# Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities

## Specification (Wales only)

NVQ/Competence-based qualifications

First registration June 2011

Issue 2

**Edexcel, BTEC and LCCI qualifications**

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This specification is Issue 2. Key changes are listed in the summary table on the next page. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com

This qualification was previously known as:

Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities (QCF)

The QN remains the same.

*References to third party material made in this specification are made in good faith. Pearson does not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Material may include textbooks, journals, magazines and other publications and websites.)*

*All information in this specification is correct at time of publication.*

# Summary of Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities specification Issue 2 changes

| Summary of changes made between previous issue and this current issue | Page number |
|---|---|
| All references to QCF have been removed throughout the specification | |
| Definition of TQT added | 1 |
| Definition of sizes of qualifications aligned to TQT | 2 |
| TQT value added | 6 |
| GLH range removed and replaced with lowest GLH value for the shortest route through the qualification | 6 |
| Guided learning definition updated | 11 |
| QCF references removed from unit titles and unit levels in all units | 12-140 |

Earlier issue(s) show(s) previous changes.

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

# Contents

# Introducing Pearson Edexcel NVQ/Competence-based qualifications

## What are NVQ/Competence-based qualifications?

National Vocational Qualifications (NVQs)/Competence-based qualifications are work-based qualifications that give learners the opportunity to develop and demonstrate their competence in the area of work or job role to which the qualification relates.

NVQs/Competence-based qualifications are based on recognised occupational standards for the appropriate sector. Occupational standards define what employees, or potential employees, must be able to do and know, and how well they should undertake work tasks and work roles. These standards are written in broad terms to enable employers and providers to apply them to a wide range of related occupational areas.

NVQs/Competence-based qualifications are outcomes-based with no fixed learning programme, therefore allowing flexible delivery to meet the individual learner's needs. At Level 2 and above, these qualifications are recognised as approved training and development courses for employees that have been in the workplace for some time or as a way of inducting, training and developing new entrants into the workplace. Qualifications at Level 1 can be used in Traineeships, which enables progression to entry level employment or to Apprenticeship programmes.

Learners will work towards their qualification in the workplace or in settings that replicate the working environment as specified in the assessment requirements. Colleges, training centres and/or employers can offer these qualifications as long as they have access to appropriate physical and human resources and have the necessary quality assurance systems in place.

## Sizes of NVQ/Competence-based qualifications

For all regulated qualifications, Pearson specify a total number of hours that it is estimated learners will require to complete and show achievement for the qualification – this is the Total Qualification Time (TQT). The TQT value indicates the size of a qualification.

Within the TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities, such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve tutors and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

As well as TQT and GLH, qualifications can also have a credit value – equal to one tenth of TQT, rounded to the nearest whole number.

TQT and credit values are assigned after consultation with users of the qualifications.

NVQ/Competence-based qualifications are available in the following sizes:

- Award – a qualification with a TQT value of 120 or less (equivalent to a range of 1–12 credits)
- Certificate – a qualification with a TQT value in the range of 121–369 (equivalent to a range of 13–36 credits)
- Diploma – a qualification with a TQT value of 370 or more (equivalent to 37 credits and above).

# Qualification title covered by this specification

This specification gives you the information you need to offer the Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities:

| Qualification title | Qualification Number (QN) | Accreditation start date |
|---|---|---|
| Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities | 600/1733/8 | 01/06/11 |

Qualifications eligible and funded for post-16-year-olds can be found on the funding Hub. The Skills Funding Agency also publishes a funding catalogue that lists the qualifications available for 19+ funding.

You should use the Qualification Number (QN), when you wish to seek public funding for your learners. Each unit within a qualification will also have a unique reference number, which is listed in this specification.

The qualification title and unit reference numbers will appear on the learners' final certification document. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

# Key features of the Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities

This qualification:

- is nationally recognised
- is based on the Level 4 Laboratory and Associated Technical Activities (NOS). The NOS, assessment requirements/strategy and qualification structure(s) are owned by SEMTA.

## What is the purpose of this qualification?

The Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities provides recognition of the skills and knowledge of individuals who work in a laboratory. It covers health and safety; effective working relationships; dealing with laboratory specimens/samples and communicating information.

## Who is this qualification for?

This qualification is for all learners aged 18 and above who are capable of reaching the required standards.

Pearson's policy is that the qualification should:

- be free from any barriers that restrict access and progression
- ensure equality of opportunity for all wishing to access the qualification(s).

## What are the potential job roles for those working towards this qualification?

- Analytical scientist
- Biochemist
- Biomedical scientist
- Biologist
- Biotechnologist
- Clinical scientist
- Microbiologist
- Physicist
- Research scientist
- Education laboratory technician
- Laboratory technician
- Medical laboratory technician

- Scientific laboratory technician

## What progression opportunities are available to learners who achieve this qualification?

Progression from this qualification can be to:

- directly into employment
- Pearson BTEC Level 4/ Level 5 HNC/HND in Applied Biology
- Pearson BTEC Level 4/ Level 5 HNC/HND in Applied Chemistry
- other higher education courses.

# What is the qualification structure for the Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical Activities?

The Total Qualification Time (TQT) for this qualification is 540 hours.

The Guided Learning Hours (GLH) for this qualification is 308.

Learners must achieve a minimum of 54 credits by completing four common mandatory units and four optional units. Two of these optional units must come from Group A and the other two optional units must come from Group B.

| Unit | Title | Credit | Level |
|------|-------|--------|-------|
| **Common Mandatory units** | | | |
| Unit 1: | Develop and maintain a healthy and safe work environment for scientific or technical activities | 8 | 4 |
| Unit 2: | Maintain effective and efficient working relationships for scientific or technical activities | 5 | 3 |
| Unit 3: | Assure quality processes and procedures for scientific or technical activities | 8 | 4 |
| Unit 4: | Carry out risk assessments on scientific or technical activity | 8 | 4 |

| Unit | Title | Credit | Level |
|------|-------|--------|-------|
| **Group A – Optional units** | | | |
| Unit 5: | Plan and run scientific or technical projects for workplace activities | 12 | 4 |
| Unit 9: | Develop and provide training for scientific or technical activities in the workplace | 8 | 4 |
| Unit 10: | Plan and conduct scientific or technical investigations | 12 | 4 |
| Unit 11: | Plan and monitor small scale processing activities | 9 | 4 |
| Unit 13: | Manage and monitor the work of scientific or technical teams | 10 | 4 |
| **Group B – Optional units** | | | |
| Unit 6: | Write scientific or technical reports for workplace activities | 4 | 4 |
| Unit 7: | Manage scientific or technical business processes for workplace activities | 12 | 4 |
| Unit 8: | Prepare and manage budgets for scientific or technical workplace activities | 8 | 4 |
| Unit 12: | Assess their own scientific or technical knowledge and skills for workplace activities | 4 | 3 |

# How is the qualification graded and assessed?

The overall grade for the qualification is a 'pass'. The learner must achieve all the required units within the specified qualification structure.

To pass a unit the learner must:

- achieve **all** the specified learning outcomes

- satisfy **all** the assessment criteria by providing sufficient and valid evidence for each criterion

- show that the evidence is their own.

The qualifications are designed to be assessed:

- in the workplace or

- in conditions resembling the workplace, as specified in the assessment requirements/strategy for the sector, or

- as part of a training programme.

## Assessment requirements/strategy

The assessment strategy for this qualification has been included in *Annexe C*. It has been developed by SEMTA in partnership with employers, training providers, awarding organisations and the regulatory authorities. The assessment strategy includes details on:

- criteria for defining realistic working environments

- roles and occupational competence of assessors, expert witnesses, internal verifiers and standards verifiers

- quality control of assessment

- evidence requirements.

Evidence of competence may come from:

- **current practice** where evidence is generated from a current job role

- a **programme of development** where evidence comes from assessment opportunities built into a learning/training programme whether at or away from the workplace

- the **Recognition of Prior Learning (RPL)** where a learner can demonstrate that they can meet the assessment criteria within a unit through knowledge, understanding or skills they already possess without undertaking a course of learning. They must submit sufficient, reliable and valid evidence for internal and standards verification purposes. RPL is acceptable for accrediting a unit, several units or a whole qualification

- a **combination** of these.

It is important that the evidence is:

| | |
|---|---|
| **Valid** | relevant to the standards for which competence is claimed |
| **Authentic** | produced by the learner |
| **Current** | sufficiently recent to create confidence that the same skill, understanding or knowledge persist at the time of the claim |
| **Reliable** | indicates that the learner can consistently perform at this level |
| **Sufficient** | fully meets the requirements of the standards. |

## Types of evidence (to be read in conjunction with the assessment strategy in Annexe C)

To successfully achieve a unit the learner must gather evidence which shows that they have met the required standard in the assessment criteria. Evidence can take a variety of different forms including the examples below. Centres should refer to the assessment strategy for information about which of the following are permissible.

- direct observation of the learner's performance by their assessor (O)

- outcomes from oral or written questioning (Q&A)

- products of the learner's work (P)

- personal statements and/or reflective accounts (RA)

- outcomes from simulation, where permitted by the assessment strategy (S)

- professional discussion (PD)

- assignment, project/case studies (A)

- authentic statements/witness testimony (WT)

- expert witness testimony (EPW)

- evidence of Recognition of Prior Learning (RPL).

The abbreviations may be used for cross-referencing purposes.

Learners can use one piece of evidence to prove their knowledge, skills and understanding across different assessment criteria and/or across different units. It is, therefore, not necessary for learners to have each assessment criterion assessed separately. Learners should be encouraged to reference the assessment criteria to which the evidence relates.

Evidence must be made available to the assessor, internal verifier and Pearson standards verifier. A range of recording documents is available on the Pearson website: qualifications.pearson.com. Alternatively, centres may develop their own.

# Centre recognition and approval

### Centre recognition

Centres that have not previously offered Pearson qualifications need to apply for and be granted centre recognition as part of the process for approval to offer individual qualifications. New centres must complete both a centre recognition approval application and a qualification approval application.

Existing centres will be given 'automatic approval' for a new qualification if they are already approved for a qualification that is being replaced by the new qualification and the conditions for automatic approval are met. Centres already holding Pearson approval are able to gain qualification approval for a different level or different sector via Edexcel online.

### Approvals agreement

All centres are required to enter into an approvals agreement which is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Pearson will act to protect the integrity of the awarding of qualifications, if centres do not comply with the agreement. This could result in the suspension of certification or withdrawal of approval.

# Quality assurance

Detailed information on Pearson's quality assurance processes is given in *Annexe A*.

# What resources are required?

Each qualification is designed to support learners working in the Laboratory and Associated Technical Activities sector. Physical resources need to support the delivery of the qualifications and the assessment of the learning outcomes and must be of industry standard. Centres must meet any specific resource requirements outlined in *Annexe C: Assessment requirements/strategy*. Staff assessing the learner must meet the requirements within the overarching assessment strategy for the sector.

