakers or shadowing professionals is a possibility. This task could be combined with work experience but it is not an essential part of the requirements for this unit.

Task 4 is expected to take 7 hours.

3.8 We have specified what evidence the learner is expected to produce, but it is important to note that if it is possible to generate the evidence in a variety of formats, then the learner is free to use the format that is most appropriate for them. Centres must advise learners as to the most appropriate format of evidence. Format must not be confused with the content or the type of datafile to be produced. Guidance on suitable formats of the evidence is provided in the section *Evidence Summary*.

4 Presentation of work for marking and moderation

4.1 Centres wishing to produce digital evidence in the form of an e-portfolio should refer to the appendix in the specification on guidance for the production of electronic assessment. *(Note to Ofqual reviewer, the arrangements for electronic evidence will be available in time for first teaching).*

4.2 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, treasury tag.

5 Scope of permitted model assignment modification

The model assignment is very self-contained in its present form. The set of tasks form a coherent whole addressing all the learning outcomes and allowing access to the full range of marks.

You **must not** change the following:

• the learning outcomes

• the marking criteria

• the requirements for supervision and authentication as described in the specification (section 'The internally assessed units').

Permitted changes:

The model assignment can be modified in terms of the areas described below at the permission of OCR but centres must be sure that learners still have the opportunity to cover all of the learning outcomes and to access the full range of marks:

• the learner's assignment, which can be contextualised or amended to suit local needs

• to allow for differences in the materials, equipment and facilities at different centre.

OCR has ensured that in the language used and the tasks and scenario provided we have avoided discrimination, bias and stereotyping and support equality and diversity. In the development of qualifications and assessments we use the guidance given in the Ofqual publication *Fair access by design,* notably this includes:

- using language and layout in assessment materials that does not present barriers to learners
- using stimulus and source materials in assessment materials (where appropriate) that do not present barriers to learners.

If centres wish to adapt the model assignment we strongly advise that staff responsible for modifying the model assignment and quality assuring it refer to the publication *Fair access by design*.

If modifications are made to the model assignment, whether to just the scenario or to both the scenario and individual tasks, it is up to the centre to ensure that all learning outcomes can be met and that learners can access the full range of marks.

Evidence summary

When completing this assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive.

Task	**What do learners need to produce (evidence)**
Task 1	Material is likely to be in a variety of forms to meet the requirements of presenting a range of different types of evidence, including graphical presentations of quantitative information, pictures etc. and could include the use of ICT, posters, videos. Witness statements of the learner's ability to carry out procedures. Written record of the measurements taken and calculations necessary to derive the outcomes necessary.
Task 2	
Task 3	
Task 4	Material could be in a number of forms, such as a PowerPoint presentation, a short video, an article or a leaflet.

Apparatus and materials for the practical procedures

Making a fertiliser
The apparatus learners may need:

- Small conical flask
- Small beaker
- Large beaker
- Pipette
- Burette
- Burette stand
- White tile
- Evaporating dish
- Water bath (for initial evaporation)
- Electronic balance

Monitoring plant growth
The apparatus needed will depend upon the environments available to learners but learners may require:

• Resources for measuring conditions (such as for pH, carbon dioxide concentration, nitrates, phosphates, potassium oxygen concentration, temperature, water content, light intensity)

• Resources for measuring plant growth (such as ruler, callipers, electronic balance)

Product produced by a microorganism
The apparatus needed will depend upon the environments available to learners but learners may require:

• Resources for measuring conditions (such as for pH, temperature, nutrient concentration)

• Resources for measuring plant growth (such as for counting cell numbers, density viscosity)