T-LEVELS | Institute for Apprenticeships & Technical Education

T Level Technical Qualification in Science

Occupational specialism assessment (OSA)

Laboratory Sciences

Assignment 1

Provider guide

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Contents

Introduction

This occupational specialism is assessed by a synoptic assessment consisting of a package of 3 assignments. The assignments require the student to independently apply an appropriate selection of knowledge, understanding, skills and techniques developed throughout the full course of study, in response to briefs or tasks. This will allow the student to demonstrate that they have met a level of threshold competence in the performance outcomes of the occupational specialism.

The synoptic assessment for this occupational specialism is graded by pass, merit or distinction, and the final grade will contribute 60% of the overall technical qualification grade. Therefore, it is important that students have the opportunity to produce work of the highest standard they can. The assignments within this synoptic assessment are designed to allow the student to do this in a way that is as occupationally realistic as possible.

What is threshold competence?

Threshold competence is defined as a level of competence that:

- signifies that a student is well-placed to develop full occupational competence with further support and development, once in employment
- is as close to full occupational competence as can be reasonably expected of a student studying the technical qualification in a provider-based setting with a substantial industry placement
- signifies that a student has achieved the level for a pass in relation to the relevant occupational specialism component

This level is reflected in the grading descriptors of the occupational specialism and successful completion of the assignments will ensure that students are well-placed to develop full occupational competence once in employment. Grading descriptors can be found in the technical qualification specification document.

What is synoptic assessment?

Synoptic assessment is a form of assessment in which students are required to demonstrate that they can identify and use, in an integrated way, an appropriate selection of skills, techniques, concepts, theories and knowledge from across the technical area, relevant to the tasks.

Synoptic assessment is integral to high-quality technical qualifications to allow students to demonstrate a holistic understanding of the sector, making effective connections between different aspects of the subject content.

The assignments and tasks in this assessment are designed to be synoptic in a way that is as occupationally realistic as possible.

How will students be assessed?

Students will be assessed against the following set of performance outcomes (POs) that describe what the student should be able to do.

Laboratory Sciences POs	
PO1	Perform a range of appropriate scientific techniques to collect experimental data in a laboratory setting, complying with regulations and requirements
PO2	Plan, review, implement and suggest improvements to scientific tasks relevant to a laboratory setting
PO3	Identify and resolve issues with scientific equipment or data errors

The synoptic assessment consists of 3 assignments:

Assignment 1

Perform a literature review surrounding a given problem that is relevant to an occupational setting. Carry out a literature review to determine suitable methods, and how to interpret results.

Students will be provided with an online information package of literature sources. They should search only these sources to find relevant material and to carry out the review.

Students should write a literature review which demonstrates how they have evaluated which literature to select for the task, including justifications for the literature selected.

Use this knowledge to design a scientific standard operating procedure (SOP) and related risk assessment (RA) that could be used to determine whether the new technique would offer an improvement over current process.

Select key information that will be needed to write the SOP and to interpret the results, for example:

- information that would help to inform the methods, techniques and equipment used
- how results are determined
- the results expected
- safety considerations

Comment on the quality and reliability of the information used.

Reference any sources of information.

Assignment 2

Perform 2 experimental techniques relevant to an occupational setting that will be assessed in terms of the student's ability to competently, accurately and safely perform the technical task to acquire the necessary data.

Assignment 3

Review a given set of experimental data/records to identify potential errors in either samples/equipment or usage of equipment by an operator. Identify the factors that could be contributing to any errors and suggest process improvements to rectify and prevent any errors identified.

Assignments are broken down into tasks where necessary. The assignments, tasks and associated guidance for students and tutors show how the assignments are expected to be delivered.

Evidence produced by students for the assignments will be sent to NCFE for marking. Assessment judgements, including overall judgement of the performance required at each of the grade boundaries, will be made by NCFE and results released to the provider at the appropriate time.

Assignment coverage

See the table at the end of this provider guide document which shows how the PO content is covered by the assignments and tasks.

Controls

There is a requirement for work completed under supervised conditions to be collected and securely stored, for controls in place to ensure that providers do not release materials to their students until the appropriate time (and that when they do release materials, they are retrieved as appropriate), and for tasks designed in ways that minimise any advantage students might gain by having prior knowledge of what they entail.

Where the occupational specialism assessments allow for research requiring the use of the internet, students must reference the sources in their work.

Marks available

Marks available for each assignment are detailed below.

Assignment		**Raw marks**	**% weighting**
1	Perform a literature review and develop a new SOP and RA to investigate a possible process improvement	102 marks	47.9%
2	Perform an experimental task relevant to an occupational setting	70 marks	32.9%
3	Assess a given set of scientific data to identify potential sources of error in the data and suggest improvements to rectify these errors	41 marks	19.2%
	Total	**213 marks**	**100%**

Assignment timings

Assignment 1 consists of 3 tasks:

- task 1 involves a literature review in which students will be assessed on their ability to extract relevant information from literature within a searchable database given to providers - task 1 is allocated 3 hours
- the literature review will then be used by the student to support their development of task 2, designing a scientific task in an unfamiliar context and selecting appropriate equipment to complete a theoretical scientific practical - task 2 is allocated 3 hours
- task 3 will involve developing a risk assessment that would be followed alongside the student's scientific practical - task 3 is allocated 1 hour

To allow providers to plan for this, and to allow NCFE to arrange moderation visits, assignment 1 will be available to the provider from the start of delivery. A submission deadline for the evidence for assignment 2 will be set for

each academic year to allow NCFE to carry out moderation and awarding before the release of results in the August of that year.