# Unit format

Each unit in this specification contains the following sections.

**Unit title**: — This is the formal title of the unit that will appear on the learner's certificate

**Unit reference number**: — Each unit is assigned a unit reference number that appears with

**Level**: — All units and qualifications have a level assigned to them. The level assigned is informed by the level descriptors by Ofqual, the qualifications regulator.

**Credit value**: — All units have a credit value. The minimum credit value is one, and credits can only be awarded in whole numbers. Learners will be awarded credits when they achieve the unit.

**Guided learning hours**: — Guided Learning Hours (GLH) is the number of hours that a centre delivering the qualification needs to provide. Guided learning means activities that directly or immediately involve tutors and assessors in teaching, supervising, and invigilating learners, for example lectures, tutorials, online instruction and supervised study.

**Unit summary**: — This provides a summary of the purpose of the unit.

**Assessment requirements/evidence requirements**: — The assessment/evidence requirements are determined by the SSC. Learners must provide evidence for each of the requirements stated in this section.

**Assessment methodology**: — This provides a summary of the assessment methodology to be used for the unit.

| Learning outcomes: | Assessment criteria: | Evidence type: | Portfolio reference: | Date: |
|---|---|---|---|---|
| | | | The learner should use this box to indicate where the evidence can be obtained eg portfolio page number. | The learner should give the date when the evidence has been provided. |

Learning outcomes state exactly what a learner should know, understand or be able to do as a result of completing a unit.

The assessment criteria of a unit specify the standard a learner is expected to meet to demonstrate that a learning outcome, or a set of learning outcomes, has been achieved.

Learners must reference the type of evidence they have and where it is available for quality assurance purposes. The learner can enter the relevant key and a reference. Alternatively, the learner and/or centre can devise their own referencing system.

# Units

# Unit 1: Develop and maintain a healthy and safe work environment for scientific or technical activities

**Unit reference number:** M/601/9902

**Level:** 4

**Credit value:** 8

**Guided learning hours:** 43

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to develop and maintain a healthy and safe work environment where scientific or technical activities are performed, in accordance with approved procedures. The learner will be expected to identify and use relevant understanding, methods and skills to address any health and safety work environment problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the work environment.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine while normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

They will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Develop and maintain a healthy and safe work environment for scientific or technical activities | 1.1 Ensure that their work is carried out in accordance with standard operating procedures | | | |
| | 1.2 Use the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify the health and safety regulations and guidelines relevant to their area of responsibility | | | |
| | 1.4 Ensure that the appropriate people are informed about their duties and obligations relating to all relevant health and safety regulations and guidelines | | | |
| | 1.5 Inform their people of their health and safety duties and responsibilities using:<br><br>– verbal instructions<br><br>Plus two methods from the following:<br><br>– electronic mail<br>– computer-based presentations<br>– health and safety meetings<br>– written instructions/documents<br>– training sessions<br>– video/photographic media | | | |
| | 1.6 Provide support to the appropriate people to enable them to work in a healthy, safe and productive way | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.7 Ensure that the work environment under their responsibility conforms to organisational and legal health and safety requirements | | | |
| 2 Develop and maintain a healthy and safe work environment for scientific or technical activities (continued) | 2.1 Carry out audits/inspection of the work environment that include all of the following:<br><br>– physical environment<br><br>– equipment<br><br>– materials<br><br>– working procedures<br><br>2.2 Discuss and resolve health and safety issues with two of the following:<br><br>– team members<br><br>– peer group<br><br>– senior managers<br><br>– external contacts<br><br>2.3 Monitor scientific or technical activities and rectify breaches in health and safety requirements promptly in accordance with organisational procedures<br><br>2.4 Record information regarding health and safety and the work environment in the appropriate workplace information system | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.5 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.6 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus two methods from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to develop and maintain a healthy and safe work environment for scientific or technical activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities. | | | |
| | 3.3 Describe the workplace procedures, as set down in local operating manuals and schemes of work | | | |
| | 3.4 Explain the importance of following manufacturers' instructions | | | |
| | 3.5 Describe the range of techniques and processes that they have to use correctly in the workplace | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.6 | Explain importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.7 | Describe the specific safety precautions to be taken when working with equipment and computer-based systems (to include such things as safety guidance relating to the use of visual display unit (VDU) equipment and work station environment (such as lighting, seating, positioning of equipment), and repetitive strain injury (RSI)) | | | |
| | 3.8 | Identity the health and safety representatives (such as the workplace Safety Officer, Staff Health & Safety Representatives and First-Aiders) | | | |
| | 3.9 | Describe the location and correct use of emergency equipment (such as fire extinguishers, including the situations in which different types of fire extinguishers are used) | | | |
| | 3.10 | Describe the types of handling and sorting system used to process orders or requests | | | |
| | 3.11 | Describe the organisational requirements for maintaining the security of the workplace and confidential information | | | |
| | 3.12 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.13 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.14 Describe the roles and responsibilities of themselves and others under the Health and Safety at Work Act and other current legislation | | | |
| 4 Know how to develop and maintain a healthy and safe work environment for scientific or technical activities (continued) | 4.1 Describe the principles and practice of risk assessment, and how to ensure that the work environment is effectively monitored | | | |
| | 4.2 Explain how to assess current working conditions and identify possible areas for improvement | | | |
| | 4.3 Explain how to communicate effectively with team members, colleagues, line managers and people outside their organisation | | | |
| | 4.4 Describe the organisational and legal requirements for maintaining a healthy, safe work environment | | | |
| | 4.5 Describe the codes of practice relevant to developing and maintaining a healthy, safe work environment | | | |
| | 4.6 Describe the types of support that it may be necessary to provide on health and safety issues, and how to provide such support | | | |
| | 4.7 Explain how to respond to contradictions between health and safety requirements and organisational constraints | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.8 Describe the organisational procedures for recommending improvements to the work environment | | | |
| | 4.9 Describe the records that must be kept, and the organisational and legislative requirements for doing so | | | |
| | 4.10 Describe the control of substances hazardous to health (COSHH) regulations, and their application in the workplace | | | |
| | 4.11 Describe the types of hazards which maybe present in the workplace, and how these can be minimised | | | |
| | 4.12 Describe the correct storage and disposal procedures for hazardous material and equipment | | | |
| | 4.13 Describe the correct procedures for the storage, transport and disposal of waste | | | |

Learner name: _____   Date:_____

Learner signature: _____   Date:_____

Assessor signature: _____   Date:_____

Internal verifier signature: _____   Date:_____
(*if sampled*)

# Unit 2: Maintain effective and efficient working relationships for scientific or technical activities

**Unit reference number:** D/601/9569

**Level:** 3

**Credit value:** 5

**Guided learning hours:** 25

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to maintain effective and efficient working relationships in a workplace where scientific or technical activities are performed, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant understanding, methods and skills to complete tasks and address problems that, whilst well defined, have a measure of complexity. They will be expected to initiate and complete tasks and procedures as well as exercise autonomy and judgement within specified parameters. They will also be aware of different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that, whilst well defined, may be complex and non-routine. They will be expected to show they have identified, selected and used appropriate scientific or technical skills, methods and procedures. They will use appropriate investigation to inform actions and review how effective these methods have been.

The learner's responsibilities will require them to comply with organisational policy and procedures for the scientific or technical activities undertaken, and to report any problems with the activities, materials or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. They will be expected to initiate and complete scientific or technical tasks and procedures, including, where relevant, taking responsibility for supervising or guiding others. They will be expected to exercise autonomy and judgement within limited parameters, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. They will be expected to work to instructions, with a minimum of supervision, either on their own or as part of a team

The learner's underpinning knowledge will enable them to use factual, procedural and theoretical understanding to complete workplace tasks and address problems that, whilst well defined, may be complex and non-routine. They will be able to interpret and evaluate relevant workplace information and ideas. They will have an understanding of the scientific or technical process used, and its application, and will know about the equipment, materials and consumables in adequate depth to provide a

sound background for carrying out the activities to the required specification.

The learner will understand the safety precautions required when carrying out scientific or technical activities. They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Maintain effective and efficient working relationships for scientific or technical activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection clothing and equipment (PPE) when doing scientific or technical activities | | | |
| | 1.3 Establish and maintain effective working relationships in the workplace | | | |
| | 1.4 Sustain positive working relationships by all of the following:<br>– working in teams<br>– supporting others<br>– being cooperative and flexible<br>– providing clear and accurate information | | | |
| | 1.5 Maintain working relationships with two of the following:<br>– colleagues in their own working group<br>– supervisors/managers<br>– more senior professionals/scientists<br>– colleagues outside their normal working group<br>– persons external to their organisation | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.6   Meet workplace standards for timekeeping, appearance and behaviour | | | |
| | 1.7   Deal with disagreements in an amicable and constructive way, so that good relationships are maintained | | | |
| 2   Maintain effective and efficient working relationships for scientific or technical activities (continued) | 2.1   Maintain communication with others, to ensure that they are kept informed about any work plans or activities which may affect them | | | |
| | 2.2   Be aware of the limits of their skills, and seek assistance from others in a polite and courteous way without causing undue disruption to normal work activities | | | |
| | 2.3   Review their personal performance and development, with the appropriate people, at regular intervals | | | |
| | 2.4   Review personal development objectives and targets, to include one of the following: <br> – dual or multi-skilling <br> – training on new equipment/technology <br> – understanding of company working practices, procedures, plans and policies <br> – increased responsibility <br> – other specific requirements | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.5 Communicate the required information about the work done, to authorised people, in accordance with departmental and organisational procedures | | | |
| | 2.6 Record details of work done, and communicate the details to the appropriate people, using:<br><br>– verbal report<br><br>Plus two methods from the following:<br><br>– written or typed report<br><br>– specific company documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to maintain effective and efficient working relationships for scientific or technical activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Explain the importance of correct identification, and any unique workplace coding system | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.6 Describe the interactions which take place between their scientific or technical speciality and others where the same speciality is used | | | |
| | 3.7 Explain how their scientific or technical work activities may affect others within the department and the workplace | | | |
| | 3.8 Describe the lines of communication and responsibilities in their department, and their links with the rest of the organisation | | | |
| | 3.9 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| 4 Know how to maintain effective and efficient working relationships for scientific or technical activities (continued) | 4.1 Describe the lines of accountability within the department | | | |
| | 4.2 Describe the reasons why good working relationships are important | | | |
| | 4.3 Explain how to create and maintain good working relationships | | | |
| | 4.4 Describe the methods of working effectively with others | | | |
| | 4.5 Describe the problems that can affect relationships in the workplace | | | |
| | 4.6 Describe the procedures for dealing with disagreements within the workplace | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.7     Describe the departmental performance review process, and their role in this process | | | |
| | 4.8     Describe the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

