



Australian Government

MSL975017 Perform laboratory-based ecological techniques

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSL975017A Perform laboratory-based ecological techniques

Application

This unit of competency covers the ability to participate in laboratory investigations involving animals, plants and related environmental parameters. The animals or plants might be single specimens, parts of specimens or be in culture or under propagation. The investigations might also be part of experimental models that examine interactions of animals and/or plants and their environments. Investigations would generally relate to taxonomy, physiology and pathology, and would be oriented to scientific research, food production and manufacture, and to investigation of biological environments and ecosystems.

This unit of competency is applicable to laboratory technicians and technical officers working in biological, biotechnology and environmental industry sectors. It is expected that all work would conform to statutory and work health and safety (WHS) codes of practice. This unit of competency assumes that personnel perform tests and procedures under the close supervision of scientific staff and that the workplace will equip its workers with relevant animal handling skills should they be required. The unit does not cover procedures related to the handling of vertebrates that are subject to national and state/territory animal care and ethics regulations.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

MSL974006 Perform biological procedures

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|---|--|
| 1 | Process specimens and documentation | <div>1.1 Check specimens and request forms for labelling and documentation before acceptance</div> <div>1.2 Log specimens, applying required document tracking mechanisms</div> <div>1.3 Dispatch specimens to referral laboratories as required</div> <div>1.4 Store specimens appropriately until required for testing</div> |
| | | |
| 2 | Participate in the identification and classification of species | <div>2.1 Record macroscopic and/or microscopic details of specimens to assist in their identification and classification</div> <div>2.2 Use taxonomic keys to assist in the identification and classification of species</div> <div>2.3 Perform laboratory analyses that can assist in identification and classification of species</div> <div>2.4 Preserve specimens for future reference</div> <div>2.5 Label preserved specimens for storage and reliable retrieval from collections</div> |
| | | |
| 3 | Maintain viability and integrity of specimens during experimentation | <div>3.1 Provide nutrients and environments to maintain viability of individual specimens and organisms being cultured or propagated</div> <div>3.2 Perform procedures and analyses to monitor the experimental environment</div> <div>3.3 Perform procedures and analyses to monitor the physiology of organisms in the experimental environment</div> <div>3.4 Adjust nutrient requirements and environmental conditions as indicated by monitoring data</div> <div>3.5 Report to supervisors data and phenomena that may risk viability of individual specimens or cultures</div> <div>3.6 Report to supervisors data and phenomena that are incompatible with the experimental design parameters</div> |

4	Integrate laboratory and field data	4.1	Locate field data relevant to the study or experiment
		4.2	Ensure that field and laboratory data codes are matched for tracking, reporting and chain of custody requirements
		4.3	Log field and laboratory data into information systems
		4.4	Assist with writing reports of experiments and related field studies
5	Maintain a safe work environment	5.1	Use established safe work practices and personal protective equipment (PPE) to ensure personal safety and that of other laboratory personnel
		5.2	Minimise the generation of waste and environmental impacts
		5.3	Ensure the safe collection of laboratory and hazardous waste for subsequent disposal
		5.4	Care for and store equipment and reagents as required

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the competence of testing and calibration laboratories, laboratory safety and quality management
- national WHS standards and codes of practice, and national environmental protection requirements

- specific codes, guidelines, procedures and methods, such as animal welfare legislation and codes of practice, guide to physical containment levels and facility types, and Australian Quarantine and Inspection Service (AQIS) Export Control (Orders) Regulations
- workplace documents, such as standard operating procedures (SOPs), quality and equipment manuals, calibration and maintenance schedules, material safety data sheets (MSDS) and safety procedures, safety procedures to minimise contraction of zoonoses, laboratory schedules, workplace recording and reporting procedures, waste minimisation disposal protocols and environment protection procedures
- workplace procedures for labelling, preparation, storage, transport and disposal of samples and specimens
- validated and authorised test procedures

Communication

Communication includes interactions with one or more of:

