



Australian Government

MSL974006 Perform biological procedures

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSL974006A Perform biological procedures

Application

This unit of competency covers the ability to interpret work requirements, prepare samples, conduct pre-use and calibration checks on equipment, and perform routine biological procedures. These procedures may involve several steps and are used to classify cell types, species and biologically active compounds by analysing their biological and chemical characteristics. This unit includes data processing, interpretation of results and troubleshooting obvious departures from standard procedures.

This unit of competency is applicable to technical assistants working in the biomedical, environmental, biotechnology and education industry sectors.

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

Nil

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.

1	Interpret and schedule work requirements	1.1	Review work request to identify samples, required procedures and materials/equipment/instruments involved
		1.2	Identify hazards and workplace control measures

			associated with the sample, preparation methods, reagents and/or equipment
		1.3	Plan parallel work sequences to optimise throughput of multiple sets of samples
2	Receive and prepare biological samples	2.1	Log samples using standard operating procedures (SOPs)
		2.2	Record sample description, compare with specification and note and report discrepancies
		2.3	Prepare samples in accordance with testing requirements
		2.4	Ensure traceability of sample from receipt to reporting of results
3	Perform techniques that assist in the classification of a cell or species	3.1	Select suitable techniques in accordance with workplace requirements and methods
		3.2	Set up and use equipment and reagents in accordance with the method
		3.3	Perform techniques in accordance with the method
4	Perform techniques that analyse biological activity	4.1	Select suitable techniques in accordance with workplace requirements and methods
		4.2	Set up and use equipment and reagents in accordance with the method
		4.3	Perform techniques in accordance with the method
5	Process and interpret data	5.1	Record test data noting atypical observations
		5.2	Construct calibration graphs and compute results for all samples from these graphs
		5.3	Ensure calculated values are consistent with expectations
		5.4	Record and report results in accordance with workplace procedures

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| | | 5.5 | Estimate and document uncertainty of measurement in accordance with workplace procedures |
| | | 5.6 | Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel |
| | | 5.7 | Determine if obvious procedure or equipment problems have led to atypical data or results |
| 6 | Maintain a safe work environment | 6.1 | Use established safe work practices and personal protective equipment (PPE) to ensure personal safety and that of other laboratory personnel |
| | | 6.2 | Minimise the generation of waste |
| | | 6.3 | Ensure the safe disposal of biohazardous wastes |
| | | 6.4 | Clean, care for and store equipment and reagents as required |
| 7 | Maintain laboratory records | 7.1 | Record approved data into workplace system |
| | | 7.2 | Maintain confidentiality and security of workplace information and laboratory data |
| | | 7.3 | Maintain equipment and calibration logs in accordance with workplace procedures |

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; quality management; volumetric glassware; chemical analysis using techniques, such as ultraviolet-visible (UV-VIS) spectrophotometry or atomic absorption spectrometry
- national work health and safety (WHS) standards and codes of practice, and national measurement regulations and guidelines
- specific codes, guidelines, procedures and methods, such as the Australian code of good manufacturing practice for medicinal products (GMP), principles of good laboratory practice (GLP), Royal Australian Chemical Institute (RACI) and/or American Association of Cereal Chemists (AACC) methods for inorganic constituents
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; and waste minimisation and safe disposal procedures

Techniques for preparation of samples

Techniques for preparation of samples include, but are not limited to, one or more of:

- dissection, such as preparation of thymus extracts from mice
- extraction (e.g. solvent extraction)
- filtration (e.g. filter water samples and plate the sediment onto agar plates for incubation and growth of *E. coli*)
- separation (e.g. dialysis)
- precipitation and flocculation
- centrifugation (excluding ultra centrifugation)
- chromatography, such as:
 - gel filtration chromatography (e.g. crude purification of proteins)
 - affinity chromatography (e.g. purification of immunoglobulins)
- electrophoresis, such as:
 - polyacrylamide gel electrophoresis for separation of DNA segments
 - agarose gel electrophoresis
 - capillary electrophoresis
 - gradient gel electrophoresis

Techniques to classify cells or species

Techniques to classify cells or species include, but are not limited to, one or more of:

- classification of species according to taxa
- classification of cells according to microscopic or staining characteristics
- characteristics of bacterial colonies:
 - growth on differential media
 - colony morphology (size and shape)
- biochemical reactions, such as miniaturised test strips, redox reactions and sugar tests

Techniques to analyse chemical and biological characteristics

Techniques to analyse chemical and biological characteristics include, but are not limited to, one or more of:

- staining, such as:
 - Gram stain for gram negative and positive bacteria
 - Romanowsky stain for blood films
 - Haematoxylin and Eosin for tissue sections
 - Oil red O for fatty cellular inclusions
 - spore staining
 - flagella staining
- microscopic examination, such as:
 - light
 - phase contrast
 - bright field
 - dark ground
 - enumeration
- colorimetry and spectrophotometry, such as:
 - UV-VIS
 - fluorimetric
 - infrared
 - flame emission
 - atomic absorption spectrometry
- electrochemistry, such as:
 - pH
 - ion selective electrodes and polarography (e.g. concentration of chloride ions)
- chromatography, such as:
 - column and thin layer analytical and preparative chromatography
 - gas and liquid chromatography for purity, raw material and formulation checks

- 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, 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 and gowns
 - using containment facilities (e.g. PCII, PCIII and PCIV physical containment laboratories), containment equipment (e.g. 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/waste water, 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.education.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>