# Unit 3: Assure quality processes and procedures for scientific or technical activities

**Unit reference number:** A/601/9904

**Level:** 4

**Credit value:** 8

**Guided learning hours:** 46

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to assure the quality of processes and procedures used for scientific or technical activities, in accordance with approved procedures. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1    sure quality processes and procedures for scientific or technical activities | 1.1   Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2   Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3   Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4   Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5   Establish clear and precise criteria for assuring the quality of processes and procedures for activities | | | |
| | 1.6   Identify suitable quality assurance methods and techniques | | | |
| | 1.7   Ensure that the specified quality assurance processes and procedures are implemented correctly | | | |
| | 1.8   Obtain accurate information from valid sources on the processes and procedures being quality assured | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 2 Assure quality processes and procedures for scientific or technical activities (continued) | 2.1 Use four of the following sources when quality assuring:<br><br>– examination/learning assessment guidelines<br><br>– equipment manuals/specifications<br><br>– work process/activity specifications<br><br>– sector specific regulations and guidelines<br><br>– international/national standards<br><br>– legal/patent information<br><br>– workplace operating procedures<br><br>– customer requirements<br><br>2.2 Assess accurately the required processes and procedures quality against actual execution | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.3 | Carry out all of the following activities: | | | |
| | | – establish clear criteria as the basis of the quality assurance process | | | |
| | | – obtain accurate information from appropriate sources for consideration in the process | | | |
| | | – assess and specifying the quality requirements for the scientific or technical activities | | | |
| | | – identify suitable quality assurance methods, techniques and procedural improvements | | | |
| | | – assess the implications of implementing the quality assurance improvements | | | |
| | | – present recommendations for improvements to the quality assurance process to the appropriate people | | | |
| | 2.4 | Assess the quality requirements for two of the following: | | | |
| | | – new project/process/procedure/scheme of work | | | |
| | | – revisions to existing project/process/procedure/ scheme of work | | | |
| | | – legislative/external quality standard requirement | | | |
| | | – workflow or service change/new facility | | | |
| | | – new equipment being introduced | | | |
| | | – practical investigation for examinations/learning assessments | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.5 Recommend improvement to the quality of the processes and procedures and/or the activities | | | |
| | 2.6 Identify and determine appropriate quality monitoring arrangements for the processes and procedures | | | |
| | 2.7 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.8 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to assure quality processes and procedures for scientific or technical activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.4 | Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 | Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 | Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 | Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 | Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 3.13 | Describe the different ways in which they are set their agreed personal work objectives | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.14 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| 4 Know how to assure quality processes and procedures for scientific or technical activities (continued) | 4.1 Describe the quality criteria that could be used for different types of scientific or technical processes and procedures | | | |
| | 4.2 Describe the quality assurance methods that are available | | | |
| | 4.3 Describe the methods used for recording and analysing scientific or technical processes and procedures | | | |
| | 4.4 Describe the relevant sources of valid information on scientific or technical processes and procedures | | | |
| | 4.5 Identify who should be involved in the scientific or technical quality assurance process | | | |
| | 4.6 Describe the type of impact that poor quality assurance could have on the organisation | | | |
| | 4.7 Identify who requires information on scientific or technical quality assurance, and the procedures for informing them | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.8 Explain how to obtain quality information on resources used by the scientific or technical activities | | | |
| | 4.9 Explain how to determine the resources that are necessary to ensure that quality methods and procedures are applied | | | |
| | 4.10 Explain how to determine the availability and suitability of resources | | | |
| | 4.11 Describe the regulations and guidelines relevant to their area of responsibility | | | |
| | 4.12 Explain how to obtain and interpret information on regulations and guidelines | | | |
| | 4.13 Describe the types of recommendation that could emerge from the quality assurance process | | | |
| | 4.14 Describe the methods used for presenting scientific or technical quality assurance recommendations for improvements | | | |

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

# Unit 4       Carry out risk assessments on scientific or technical activity

**Unit reference number:**      L/601/9910

**Level:**      4

**Credit value:**      8

**Guided learning hours:**      41

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to carry out scientific or technical health and safety risk assessments, in accordance with approved procedures. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Carry out risk assessments on scientific or technical activity | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Define clearly why, when and where the risk assessment will be carried out | | | |
| | 1.6 Ensure they have accurate and up-to-date information on the scientific or technical activity for which the risk assessment is to be carried out | | | |
| | 1.7 Select a method of identifying hazards which is appropriate to the area being assessed | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.8 Carry out all of the following during the risk assessment activities: | | | |
| | – adhere to procedures or systems in place for COSHH, personal protective equipment and other relevant safety regulations | | | |
| | – obtain the required risk assessment documentation | | | |
| | – ensure the purpose and scope of the risk assessment to be carried out | | | |
| | – obtain approval to carry out the risk assessment activities from the appropriate people | | | |
| | – ensure that all appropriate personnel are fully informed of their intended activities | | | |
| | – ensure that risk assessment records are stored in a manner suited to future audit or investigation | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 2 Carry out risk assessments on scientific or technical activity (continued) | 2.1 Conduct a risk assessment on three of the following laboratory activities:<br><br>– obtaining samples<br><br>– preparing samples<br><br>– testing samples<br><br>– obtaining resources or chemicals<br><br>– preparing resources or chemicals<br><br>– testing materials or equipment<br><br>– use of people for a specific activity<br><br>– use of equipment for a specific activity<br><br>– use of materials for a specific activity<br><br>– risks to the environment<br><br>– other (please specify)<br><br>– 2.2 Identify work areas, processes, tools, equipment or materials that have the potential to cause harm or damage to people, property or the environment | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.3 Carry out risk assessment using:<br><br>– direct observation<br><br>Plus two of the following<br><br>– employment regulations<br><br>– accident reports<br><br>– quality standards<br><br>– interviewing people<br><br>– expert technical advice<br><br>– manufacturer's/supplier's technical information | | | |
| | 2.4 Assess the level of risk, and consider how the risks can be eliminated, mitigated or controlled to minimise harm | | | |
| | 2.5 Propose and record recommendations for dealing with the identified risks | | | |
| | 2.6 Provide recommendations to deal with all of the following categories of risk:<br><br>– those that can be eliminated<br><br>– those that can be reduced<br><br>– those that remain constant | | | |
| | 2.7 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.8 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to carry out risk assessments on scientific or technical activity | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace. | | | |
| | 3.4 Describe the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Describe the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 | Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 | Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 3.13 | Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14 | Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 | Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to carry out risk assessments on scientific or technical activity (continued) | 4.1 Describe the specific scientific or technical work activities of the people where they are carrying out the risk assessment | | | |
| | 4.2 Explain how to obtain information on the scientific or technical activities, and the health and safety regulations and requirements to be observed | | | |
| | 4.3 Describe the particular health and safety risks which can arise from different activities undertaken, and the precautions that can be taken | | | |
| | 4.4 Describe the various hazard spotting and safety assessment methods and techniques that can be used | | | |
| | 4.5 Explain how to identify hazards which might arise from changes in working practices | | | |
| | 4.6 Explain how to ensure that the hazard identification causes minimal disruption and concern to other people | | | |
| | 4.7 Describe the potential implications of the risks | | | |
| | 4.8 Describe the methods of identifying hazards and assessing the probability of a risk situation occurring | | | |
| | 4.9 Explain how to prioritise and manage hazards | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.10 Describe the types of risk assessment methods that are appropriate to different types of risk | | | |
| | 4.11 Describe the methods of collecting and evaluating information on risk assessment activities | | | |
| | 4.12 Describe the techniques for defining and controlling identified risks | | | |
| | 4.13 Describe the problems that can occur during risk assessments, and how these problems can be avoided or rectified | | | |
| | 4.14 Describe the sources of technical expertise that can advise on health and safety risk assessments | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

# Unit 5 Plan and run scientific or technical projects for workplace activities

**Unit reference number:** D/601/9913

**Level:** 4

**Credit value:** 12

**Guided learning hours:** 77

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to prepare and run projects for scientific or technical activities, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1  Plan and run scientific or technical projects for workplace activities | 1.1  Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2  Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3  Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4  Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5  Evaluate available information and consult with others to prepare project plans for the delivery of scientific or technical activities | | | |
| | 1.6  Consult two of the following people during the preparation and running of projects:<br>– supervisor<br>– manager<br>– the project team<br>– team leader<br>– head of department<br>– health and safety officer<br>– teacher or trainer<br>– customer | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.7 Prepare a project plan for scientific or technical activities that:<br><br>– can deliver outcomes in line with workplace goals and aims<br><br>Plus all of the following:<br><br>– identifies and explores alternative strategies for delivery<br><br>– take into account the views of the project team and any other relevant people<br><br>– incorporates all relevant time, cost and delivery measures/milestones<br><br>– makes efficient use of available resources<br><br>1.8 Devise project plans with two of the following components:<br><br>– multi stage/activity operations<br><br>– multitasking requirements<br><br>– multi-parameter or control factors<br><br>– high level of skill/experience needed<br><br>– constraints (e.g. resources, regulatory)<br><br>– critical path dependencies | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.9    Confirm project objectives are all of the following:<br><br>–   specific<br><br>–   measurable<br><br>–   achievable<br><br>–   realistic<br><br>–   time bound<br><br>1.10  Quantify four of following resource requirements for projects:<br><br>–   materials<br><br>–   equipment<br><br>–   financial<br><br>–   time<br><br>–   personnel | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 2 Plan and run scientific or technical projects for workplace activities (continued) | 2.1 Submit proposed projects to the relevant people in the organisation, for approval and to assist the overall planning process | | | |
| | 2.2 Use the agreed project plans to start, monitor and control delivery of scientific or technical activities | | | |
| | 2.3 Evaluate variances between what was planned and what actually happened on the project | | | |
| | 2.4 Take prompt corrective action, obtaining agreement from the relevant people if required, to delivery the critical project outcomes | | | |
| | 2.5 Propose revisions to the project plan, if necessary, in response to variances and/or significant or unforeseen developments, and discuss and agree the revisions with the relevant people in the organisation | | | |
| | 2.6 Provide ongoing information on performance against the project plan to relevant people in their organisation | | | |
| | 2.7 Gather information from implementation of the project plan to assist in the preparation of future project plans | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.8 | Deliver projects with two of the following critical outcomes: | | | |
| | | – specified output quality | | | |
| | | – within defined budget | | | |
| | | – against fixed timescales | | | |
| | 2.9 | Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.10 | Record and communicate details of the work done, to the appropriate people, using: | | | |
| | | – verbal report | | | |
| | | Plus one method from the following: | | | |
| | | – written or typed report | | | |
| | | – specific workplace documentation | | | |
| | | – computer-based record | | | |
| | | – electronic mail | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 3    Know how to plan and run scientific or technical projects for workplace activities | 3.1   Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2   Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3   Describe the scientific or technical techniques and processes they must use correctly in the workplace. | | | |
| | 3.4   Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5   Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6   Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7   Describe the workplace business aims and goals and the planning process | | | |
| | 3.8   Describe the workplace organisational structure, its values and culture | | | |
| | 3.9   Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.10 Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 Explain how to identify and assess the scientific or technical requirements of their work role | | | |
| | 3.13 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | 3.16 Describe the consequences of breaches of quality procedures | | | |
| | 3.17 Explain how to identify hazards and what action to take | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to plan and run scientific or technical projects for workplace activities (continued) | 4.1 Explain what systems are used to ensure quality within the workplace and the projects delivered | | | |
| | 4.2 Describe the methods used to plan projects and the activities and tasks associated with them | | | |
| | 4.3 Explain what standards and workplace procedures are appropriate to scientific or technical projects | | | |
| | 4.4 Identify the project customers, and how to elicit and confirm their requirements | | | |
| | 4.5 Explain how to develop and monitor detailed project objectives from plans | | | |
| | 4.6 Explain how to clarify and agree project objectives with the customer | | | |
| | 4.7 Explain why it is important to explore and evaluate alternative project plans | | | |
| | 4.8 Describe who needs to be consulted when planning and resourcing project plans | | | |
| | 4.9 Explain how to write the project plan, incorporating all necessary detail into the plan | | | |
| | 4.10 Explain how to make efficient use of resources | | | |
| | 4.11 Explain how to evaluate variances between plans and what actually being delivered on the project | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.12 Describe the range of corrective actions that can be used when delivery of the critical outcomes may be under threat | | | |
| | 4.13 Explain how to update and revise project plans in response to variances and/or significant or unforeseen developments, and who should be consulted | | | |
| | 4.14 Explain how to provide information/reports on performance during and after projects | | | |
| | 4.15 Describe the document control and reporting procedures that should be used | | | |
| | 4.16 Explain the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____  Date:_____