Assignment 2 consists of 2 practical tasks in which students will be assessed on their ability to safely and effectively carry out a given technique. Assignment 2 is allocated 6 hours in total, split across a part A and part B, 3 hours for each. It will be assessed by direct observation and through the student's written record from the practical activity. Assessors will be required to observe each student while completing their practical task.

This assignment will be released on a particular date each year for delivery over a set window. These dates will be set to allow providers time to plan the delivery of the assignments. Evidence for assignment 2 must be returned to NCFE for marking after completion.

For assignment 3, providers and students will be provided with a dataset and scenario in which the student is expected to identify potential sources of error in the dataset and suggest the origins of any errors, as well as suggesting methods for rectifying and preventing these errors in the future. Assignment 3 is allocated 3 hours.

Assignment 3 will be assessed via the student's written records and will be released on a particular date each year for delivery across a defined assessment window (for example, 1 week). These dates will be set to allow providers time to plan the delivery of the assignments.

All evidence created, generated and recorded for these assignments is subject to data protection rules, and information should be anonymised to protect the rights of individuals, where relevant.

Assignment specific guidance

Required material

The provided material (including a searchable database of literature) will be sent to providers ahead of the assessment window. Providers must issue the provided material to their students upon commencement of task 1.

Students are not allowed to bring outside research or any other unauthorised materials into the supervised environment.

Assignment 1: perform a literature review and develop a new SOP and RA to investigate a possible process improvement

This assignment is to be completed under supervised conditions over a period of 7 hours, split into 3 tasks, of duration 3 hours, 3 hours, and 1 hour respectively. The assignment will be completed during a week-long assessment window. The 1 week assessment window will be specified by NCFE.

Providers may schedule supervised rest breaks during the tasks. Any rest breaks must be supervised, and students must not have access to any resources during this time. In addition, assessment materials must be kept securely and must not be removed from the supervised environment.

Providers must ensure that during each separate task, students have access to the provided searchable database of literature. Students also should have access to relevant material such as the pro-forma sheet provided for developing their RA for Task 3.

Resources required include access to the internet for the purpose of accessing the literature sources/links provided. Privacy mode should be disabled and policies applied to prevent deletion of browsing history.

Students are required to sign declarations of authenticity to confirm that all of the work they complete during the supervised assessment is their own. Students must be made aware of the importance of this declaration and the impact this could have on their overall grade if malpractice was to be identified. providers must also ensure that the students' work is authenticated by the tutor before it is submitted to NCFE for marking. The declaration forms are available on the NCFE website.

The assignment is a formal external assessment and must be conducted with reference to the instructions on the front of the assignment booklet, as well as the regulations for the conduct of external assessment and qualification specific instructions for delivery (QSID) documents, which should be accessed from the NCFE Website to ensure they are the most up-to-date versions.

Providers are not allowed to give any support or guidance to students during the supervised time.

Students must ensure that all materials can be identified as their own work.

Assignment coverage

Assignment 1: perform a literature review and develop a new SOP and RA to investigate a possible process improvement

K1.1: How health, safety and environmental practices are applied when performing scientific techniques

K1.3: The principles of the 'Universal Ethical Code for Scientists 2007' and how it affects ethical practices in a laboratory setting

K1.48: The factors to consider when choosing between a range of scientific techniques

K1.67: The purpose and importance of SOPs within the laboratory environment

K2.1: How the following considerations inform the planning of laboratory procedures:

- developing a specific hypothesis, where appropriate, for a scientific task:
  - translating the client objectives into the hypothesis
  - identifying the most appropriate techniques for a scientific task

K2.2: How to undertake literature searches and use scientific papers to plan scientific tasks

K2.3: The principles of laboratory method validation when planning scientific tasks

K2.4: The principles of laboratory equipment validation when planning scientific tasks

K2.5: The difference between concrete and abstract modelling techniques:

- concrete: a trial task prior to planning
- abstract: planning on paper or using computer simulations

K2.7: How to establish the validity of the results against standards and controls

S2.16: Perform a literature review to extract relevant information to support planning a scientific task

S2.17: Apply knowledge of scientific techniques to an unfamiliar context when planning a scientific task

S1.69: Comply with relevant health and safety legislation and regulations, including COSHH (Control of Substances Hazardous to Health) and biosafety containment levels, when handling and disposing of solids, liquids, and gases relevant for the scientific technique being performed, including:

- radioactive sources (for example, caesium-137)

S1.70: Complete a risk assessment to minimise potential hazards and risks when performing a scientific technique:

- step 1 - identifying the hazards, taking account of warning symbols and using model risk assessments:
  - chemical (for example, compressed gases, cleaning agents)
  - biological (for example, biological samples)
  - physical (for example, repetitive tasks, noise levels)
- step 2 - assessing the risks:
  - how likely is the scientific technique to go wrong?
  - who might be harmed?

  - what could be the consequences?
- step 3 - evaluating the risks and selecting control measures:
  - identifying alternate or safer methods than those proposed (for example, using a different concentration of chemicals)
  - identifying the appropriate PPE to use
- step 4 - recording findings, following the risk assessment, and amending the control measures as necessary:
  - in a clear and unambiguous way
  - using technical language correctly
  - organising the findings logically and coherently
  - using the appropriate vocabulary, spelling and grammar
- step 5 - reviewing risk assessment and modifying method where required

S1.71: Use appropriate PPE when performing scientific tasks (for example, suitable eye protection and gloves)

S2.15: Design a scientific task in an unfamiliar context, taking into consideration a range of factors

Performance outcome grids

Assignment 1

Task	PO1	PO2	PO3	Total
1	0	28	0	28
2	10	48	0	58
3	0	16	0	16
Total marks	10	92	0	102
% weighting	10%	90%	0%	100%

Document information

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