- scientists
- field workers
- local government professionals or representatives of state/territory authorities, such as environmental protection agencies
- supervisors and managers (laboratory, quality and customer service)
- clients

Disposal of biohazardous wastes

Disposal of biohazardous wastes includes, but is not limited to, one or more of:

- collection for sterilisation by autoclaving (e.g. autoclaving of microbiological plates)
- appropriate storage (e.g. of waste containing radioactive isotopes)
- use of biohazard waste containers

Safe work practices

Safe work practices include, but are not limited to, one or more of:

- ensuring access to service shut-off points
- recognising and observing hazard warnings and safety signs
- labelling of samples, reagents, aliquoted samples and hazardous materials
- handling and storage of hazardous materials and equipment in accordance with labelling, material safety data sheets (MSDS)

and manufacturer instructions

- identifying and reporting operating problems or equipment malfunctions
- cleaning and decontaminating equipment and work areas regularly using workplace procedures
- using PPE, such as gloves, safety glasses, coveralls, gowns, hearing protection and safety boots
- using containment facilities (PCII, PCIII and PCIV physical containment laboratories), containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets) and containment procedures
- following established manual handling procedures
- reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/wastewater, gases, smoke, vapour, fumes, odour and particulates, to appropriate personnel

WHS and environmental management requirements

WHS and environmental management requirements include:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time
- applying standard precautions relating to the potentially hazardous nature of samples
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL975017 Perform laboratory-based ecological techniques

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- identifying and classifying at least five (5) different animal and plant species for scientific and experimental purposes
- processing, labelling, preserving and storing at least five (5) different kinds of specimens
- performing procedures and analyses to monitor the physiology of organisms/specimens in the experimental environment and maintain their viability on at least three (3) occasions
- taking representative samples for analysis
- not contaminating sterile environments or specimens
- integrating field and laboratory data to provide meaningful results in support of laboratory investigations
- using appropriate scientific terminology and technical concepts to report data and phenomena that may risk viability of individual specimens or cultures or are incompatible with the experimental design parameters
- safely collecting, storing and disposing of waste and minimising contamination of the environment
- following workplace safety procedures.

Knowledge Evidence

- Must provide evidence that demonstrates knowledge of:
- growth requirements of organisms that are subjects of laboratory or greenhouse culture or propagation relevant to job role
- general anatomy of plants and animals that is useful as classification data
- processes that are essential for preservation of plant and animal material for use as reference material
- relationships between field and laboratory data that are useful in giving commentary on the integrity or distress in biological environments
- rationale for selection of techniques used to monitor the experimental environment and the effects of variables on organisms in the experimental environment
- uses of environmental impact statements that incorporate the results of field and laboratory analyses
- workplace and/or legal traceability requirements

relevant hazards, work health and safety (WHS) and environment requirements.

Assessment Conditions

- Judgment of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL925001 Analyse data and report results
 - MSL974007 Undertake environmental field-based monitoring
- Holistic assessment methods include:
 - review of data and results obtained by the candidate over time to ensure accuracy and consistency
 - inspection of records and workplace documentation completed by the candidate
 - feedback from supervisors or clients about the candidate's ability to perform laboratory-based ecological techniques in support of laboratory investigations involving animals, plants and related environmental parameters
 - observation of the candidate processing specimens and conducting analyses
 - questioning about procedures that form part of experiments relevant to job role
 - review of the candidate's responses to case studies/scenarios, such as:
 - relating field and laboratory data in an environmental impact statement
 - preservation of plant species and placement in a herbarium
 - plant propagation in a variety of controlled environments
 - maintenance of cultures of protozoans or invertebrates.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - equipment and resources for investigating the physiology of plants and animals in the laboratory
 - workplace procedures, sampling plans, test methods and equipment manuals
 - computers and programs for simulated experiments or data analysis
 - items of equipment, reagents, specimens and systems for botanical and zoological techniques
 - laboratory information management systems (LIMS), databases, record and filing systems, including specimen accessioning.

- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment OR
 - having consulted with a laboratory about performing the competency being assessed within the last twelve months.
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