Learner signature: _____  Date:_____

Assessor signature: _____  Date:_____

Internal verifier signature: _____  Date:_____
(*if sampled*)

# Unit 6: Write scientific or technical reports for workplace activities

**Unit reference number:** K/601/9915

**Level:** 4

**Credit value:** 4

**Guided learning hours:** 27

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to write technical reports, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

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## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Write scientific or technical reports for workplace activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Establish the scope and purpose of the scientific or technical report to be delivered | | | |
| | 1.6 Determine quality and delivery issues, and the resources needed to deliver the report | | | |
| | 1.7 Write technical reports for both of the following situations:<br><br>– internal consumption<br><br>– external consumption | | | |
| | 1.8 Present the report data and content in an appropriate format and structure for the reader(s) | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.9 Write technical reports that include eight of the following: <br><br> – report title <br><br> – laboratory and location <br><br> – purpose of scientific or technical activities <br><br> – procedures and guidelines followed <br><br> – data collected from scientific or technical activities <br><br> – scientific or technical calculations done <br><br> – uncertainty/error analysis <br><br> – final results from scientific or technical activities <br><br> – discussion on results conclusion <br><br> – references used in the report <br><br> – summary | | | |
| 2 Write scientific or technical reports for workplace activities (continued) | 2.1 Implement quality checks according to the workplace procedures and policies <br><br> 2.2 Include all information that is relevant and sufficient for the scientific or technical activities and quality standards <br><br> 2.3 Technically review any third party data added to the report for quality, and, where appropriate, provide feedback to the author(s) on their observations/recommendations | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.4 | Publish technical reports in both of the following formats: | | | |
| | | – draft form | | | |
| | | – final version | | | |
| | 2.5 | Obtain feedback on their early draft to ensure that the final report meets the stated purpose | | | |
| | 2.6 | Follow the relevant procedures for authorisation from the appropriate people and for release of the report | | | |
| | 2.7 | Ensure that the report is completed and issued within the agreed time limits | | | |
| | 2.8 | Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.9 | Record details of the work done, and communicate the details to the appropriate people, using both: | | | |
| | | – verbal report | | | |
| | | – laboratory notebook | | | |
| | | Plus one method from the following: | | | |
| | | – written or typed report (e.g. laboratory notebook) | | | |
| | | – specific company documentation | | | |
| | | – computer-based record | | | |
| | | – electronic mail | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 3 Know how to write scientific or technical reports for workplace activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 Describe the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Describe the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7 Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.10   Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11   Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12   Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 3.13   Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14   Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15   Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | 3.16   Describe the legal responsibilities for health and safety issues relevant to technical reports | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to write scientific or technical reports for workplace activities (continued) | 4.1 Describe the requirements of any external regulatory bodies, where they are appropriate to the reports | | | |
| | 4.2 Describe the legal consequences of breaches of quality procedures | | | |
| | 4.3 Describe the systems used to ensure quality of reports within the organisation | | | |
| | 4.4 Describe the methods used to monitor these quality systems | | | |
| | 4.5 Describe the standards and standard operating procedures appropriate to the writing and publishing of reports | | | |
| | 4.6 Explain how to establish the scope of the technical report | | | |
| | 4.7 Explain how to establish the purpose of the technical report | | | |
| | 4.8 Explain how to access appropriate information | | | |
| | 4.9 Explain how to assess the quality and completeness of the data/information | | | |
| | 4.10 Describe the range of methods used to present the data in reports | | | |
| | 4.11 Explain how to structure the report logically, clearly and concisely | | | |
| | 4.12 Describe the appropriate format and 'house style' of the report | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.13 Describe the structure for a good scientific or technical report (eg, report title, laboratory/location, purpose, procedure, data collection, calculations, uncertainty/error analysis, final results, discussion, conclusion and references) | | | |
| | 4.14 Explain how to evaluate the information, draw logical conclusions and make subsequent recommendations from their evaluation of the information | | | |
| | 4.15 Identify the person to whom to distribute the report, and the appropriate communication channels | | | |
| | 4.16 Describe the authorisation required before the reports can be released for issue | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

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# Unit 7: Manage scientific or technical business processes for workplace activities

**Unit reference number:** D/601/9930

**Level:** 4

**Credit value:** 12

**Guided learning hours:** 82

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to manage scientific or technical business processes for workplace activities, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Manage scientific or technical business processes for workplace activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Ensure scientific or technical processes and resources are sustainable and effective in their use | | | |
| | 1.6 Identify and provide the scientific or technical resources required to deliver business plans | | | |
| | 1.7 Provide scientific or technical information and support for staff and other stakeholders essential to the delivery of business plans | | | |
| 2 Manage scientific or technical business processes for workplace activities (continued) | 2.1 Establish and use effective methods to review and improve the scientific or technical process for the delivery of business plans | | | |
| | 2.2 Work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.3 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.4 Discuss and agree workplace performance with one of the following people: | | | |
| | – manager | | | |
| | – director | | | |
| | – head of school | | | |
| | – head teacher | | | |
| | – vice principal | | | |
| | – principal | | | |
| | 2.5 Agree business and scientific or technical work objectives that are all the following: | | | |
| | – specific | | | |
| | – measureable | | | |
| | – achievable | | | |
| | – realistic | | | |
| | – time-bound | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.6   Establish and use effective methods for all of the following:<br><br>– keeping staff informed of plans and developments<br><br>– specifying what is expected of team leaders and their staff and their accountabilities<br><br>– the analysis and resolution of problems and how to respond to workplace delays<br><br>– complying with, and ensuring others comply with, legal requirements, industry regulations, organisational policies and professional codes<br><br>– monitoring the quality of scientific or technical work and progress against workplace plans and take appropriate corrective action, where necessary<br><br>– details that are critical to achieving successful business results<br><br>– identifying common issues and trends and their impact upon current and future work | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.7 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to manage scientific or technical business processes for workplace activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 | Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 | Explain how to identify and assess the scientific or technical requirements of their work roles | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to manage scientific or technical business processes for workplace activities (continued) | 4.1 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 4.2 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 4.3 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | 4.4 Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 4.5 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 4.6 Explain how to ensure processes and scientific or technical resources are sustainable and effective in their use, and the importance of doing so | | | |
| | 4.7 Describe the difference between business and scientific or technical process outputs and outcomes | | | |
| | 4.8 Explain how to assess business and scientific or technical process changes for risk and reward against their potential investment cost | | | |
| | 4.9 Explain how to carry out cost and benefit analysis for scientific or technical activities | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.10   Identify the types of analytical and problem-solving tools used when developing business processes | | | |
| | 4.11   Explain how to measure the effect of improvements in the business process and scientific or technical activities | | | |

Learner name: _____    Date:_____

Learner signature: _____    Date:_____

Assessor signature: _____    Date:_____

Internal verifier signature: _____    Date:_____
(*if sampled*)

# Unit 8: Prepare and manage budgets for scientific or technical workplace activities

**Unit reference number:** M/601/9933

**Level:** 4

**Credit value:** 8

**Guided learning hours:** 58

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to manage finance for scientific or technical workplace activities, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Prepare and manage budgets for scientific or technical workplace activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Evaluate available information and consult with others to prepare budget plans for activities | | | |
| | 1.6 Submit proposed budgets to the relevant people in the organisation, for approval and to assist the overall planning process | | | |
| | 1.7 Discuss and agree budgets with one of the following people: <br> – manager <br> – director <br> – head of school <br> – head teacher <br> – vice principal <br> – principal | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.8 Agree business and scientific or technical work objectives that are all the following:<br><br>– specific<br><br>– measureable<br><br>– achievable<br><br>– realistic<br><br>– time-bound | | | |
| | 1.9 Use the agreed budget plans to start, monitor and control delivery of scientific or technical activities | | | |
| 2 Prepare and manage budgets for scientific or technical workplace activities (continued) | 2.1 Establish and use effective methods for all of the following:<br><br>– keeping staff informed of budget plans and developments<br><br>– specifying what is expected of team leaders and their staff and their accountabilities<br><br>– monitoring the budgets for scientific or technical work and progress against workplace plans and take appropriate corrective action, where necessary<br><br>– details that are critical to monitoring budgets and achieving successful business results<br><br>– identifying common budgeting issues and trends and their impact upon current and future spending | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.2 | Evaluate variances between what was planned in the budget and what actually happened in the workplace | | | |
| | 2.3 | Take prompt corrective action, obtaining agreement from the relevant people if required, to delivery the critical budget outcomes | | | |
| | 2.4 | Propose revisions to the budget plan, if necessary, in response to variances and/or significant or unforeseen developments, and discuss and agree the revisions with the relevant people in the organisation | | | |
| | 2.5 | Provide ongoing information on performance against the budget plan to relevant people in their organisation | | | |
| | 2.6 | Gather information from implementation of the budget plan to assist in the preparation of future project plans | | | |
| | 2.7 | Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.8 | Record details of the work activities, and communicate the details to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to prepare and manage budgets for scientific or technical workplace activities | 3.1 | Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 | Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 | Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 | Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 | Explain the importance of correct identification, and any unique workplace coding system | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.6 | Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 | Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 | Explain how to identify and assess the scientific or technical requirements of their work role | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4    Know how to prepare and manage budgets for scientific or technical workplace activities (continued) | 4.1    Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 4.2    Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 4.3    Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | 4.4    Describe the budget responsibilities, including the limits of their authority, for their workplace role | | | |
| | 4.5    Describe the budget information available in their organisation | | | |
| | 4.6    Describe the scientific or technical activities for which budgets have been allocated | | | |
| | 4.7    Describe the budgeting period(s) used in their workplace | | | |
| | 4.8    Describe the workplace procedures for the preparation and approval of budgets | | | |
| | 4.9    Describe the workplace procedures for monitoring and reporting of performance against existing and revised budgets | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.10 Describe the workplace systems established for managing and evaluating performance against budgets | | | |
| | 4.11 Describe the people in the workplace who need information on the financial performance of their area | | | |
| | 4.12 Describe the procedures for presenting financial information and the timescales/deadlines for delivering this information | | | |

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

# Unit 9: Develop and provide training for scientific or technical activities in the workplace

**Unit reference number:** F/601/9936

**Level:** 4

**Credit value:** 8

**Guided learning hours:** 45

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to develop and provide training for scientific or technical activities in the workplace, in accordance with approved procedures. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure

that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Develop and provide training for scientific or technical activities in the workplace | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Discuss the training and instruction activities needed with the relevant person or persons | | | |
| | 1.6 Discuss training activities with the: <br> – trainee <br> Plus one of the following: <br> – supervisor <br> – manager <br> – team leader <br> – head of department <br> – technical expert <br> – training provider <br> – training coordinator <br> – head teacher | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.7   Analyse the training needs of the individuals to be trained | | | |
| | 1.8   Assess and manage risks associated with the training and instruction to be delivered | | | |
| | 1.9   Develop plans for the delivery of the training and instruction activities | | | |
| 2   Develop and provide training for scientific or technical activities in the workplace (continued) | 2.1   Develop training activities by all of the following:<br>– plan training opportunities, learning objectives and timescales<br>– communicating and providing learner feedback<br>– dealing with any obstacles or issues that arise<br>– motivating, supporting and stimulating learner interest<br>– Promoting best practice<br>– Evaluate outcomes and update development plans<br><br>2.2   Select and prepare training and instruction resources to deliver these activities | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.3 | Select and prepare four of the following training requirements:<br><br>– induction<br><br>– risk assessment<br><br>– curriculum/course modification<br><br>– equipment<br><br>– appraisal or CPD review<br><br>– resources/worksheets<br><br>– problem solving task<br><br>– scientific or technical technique<br><br>– off site activity<br><br>– organisation policy change<br><br>– department directives | | | |
| | 2.4 | Deliver training for individuals in the scientific or technical activities required | | | |
| | 2.5 | Carry out training for two of the following people:<br><br>– trainee technician<br><br>– technician<br><br>– newly qualified person<br><br>– teacher<br><br>– trainer | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.6 Evaluate and review trainee progress during the training process | | | |
| | 2.7 Monitor and refine training activities to improve the trainee's attainment of required scientific or technical skills | | | |
| | 2.8 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.9 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 3　Know how to develop and provide training for scientific or technical activities in the workplace | 3.1　Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2　Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3　Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4　Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5　Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6　Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7　Describe the workplace business aims and goals and the planning process | | | |
| | 3.8　Describe the workplace organisational structure, its values and culture | | | |
| | 3.9　Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.10 Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 3.13 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | 3.16 Explain how to assess the scientific or technical skills of new trainees | | | |
| | 3.17 Explain how to conduct a training needs analysis | | | |
| | 3.18 Describe the checks to be made to ensure trainees can learn safely and apply job skills in the workplace | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4   Know how to develop and provide training for scientific or technical activities in the workplace (continued) | 4.1   Explain how to develop and deliver a training plan for trainees | | | |
| | 4.2   Explain how to give trainees on-the-job instruction and supervising their work | | | |
| | 4.3   Explain how to assess the trainee's progress in acquiring and applying job skills and skills in working with others | | | |
| | 4.4   Explain how to gather trainee feedback on their progress and achievements | | | |
| | 4.5   Describe the methods used for giving the trainee feedback on their progress and achievements | | | |
| | 4.6   Describe the procedures for keeping training records | | | |
| | 4.7   Describe the procedures for reporting trainees' progress and updating performance and development records | | | |
| | 4.8   Explain how to identify and prioritise learning needs based upon gaps between scientific or technical knowledge and skills and the requirements of the job | | | |
| | 4.9   Explain how they work with colleagues and make use of unplanned opportunities | | | |
| | 4.10   Explain how to ensure resources are available for training and timescales are realistic | | | |
| | 4.11   Explain how to ensure they show fairness, integrity and consistency in their decision making | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.12 Describe the what is meant by SMART (specific, measurable, achievable, realistic and time-bound) learning objectives | | | |
| | 4.13 Explain how to evaluate effectiveness of training completed and feedback to the relevant people | | | |
| | 4.14 Describe the organisational requirements for maintaining the security and confidentiality of any training records kept | | | |
| | 4.15 Describe the document control and reporting procedures that should be used | | | |
| | 4.16 Explain the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

# Unit 10: Plan and conduct scientific or technical investigations

**Unit reference number:**  T/601/9982

**Level:**  4

**Credit value:**  12

**Guided learning hours:**  78

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to plan and conduct scientific or technical investigations, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Plan and conduct scientific or technical investigations | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Identify the objective of the investigation | | | |
| | 1.6 Obtain and collate appropriate information which assists the investigation | | | |
| | 1.7 Analyse the information correctly and evaluate it against the objective of the investigation | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.8 Evaluate information from two of the following sources<br><br>– new external standards/regulations<br><br>– manufacturer's instructions<br><br>– equipment technical reviews<br><br>– material technical reviews<br><br>– COSHH data sheets<br><br>– environmental reports<br><br>– workplace records archives<br><br>– operating procedures<br><br>– test/technical reports<br><br>– accident reports<br><br>– health and safety documentation | | | |
| | 1.9 Identify the conditions under which investigations can take place | | | |
| | 1.10 Evaluate the alternative investigative techniques and select the appropriate technique | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 2   Plan and conduct scientific or technical investigations (continued) | 2.1   Evaluate capability requirements for investigations that require all of the following:<br><br>–   techniques<br><br>–   technical expertise<br><br>–   available time<br><br>–   resources<br><br>2.2   Prioritise the tasks within the investigation and identify appropriate procedures<br><br>2.3   Quantify the resource requirements for the investigations and ensure that they are within the capability of the organisation<br><br>2.4   Specify resources requirements against two of the following parameters<br><br>–   staff<br><br>–   equipment<br><br>–   materials/chemical<br><br>–   time<br><br>2.5   Set procedures in place to deal with contingencies arising during investigations | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.6 | Establish contingencies for two of the following:<br><br>– equipment failure<br><br>– delays<br><br>– changes in variables<br><br>– safety/environmental change | | | |
| | 2.7 | Conduct investigations in accordance with the established plans | | | |
| | 2.8 | Conduct investigations into one of the following:<br><br>– a non-compliance problem<br><br>– the properties of a new material<br><br>– applications of a new material<br><br>– identifying a substance<br><br>– resolution technical problem<br><br>– cost reduction programme<br><br>– quality assurance review<br><br>– hazard/accident | | | |
| | 2.9 | Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.10 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to plan and conduct scientific or technical investigations | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.7 Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 Explain how to identify and assess the scientific or technical requirements of their work roles | | | |
| | 3.13 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to plan and conduct scientific or technical investigations (continued) | 4.1 Describe the principles and procedures for scientific or technical investigations | | | |
| | 4.2 Describe the techniques that are relevant to the investigation | | | |
| | 4.3 Explain how to set objectives taking account of capabilities and available resources | | | |
| | 4.4 Explain how to source and access relevant standards | | | |
| | 4.5 Describe the acceptable operating conditions for conducting investigations | | | |
| | 4.6 Describe the implications of deviations from set procedures | | | |
| | 4.7 Explain how to identify customer requirements | | | |
| | 4.8 Describe the essential features of an investigation plan and how to initiate it | | | |
| | 4.9 Explain how to identify the most appropriate equipment for investigations | | | |
| | 4.10 Describe the procedures for recording and reporting the investigations done | | | |
| | 4.11 Explain how to identify and deal with contingencies | | | |
| | 4.12 Describe the limits and constraints for investigations that are done | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.13 Describe the methods and processes used to deal with deviations from investigation plans | | | |
| | 4.14 Explain how to establish contingency plans for deviations from investigation plans. | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

# Unit 11: Plan and monitor small scale processing activities

**Unit reference number:** L/601/9986

**Level:** 4

**Credit value:** 9

**Guided learning hours:** 58

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to plan and monitor small scale processing activities, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Plan and monitor small scale processing activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) where scientific or technical activities are performed | | | |
| | 1.3 Identify and agree the business and scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Establish processes that deliver scientific or technical outcomes based on organisational goals and aims | | | |
| | 1.5 Evaluate available information and consult with others to prepare plans for small scale processing activities | | | |
| | 1.6 Establish the conditions for small scale processing and take the appropriate action to maintain them | | | |
| | 1.7 Detail the calibration status of equipment and the preparations required for the processing operation | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 1.8 | Produce small scale processing plans for two of the following: | | | |
| | | – testing the viability of a proposed large-scale manufacturing method | | | |
| | | – meeting a customer's requirements for a specialist product not required in any great quantity | | | |
| | | – producing small quantities of products to be used in sampling | | | |
| | | – testing or other investigations such as reference standards or design evaluation | | | |
| | 1.9 | Establish plans for all of the following controlled conditions during processing | | | |
| | | – health and safety | | | |
| | | – environment | | | |
| | | – allotted time | | | |
| | | – recording systems | | | |
| | | – cleanliness & hygiene | | | |
| | 1.10 | Set out data collection requirements for all of the following processing information: | | | |
| | | – sample identification | | | |
| | | – calculations and data | | | |
| | | – results of small scale processing | | | |
| | | – conditions of in-process test | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 2    Plan and monitor small scale processing activities (continued) | 2.1   Quantify four of the following resource requirements for small scale processing activities:<br><br>  – materials<br><br>  – equipment<br><br>  – financial<br><br>  – time<br><br>  – personnel<br><br>2.2   Submit proposed plans to the relevant people in the organisation, for approval and to assist the overall planning process<br><br>2.3   Consult two of the following people during the planning and running of small scale processing:<br><br>  – supervisor<br><br>  – manager<br><br>  – the processing team<br><br>  – team leader<br><br>  – head of department<br><br>  – health and safety officer<br><br>  – teacher or trainer<br><br>  – customer<br><br>2.4   Use the agreed plans to start, monitor and control delivery of small scale processing activities | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 2.5 | Evaluate variances between what was planned and what actually happened on the activities | | | |
| | 2.6 | Take prompt corrective action, obtaining agreement from the relevant people if required, to deliver the critical processing outcomes | | | |
| | 2.7 | Gather information from implementation of the small processing plan to assist in the preparation of future plans | | | |
| | 2.8 | Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.9 | Record and communicate details of work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |

| Learning outcomes | | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|---|
| 3 | Know how to plan and monitor small scale processing activities | 3.1 | Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | | 3.2 | Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | | 3.3 | Describe the scientific or technical techniques and processes they must use correctly in the workplace. | | | |
| | | 3.4 | Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | | 3.5 | Explain the importance of correct identification, and any unique workplace coding system | | | |
| | | 3.6 | Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.10 Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| | 3.12 Explain how to identify and assess the scientific or technical requirements of their work role | | | |
| | 3.13 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 3.14 Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | 3.15 Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 4 Know how to plan and monitor small scale processing activities (continued) | 4.1 Describe the consequences of breaches of quality procedures | | | |
| | 4.2 Explain how to identify hazards and what action to take | | | |
| | 4.3 Describe the principles and procedures for small scale processing | | | |
| | 4.4 Describe the essential features of a process plan and how to establish it | | | |
| | 4.5 Explain how to source and access relevant standards | | | |
| | 4.6 Describe the operating conditions that are necessary to conduct the small scale processing, and how to maintain them | | | |
| | 4.7 Explain why it is important to establish set procedures | | | |
| | 4.8 Describe the range of equipment used for small scale processing | | | |
| | 4.9 Explain why it is important to establish data recording and reporting procedures for activities | | | |
| | 4.10 Describe the methods that can be used for dealing with the handling, storage and disposal of materials | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.11 Describe the cleaning materials and methods that should be used | | | |
| | 4.12 Describe the range of resources needed for small scale processing | | | |
| | 4.13 Describe the reporting procedure in the event of deviations from processing plans | | | |
| | 4.14 Describe the document control and reporting procedures that should be used | | | |
| | 4.15 Explain the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____    Date:_____

Learner signature: _____    Date:_____

Assessor signature: _____    Date:_____

Internal verifier signature: _____    Date:_____
(*if sampled*)

# Unit 12: Assess their own scientific or technical knowledge and skills for workplace activities

**Unit reference number:** R/601/9729

**Level:** 3

**Credit value:** 4

**Guided learning hours:** 23

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to assess their own scientific or technical knowledge and skills for workplace activities, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant understanding, methods and skills to complete tasks and address problems that, whilst well defined, have a measure of complexity. They will be expected to initiate and complete tasks and procedures as well as exercise autonomy and judgement within limited parameters. They will also be aware of different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that, while well defined, may be complex and non-routine. They will be expected to show they have identified, selected and used appropriate scientific or technical skills, methods and procedures. They will use appropriate investigation to inform actions and review how effective these methods have been.

The learner's responsibilities will require them to comply with organisational policy and procedures for the scientific or technical operations undertaken, and to report any problems with the activities, materials or equipment that they cannot personally resolve, or that are outside their permitted authority, to the relevant people. They will be expected to initiate and complete tasks and procedures, including, where relevant, taking responsibility for supervising or guiding others. They will be expected to exercise autonomy and judgement within limited parameters, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. They will be expected to work to instructions, with a minimum of supervision, either on their own or as part of a team

The learner's underpinning knowledge will enable them to use factual, procedural and theoretical understanding to complete scientific or technical tasks and address problems that, whilst well defined, may be complex and non-routine. They will be able to interpret and evaluate relevant workplace information and ideas. They will have an understanding of the scientific or technical process used, and its application, and will know about the equipment, materials and consumables in adequate depth to provide a

sound background for carrying out the activities to the required specification.

The learner will understand the safety precautions required when carrying out scientific or technical activities. They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Assess their own scientific or technical knowledge and skills for workplace activities | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) when performing scientific or technical activities | | | |
| | 1.3 Identify and agree the scientific or technical requirements of their role in the workplace | | | |
| | 1.4 Discuss and agree personal work objectives and how they will measure progress | | | |
| | 1.5 Discuss and agree workplace performance with one of the following people: <br> – supervisor <br> – manager <br> – team leader <br> – head of department <br> – health and safety officer <br> – teacher or trainer | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.6 Agree scientific or technical work objectives that are all the following: <br><br>– specific <br><br>– measureable <br><br>– achievable <br><br>– realistic <br><br>– time-bound <br><br>1.7 Identify any scientific or technical knowledge, understanding and skills gaps for their workplace role | | | |
| 2 Assess their own scientific or technical knowledge and skills for workplace activities (continued) | 2.1 Discuss and agree a development plan to address any identified knowledge, understanding and skills gaps <br><br>2.2 Undertake agreed development actions and evaluate how they have contributed to their improved performance <br><br>2.3 Obtain regular feedback on their scientific or technical performance to meet workplace requirements and milestones <br><br>2.4 Work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines <br><br>2.5 Communicate the required information about the work done, in accordance with departmental and organisational procedures | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.6 Record and communicate details of work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to assess their own scientific or technical knowledge and skills for workplace activities | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |
| | 3.4 Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 Explain the importance of correct identification, and any unique workplace coding system | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 3.6 Describe the organisational requirements for maintaining the security of the workplace (e.g. access or aseptic conditions) | | | |
| | 3.7 Describe the lines of communication and responsibilities in their department, and their links with the rest of the organisation | | | |
| | 3.8 Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |
| 4 Know how to assess their own scientific or technical knowledge and skills for workplace activities (continued) | 4.1 Explain how to identify and assess the scientific or technical requirements of a work role | | | |
| | 4.2 Describe the different ways in which they are set their agreed personal work objectives | | | |
| | 4.3 Explain how to assess and identify gaps in their current scientific or technical knowledge, understanding and skills | | | |
| | 4.4 Explain how to measure their progress against scientific or technical work objectives | | | |
| | 4.5 Describe the type of development activities that can be undertaken to address identified scientific or technical gaps in knowledge, understanding and skills | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 4.6 | Explain how to identify development needs to address any gaps between the requirements of their work role and their current scientific or technical knowledge, understanding and skills | | | |
| | 4.7 | Explain how to identify whether/how development activities have contributed to their performance | | | |
| | 4.8 | Explain the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

Specification – Pearson Edexcel Level 4 NVQ Diploma in Laboratory and Associated Technical
Activities – Issue 2 - January 2018 © Pearson Education Limited 2018

# Unit 13: Manage and monitor the work of scientific or technical teams

**Unit reference number:** R/601/9990

**Level:** 4

**Credit value:** 10

**Guided learning hours:** 67

## Unit summary

This unit covers the skills and knowledge needed to prove the competences required to manage the work of scientific or technical teams, in accordance with approved procedures and practices. The learner will be expected to identify and use relevant business and scientific or technical understanding, methods and skills to address workplace problems that are well defined but complex and non-routine. They will be expected to take responsibility for overall courses of action. They will exercise autonomy and judgement within fairly broad parameters and understand different perspectives or approaches used within the workplace.

On completion of workplace activities, the learner will be required to show they have addressed problems that are complex and non-routine whilst normally fairly well defined. They will be expected to show they have identified, selected and used appropriate business and scientific or technical methods and skills. They will show they have initiated and used appropriate investigation to inform their actions. They will also show how they review the effectiveness and appropriateness of the methods, actions and results of their scientific or technical work.

The learner's responsibilities will require them to comply with organisational policy and procedures for the business and scientific or technical operations undertaken. They will be responsible for courses of action, including, where relevant, responsibility for the work of others. They will also exercise autonomy and judgement for their scientific or technical activities within broad but generally well-defined parameters.

The learner's underpinning knowledge will enable them to use practical, theoretical or technical understanding to address workplace problems that are well defined but complex and non-routine. They will know how to analyse, interpret and evaluate relevant business and scientific or technical information and ideas, and will be aware of the nature and approximate scope of the business and scientific or technical activities undertaken. They will understand different perspectives or approaches on workplace activities.

The learner will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks, applicable to their area of responsibility. They will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility they owe to themselves and others in the workplace.

## Assessment requirements

Assessment requirements are set down in Annexe C: Assessment strategy.

## Assessment methodology

This unit is assessed in the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

## Learning outcomes and assessment criteria

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| 1 Manage and monitor the work of scientific or technical teams | 1.1 Ensure that their work is carried out in accordance with workplace procedures | | | |
| | 1.2 Use safe practices and the appropriate personal protection equipment (PPE) when performing scientific or technical activities | | | |
| | 1.3 Set out and positively communicate the department goals and each team's objectives to team leaders | | | |
| | 1.4 Involve team leaders in planning how their team will achieve its scientific or technical objectives | | | |
| | 1.5 Discuss and agree their teams' workplace performance requirements with one of the following people:<br>– supervisor<br>– manager<br>– team leader<br>– head of department<br>– health and safety officer<br>– teacher or trainer | | | |
| | 1.6 Ensure that each team leader has personal work objectives and understands how achieving these will contribute to achievement of the workplace objectives | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.7    Agree scientific or technical work objectives with their teams with targets that are all of the following:<br><br>–   specific<br><br>–   measureable<br><br>–   achievable<br><br>–   realistic<br><br>–   time-bound<br><br>1.8    Encourage and support team leaders to achieve their personal work objectives and those of their team | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 1.9      Help their team leader's performance with the following:<br><br>–   progress against objectives for workplace activities<br><br>Plus four from the following:<br><br>–   technical support for a procedure<br><br>–   problem diagnosis and solution<br><br>–   technical advice and guidance<br><br>–   introduction of new equipment<br><br>–   introduction of new process<br><br>–   a defective product or piece of equipment<br><br>–   evaluating the possible use of a new raw material within an existing process | | | |

| Learning outcomes | | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|---|
| 2 | Manage and monitor the work of scientific or technical teams (continued) | 2.1 | Provide scientific or technical information from all of the following sources:<br>– changes in legislation<br>– new methods and techniques<br>– findings from internal activities | | | |
| | | 2.2 | Use the following sources of support to help their teams:<br>– budget v actual performance reports<br>– team meetings/discussion<br>Plus two of the following sources:<br>– scientific or technical documents<br>– workplace guidelines or procedures<br>– external specialist/associate<br>– new curriculum<br>– student/learner assessments<br>– new or changes in a scheme of work | | | |
| | | 2.3 | Provide recognition when individual and team objectives have been achieved | | | |
| | | 2.4 | Help individuals and the team find solutions to problems and issues with objectives and the work environment | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 2.5 Encourage and recognise creativity and innovation within teams | | | |
| | 2.6 Monitor progress and achievement against each team's agreed objectives for workplace activities | | | |
| | 2.7 Present the results of the work done to the appropriate people, in accordance with departmental and organisational procedures | | | |
| | 2.8 Record and communicate details of the work done, to the appropriate people, using:<br><br>– verbal report<br><br>Plus one method from the following:<br><br>– written or typed report<br><br>– specific workplace documentation<br><br>– computer-based record<br><br>– electronic mail | | | |
| 3 Know how to manage and monitor the work of scientific or technical teams | 3.1 Describe the health and safety requirements of the area in which they are carrying out the scientific or technical activities | | | |
| | 3.2 Describe the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities | | | |
| | 3.3 Describe the scientific or technical techniques and processes they must use correctly in the workplace | | | |

| Learning outcomes | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|
| | 3.4 | Explain the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities | | | |
| | 3.5 | Explain the importance of correct identification, and any unique workplace coding system | | | |
| | 3.6 | Describe the organisational requirements for maintaining the security of the workplace and keeping confidential documents (e.g. access or aseptic conditions) | | | |
| | 3.7 | Describe the workplace business aims and goals and the planning process | | | |
| | 3.8 | Describe the workplace organisational structure, its values and culture | | | |
| | 3.9 | Explain how their scientific or technical activities add value through delivering workplace products, services and processes | | | |
| | 3.10 | Describe the lines of communication and responsibilities in their department, and the links with the rest of the organisation | | | |
| | 3.11 | Describe the limits of their own authority and to whom they should report if they have problems that they cannot resolve | | | |

| Learning outcomes | | Assessment criteria | | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|---|---|
| 4 | Know how to manage and monitor the work of scientific or technical teams (continued) | 4.1 | Describe the different ways in which they are set their agreed personal work objectives | | | |
| | | 4.2 | Describe the different perspectives and approaches that are important when exercising autonomy or judgement about scientific or technical activities used | | | |
| | | 4.3 | Describe the types of investigation initiated and used to review the effectiveness or appropriateness of methods, action and results of their scientific or technical work | | | |
| | | 4.4 | Explain how to identify and assess the scientific or technical requirements of work roles | | | |
| | | 4.5 | Describe the planning required for the teams and team leaders to achieve their workplace scientific or technical objectives | | | |
| | | 4.6 | Explain how to set and monitor the work objectives and performance of teams | | | |
| | | 4.7 | Explain how the quality, cost and delivery targets of teams are measured | | | |
| | | 4.8 | Describe the types of support and advice that team leaders are likely to need and how to respond to these | | | |
| | | 4.9 | Describe the reporting procedure in the event of deviations from team plans | | | |

| Learning outcomes | Assessment criteria | Evidence type | Portfolio reference | Date |
|---|---|---|---|---|
| | 4.10 Describe the document control and reporting procedures that should be used | | | |
| | 4.11 Describe the reasons why effective communication is important, and the methods used for communicating effectively | | | |

Learner name: _____     Date:_____

Learner signature: _____     Date:_____

Assessor signature: _____     Date:_____

Internal verifier signature: _____     Date:_____
(*if sampled*)

# Further information and useful publications

To get in touch with us visit our 'Contact us' pages:

- Edexcel, BTEC and Pearson Work Based Learning contact details: qualifications.pearson.com/en/support/contact-us.html

- books, software and online resources for UK schools and colleges: www.pearsonschoolsandfecolleges.co.uk

Key publications

- *Adjustments for candidates with disabilities and learning difficulties, Access and Arrangements and Reasonable Adjustments, General and Vocational qualifications* (Joint Council for Qualifications (JCQ))

- *Supplementary guidance for reasonable adjustments and special consideration in vocational internally assessed units* (Pearson)

- *General and Vocational qualifications, Suspected Malpractice in Examination and Assessments: Policies and Procedures* (JCQ)

- *Equality Policy* (Pearson)

- *Recognition of Prior Learning Policy and Process* (Pearson)

- *UK Information Manual* (Pearson)

- *Pearson Edexcel NVQs, SVQs and competence-based qualifications – Delivery Requirements and Quality Assurance Guidance* (Pearson)

All of these publications are available on our website: qualifications.pearson.com

Further information and publications on the delivery and quality assurance of NVQ/Competence-based qualifications are available at our website on the Delivering BTEC pages. Our publications catalogue lists all the material available to support our qualifications. To access the catalogue and order publications, please go to the resources page of our website.


## How to obtain National Occupational Standards

To obtain the National Occupational Standards for Laboratory and Associated Technical Activities please go to:

**SEMTA**
www.semta.org.uk

# Professional development and training

Pearson supports UK and international customers with training related to NVQ and BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building functional skills into your programme
- building effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website (qualifications.pearson.com). You can request customised training through the website or by contacting one of our advisers in the Training from Pearson team via Customer Services to discuss your training needs.

The training we provide:

- is active
- is designed to be supportive and thought provoking
- builds on best practice
- may be suitable for those seeking evidence for their continuing professional development.

# Annexe A: Quality assurance

## Key principles of quality assurance

- A centre delivering Pearson qualifications must be a Pearson recognised centre and must have approval for qualifications that it is offering.

- The centre agrees, as part of gaining recognition, to abide by specific terms and conditions relating to the effective delivery and quality assurance of assessment. The centre must abide by these conditions throughout the period of delivery.

- Pearson makes available to approved centres a range of materials and opportunities to exemplify the processes required for effective assessment and provide examples of effective standards. Approved centres must use the guidance on assessment to ensure that staff who are delivering Pearson qualifications are applying consistent standards.

- An approved centre must follow agreed protocols for: standardisation of assessors; planning, monitoring and recording of assessment processes; internal verification and recording of internal verification processes and dealing with special circumstances, appeals and malpractice.

## Quality assurance processes

The approach to quality assured assessment is made through a partnership between a recognised centre and Pearson. Pearson is committed to ensuring that it follows best practice and employs appropriate technology to support quality assurance processes where practicable. The specific arrangements for working with centres will vary. Pearson seeks to ensure that the quality-assurance processes it uses do not inflict undue bureaucratic processes on centres, and works to support them in providing robust quality-assurance processes.

The learning outcomes and assessment criteria in each unit within this specification set out the standard to be achieved by each learner in order to gain each qualification. Pearson operates a quality-assurance process, designed to ensure that these standards are maintained by all assessors and verifiers.

For the purposes of quality assurance, all individual qualifications and units are considered as a whole. Centres offering these qualifications must be committed to ensuring the quality of the units and qualifications they offer, through effective standardisation of assessors and internal verification of assessor decisions. Centre quality assurance and assessment processes are monitored by Pearson.

The Pearson quality-assurance processes will involve:

- gaining centre recognition and qualification approval if a centre is not currently approved to offer Pearson qualifications

- annual visits to centres by Pearson for quality review and development of overarching processes and quality standards. Quality review and development visits will be conducted by a Pearson quality development reviewer

- annual visits by occupationally competent and qualified Pearson Standards Verifiers for sampling of internal verification and assessor decisions for the occupational sector

- the provision of support, advice and guidance towards the achievement of National Occupational Standards.

Centres are required to declare their commitment to ensuring quality and appropriate opportunities for learners that lead to valid and accurate assessment outcomes. In addition, centres will commit to undertaking defined training and online standardisation activities.

# Annexe B: Centre certification and registration

Pearson Standards Verifiers will provide support, advice and guidance to centres to achieve Direct Claims Status (DCS). Pearson will maintain the integrity of Pearson NVQs through ensuring that the awarding of these qualifications is secure. Where there are quality issues identified in the delivery of programmes, Pearson will exercise the right to:

- direct centres to take action
- limit or suspend certification
- suspend registration.

The approach of Pearson in such circumstances is to work with the centre to overcome the problems identified. If additional training is required, Pearson will aim to secure the appropriate expertise to provide this.

## What are the access arrangements and special considerations for the qualifications in this specification?

Centres are required to recruit learners to Pearson qualifications with integrity.

Appropriate steps should be taken to assess each applicant's potential and a professional judgement should be made about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Pearson's policy on learners with particular requirements.

Pearson's policy on access arrangements and special considerations for Pearson qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 2010 Equality Act) without compromising the assessment of skills, knowledge, understanding or competence. Please refer to *Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications* for further details. qualifications.pearson.com.

# Annexe C: Assessment requirements/strategy

## Introduction

Semta, the Sector Skills Council for the Science Engineering Manufacturing Technologies

Sector, has produced this QCF Unit Assessment Strategy to:

- assist Assessors, Internal Verifiers and External Verifiers
- encourage and promote consistent assessment of NVQ units
- promote cost effective assessment plans

This document also provides definitions for:

- the qualifications and experience required for Assessors and Verifiers
- the assessment environment and notes on simulation/replication.
- access to units

and requirements relating to:

- carrying out assessments
- performance evidence
- assessing knowledge and understanding

The importance and value in which employers and learners place on undertaking NVQ units will provide a key measure of [Semta's] success with this unit assessment strategy. Another key success factor will be [Semta's] partnership with the relevant Awarding Organisations.

## Assessor Requirements to Demonstrate Effective Assessment Practice

Assessment must be carried out by competent Assessors that as a minimum must hold the QCF Level 3 Award in Assessing Competence in the Work Environment. Current and operational Assessors that hold units D32 and/or D33 or A1 and/or A2 as appropriate to the assessment being carried out, will not be required to achieve the QCF Level 3 Award as they are still appropriate for the assessment requirements set out in this Unit Assessment Strategy. However, they will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace assessment to the most up to date National Occupational Standards (NOS)

## Assessor Technical Requirements

Assessors must be able to demonstrate that they have verifiable, relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence requirements as set out in the relevant QCF unit learning outcomes and associated assessment criteria.

This will be demonstrated either by holding a relevant technical qualification or by proven industrial experience of the technical areas to be assessed. The assessor's competence must, at the very least, be at the same level as that required of the learner(s) in the units being assessed.

Assessors must also be:

Fully conversant with the Awarding Organisation's assessment recording documentation used for the QCF NVQ units against which the assessments and verification are to be carried out, other relevant documentation and system and procedures to support the QA process.

## Verifier Requirements (internal and external)

Internal quality assurance (Internal Verification) must be carried out by competent Verifiers that as a minimum must hold the QCF Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practices. Current and operational Internal Verifiers that hold internal verification units V1 or D34 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this Unit Assessment Strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised Assessor units D32 and/or D33 or A1 and/or A2 or the QCF Level 3 Award in Assessing Competence in the Work Environment.

External quality assurance (External Verification) must be carried out by competent External Verifiers that as a minimum must hold the QCF Level 4 Award in the External Quality Assurance of Assessment Processes and Practices. Current and operational External Verifiers that hold external verification units V2 or D35 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this Unit Assessment Strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised Assessor units D32 and/or D33 or A1 and/or A2 or the Level 3 Award in Assessing Competence in the Work Environment.

External and Internal Verifiers will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace Quality Assurance (verification) of Assessment Processes and Practices to the most up to date National Occupational Standards (NOS).

Verifiers, both Internal and External, will also be expected to be fully conversant with the terminology used in the QCF NVQ units against which the assessments and verification are to be carried out, the appropriate Regulatory Body's systems and procedures and the relevant Awarding Organisation's documentation, systems and procedures within which the assessment and verification is taking place.

## Specific technical requirements for internal and external verifiers

Internal and external verifiers of this qualification must be able to demonstrate that have verifiable, sufficient and relevant industrial experience, and must have a working knowledge of the processes, techniques and procedures that are used in the relevant sector/occupation.

The tables on the following page show the recommended levels of technical competence for assessors, internal verifiers, and external verifiers.

## Technical Requirements for Assessors and Verifiers

| Position | Prime activity requirements | Support activity requirements | Technical requirements (see notes) |
|---|---|---|---|
| Assessor | Assessment Skills | IV Systems | Technical competence in the areas covered by the QCF units being assessed |
| Internal Verifier | Verification Skills | Assessment Knowledge | Technical understanding of the areas covered by the qualifications |
| External Verifier | Verification skills | Assessment Understanding | Technical awareness of the areas covered by the qualifications |

### Notes

1 Technical competence is defined here as a combination of practical skills, knowledge, and the ability to apply both of these, in familiar and new situations, within a real working environment.

2 Technical understanding is defined here as having a good understanding of the technical activities being assessed, together with knowledge of relevant Health & Safety implications and requirements of the assessments.

3 Technical awareness is defined here as a general overview of the subject area, sufficient to ensure that assessment and portfolio evidence are reliable, and that relevant Health and Safety requirements have been complied with.

4 The competence required by the assessor, internal verifier and external verifier, in the occupational area being assessed, is likely to exist at three levels as indicated by the shaded zones in the following table.

| Technical Competence<br><br>Required by: | An ability to discuss the general principles of the competences being assessed | An ability to describe the practical aspects of the competence being assessed | An ability to demonstrate the practical competences being assessed |
|---|---|---|---|
| Assessor | | | |
| Internal Verifier | | | |
| External Verifier | | | |

## Assessment Environment

The evidence put forward for this unit can only be regarded valid, reliable, sufficient and authentic if achieved and obtained in the working environment and be clearly attributable to the learner. However, in certain circumstances, simulation/replication of work activities may be acceptable.

- The use of high quality, realistic simulations, which impose pressures which are consistent with workplace expectations, should only be used in relation to the assessment of the following:-

  o rare or dangerous occurrences, such as those associated with health, safety and the environment issues, emergency scenarios and rare operations at work;

  o the response to faults and problems for which no opportunity has presented for the use of naturally occurring workplace evidence of learners competence;

  o aspects of working relationships and communications for which no opportunity has presented for the use of naturally occurring workplace evidence of learner's competence.

- Simulations will require prior approval from the specific Awarding Organisation and should be designed in relation to the following parameters: -

  o the environment in which simulations take place must be designed to match the characteristics of the working environment;

  o simulations which are designed to assess competence in dealing with emergencies, accidents and incidents must be verified as complying with relevant health, safety and environmental legislation by a competent health and safety/environmental control officer before being used;

  o simulated activities should place learners under the same pressures of time, access to resources and access to information as would be expected if the activity was real;

  o simulated activities should require learners to demonstrate their competence using real plant and equipment;

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- o simulated activities which require interaction with colleagues and contacts should require the learner to use the communication media that would be expected at the workplace;
- o for health and safety reason simulations need not involve the use of genuine substances/materials. Any simulations which require the learner to handle or otherwise deal with materials substances/should ensure that the substitute take the same form as in the workplace

Simulations/replications should be designed in relation to a realistic work environment, having an acceptable level of appropriate equipment and operating to Good Laboratory Practice (GLP)/Good Control Laboratory Practice (GCLP) and/or Good Manufacturing Practice (GMP)/Current Good Manufacturing Practice (CGMP) standards. It may involve the use of inert substitutes for dangerous compounds or microbiological materials.

## Access to Assessment

There are no entry qualifications or age limits required by learners to undertake the NVQ units unless this is a legal requirement of the process or the environment. Assessment is open to any learner who has the potential to achieve the assessment criteria set out in the units.

Aids or appliances, which are designed to alleviate disability, may be used during assessment, providing they do not compromise the standard required.

## Carrying Out Assessment

The NVQ units were specifically developed to cover a wide range of activities. The evidence produced for the units will, therefore, depend on the learners choice of "bulleted items" listed in the unit assessment criteria.

Where the assessment criteria gives a choice of bulleted items (for example 'any three from five'), assessors should note that learners do not need to provide evidence of the other items to complete the unit (in this example, two) items, particularly where these additional items may relate to other activities or methods that are not part of the learners normal workplace activity or area of expertise.

## Minimum Performance Evidence Requirements

Performance evidence must be the main form of evidence gathered. In order to demonstrate consistent, competent performance for a unit, performance evidence must be provided, and must be sufficient to show that the performance requirements of the unit have been carried out to the prescribed standards. It is possible that some of the scope items may be covered more than once. The assessor and learner need to devise an assessment plan to ensure that performance evidence is sufficient to cover all the specified scope items and which maximises the opportunities to gather evidence. Where applicable, performance evidence maybe used for more than one unit.

The most effective way of assessing competence, especially for the performance statements in relation to scope items, is through direct

observation of the learner. Assessors must make sure that the evidence provided reflects the learner's competence and not just the achievement of a training programme.

Evidence that has been produced from team activities, for example, cleaning equipment, is only valid when it clearly relates to the learners specific and individual contribution to the activity, and not to the general outcome(s).

Each example of performance evidence will often contain features that apply to more than one unit, and can be used as evidence in any unit where appropriate.

Performance evidence must be a combination of:

- outputs of the learner's work, such as items that have been processed or worked on, and documents produced as part of a work activity

together with:

- evidence of the way the learner carried out the activities such as witness testimonies, assessor observations or authenticated learner reports, records or photographs of the work/activity carried out, etc.

Competent performance is more than just carrying out a series of individual set tasks. Many of the units contain statements that require the learner to provide evidence that proves they are capable of combining the various features and techniques. Where this is the case, separate fragments of evidence would not provide this combination of features and techniques and will not, therefore, be acceptable as demonstrating competent performance.

If there is any doubt as to what constitutes valid, authentic and reliable evidence, the internal and/or external verifier should be consulted.


## Assessing knowledge and understanding

Knowledge and understanding are key components of competent performance, but it is unlikely that performance evidence alone will provide enough evidence in this area. Where the learner's knowledge and understanding (and the handling of contingency situations) is not apparent from performance evidence, it must be assessed by other means and be supported by suitable evidence.

Knowledge and understanding can be demonstrated in a number of different ways. Semta expects oral questioning and practical demonstrations to be used, as these are considered the most appropriate for these units. Assessors should ask enough questions to make sure that the learner has an appropriate level of knowledge and understanding, as required by the unit.

Awarding Organisations may choose other methods, which must be supported by a suitable rationale

Evidence of knowledge and understanding will not be required for those bulleted items in the assessment criteria that have not been selected by the learner.

The achievement of the specific knowledge and understanding requirements of the units cannot simply be inferred by the results of tests or assignments

from other units, qualifications or training programmes. Where evidence is submitted from these sources, the assessor must, as with any assessment, make sure the evidence is valid, reliable, authentic, directly attributable to the learner, and meets the full knowledge and understanding requirements of the unit.

Where oral questioning is used the assessor must retain a record of the questions asked, together with the learner's answers.

Awarding Organisations may choose other methods, which must be supported by a suitable rationale.

## Witness testimony

Where observation is used to obtain performance evidence, this must be carried out against the unit assessment criteria. Best practice would require that such observation is carried out by a qualified Assessor. If this is not practicable, then alternative sources of evidence may be used.

For example, the observation may be carried out against the assessment criteria by someone else that is in close contact with the learner. This could be a team leader, supervisor, mentor or line manager who may be regarded as a suitable witness to the learner's competency. However, the witness must be technically competent in the process or skills that they are providing testimony for, to at least the same level of expertise as that required of the learner. It will be the responsibility of the assessor to make sure that any witness testimonies accepted as evidence of the learner's competency are reliable, auditable and technically valid.

## Quality Control of Assessment

### General

There are two major points where an Awarding Organisation interacts with the Centre in relation to the External Quality Control of Assessment and these are:

- Approval - when a Centre take on new qualifications/units, the Awarding Organisation, normally through an External Verifier (EV) ensures that the Centre is suitably equipped and prepared to deliver the new units/qualification

- Monitoring - throughout the ongoing delivery of the qualification/units the Awarding Organisation, through EV monitoring and other mechanisms must maintain the quality and consistency of assessment of the units/qualification

### Approval

In granting Approval, the Awarding Organisation, normally through its External Verifiers (EV) must ensure that the prospective Centre:

- Meets the requirements of the Qualification Regulator

- Has sufficient and appropriate physical and staff resources

- Meets relevant health and safety and/or equality and access requirements

- Has a robust plan for the delivery of the qualification/units

The Awarding Organisation may visit the Centre to view evidence or may undertake this via other means.

The Awarding Organisation must have a clear rationale for the method(s) deployed

**Monitoring**

The Awarding Organisation, through EV monitoring and other mechanisms must ensure:

- that a strategy is developed and deployed for the ongoing Awarding Organisation monitoring of the Centre. This strategy must be based on an active risk assessment of the Centre. In particular the strategy must identify the learner's, assessors and Internal Verifier sampling strategy to be deployed and the rationale behind this

- that the Centre's internal quality assurance processes are effective in learner's assessment

- that sanctions are applied to a Centre where necessary and that corrective actions are taken by the Centre and monitored by the Awarding Organisation/EV

- that reviews of Awarding Organisation's external auditing arrangements are undertaken

Awarding Organisations are required to provide to SEMTA, on request, details of the strategies, rationales and reviews detailed above.

**Notes:**

a)     It is recognised that some Awarding Bodies provide supplementary guidance and documentation to centres to support the quality of assessment and verification practice of N/SVQs.

# Annexe D: Additional requirement for qualifications that use the term 'NVQ' in a QCF qualification title

Please go to www.ofqual.gov.uk to access the document *'Operating rules for using the term 'NVQ' in a QCF qualification title'*.