



Australian Government

MSS024022 Perform environmental biological techniques

Release: 1

MSS024022 Perform environmental biological techniques

Modification History

Release 1. Updated unit code. Changes to elements and performance criteria. Range of conditions removed. Assessment requirements amended. Equivalent outcome.

Application

This unit describes the skills and knowledge to collect and examine biological samples using microscopes, keys and biochemical tests to identify and enumerate environmentally significant organisms. Personnel are expected to prepare aseptic media and solutions, set up equipment for microbiological testing and identify basic microorganisms of environmental significance.

This unit applies to environmental technicians working in a range of industry sectors, including environmental services; clean water; water treatment, storm and wastewater management; and natural resource management.

No licensing or certification requirements exist at the time of publication. Relevant legislation, industry standards and codes of practice within Australia must be applied.

Pre-requisite Unit

Nil

Competency Field

Sampling and testing

Unit Sector

Environmental

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Obtain biological samples	1.1	Locate and read background information for site or project
		1.2	Review work request to identify required samples and the procedures, materials and equipment involved
		1.3	Identify hazards and workplace control measures associated with collecting the sample, preparation

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. methods, reagents and equipment
	1.4 Assemble required materials, reagents and equipment and check they are fit for purpose
	1.5 Collect samples in accordance with legislative requirements, codes of practice and workplace procedures
	1.6 Log samples using workplace procedures
	1.7 Record sample description, compare with specification and note and report discrepancies
	1.8 Ensure traceability from receipt of sample to reporting of results
2 Prepare samples and grow cultures	2.1 Use aseptic techniques to prepare media for microbiological analysis
	2.2 Obtain samples for microbiological analysis
	2.3 Identify contamination pathways for both samples and media
	2.4 Perform simple chemical tests to identify morphology of environmentally significant bacteria
	2.5 Use aseptic techniques to manipulate samples and bacterial cultures
	2.6 Use standard techniques to grow cultures of environmentally significant microorganisms
	2.7 Use disinfection and sterilisation to control the growth of microorganisms
3 Prepare microscope for use	3.1 Select microscope and attachments for examination and measurements
	3.2 Check that all microscope components are clean and fit for purpose

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
		3.3	Mount sample in accordance with specified method
		3.4	Adjust settings and alignment of optical and mechanical components to optimise performance
4	Perform microscopic examination in accordance with test methods	4.1	Identify microorganisms, cell structures and components of animal and plant tissues in environmental samples
		4.2	Measure organisms and structures
		4.3	Enumerate microorganisms in environmental samples
5	Classify organisms	5.1	Classify organisms into hierarchical structures using appropriate keys
		5.2	Record all observations and measurements used to determine classifications
6	Relate cell structures and their functions to environmental adaptation	6.1	Identify cell structures from examination of biological specimens
		6.2	Associate biological functions with cell structures
		6.3	Associate cell physiology and enzyme cycles to environmental adaptation
		6.4	Identify important biochemical pathways associated with environmentally significant organisms
7	Maintain a safe work environment	7.1	Use personal protective clothing and safety equipment to ensure safety and minimise cross-contamination
		7.2	Handle all samples and equipment in accordance with workplace safety procedures
		7.3	Clean up spills using techniques to protect personnel, work area and environment
		7.4	Minimise generation of waste and environmental

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	impacts
	7.5 Collect and dispose of all wastes safely
	7.6 Report hazards and incidents to designated personnel using workplace procedures
8 Maintain workplace records	8.1 Record approved data into workplace system
	8.2 Maintain confidentiality and security of workplace information and data

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.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSS024010 Perform environmental biological techniques.

Links

The MSS Sustainability Companion Volume implementation Guides are available from VETNet: -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5b04f318-804f-4dc0-9463-c3fb9a3fe998>

Assessment Requirements for MSS024022 Perform environmental biological techniques

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and:

- performed each of the following environmental biological techniques on at least 2 occasions:
 - collecting biological samples in accordance with work request and procedures
 - using aseptic techniques to obtain and manipulate samples and prepare media
 - using standard techniques to grow cultures of environmentally significant microorganisms
 - setting up, cleaning and optimising the performance of light microscopes
 - conducting tests and microscopic examination of samples to identify and enumerate environmentally significant (micro)organisms and important components of plant and animal tissues

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- principles and terminology used in elementary microbiological testing, organism classification, microscopic examination
- sampling techniques for air, water, soil in terrestrial and aquatic habitats
- types of samples
- relationship between sterile practices, hygiene procedures and the ability to obtain growth of microorganisms free of contamination
- importance of pure culture techniques and aseptic transfer to successful microbiological investigation and correct interpretation of results
- aseptic techniques
- growth requirements of microorganism cultures (including bacteria, fungi and yeasts)
- principles of infection control related to work health and safety (WHS), sampling and transfer of materials in microbiological investigations
- disinfection and sterilisation procedures used in the collection, processing and safe disposal of samples and materials
- cleaning and sanitising requirements of equipment and work area and effects of physical and chemical agents on microbial growth and death

- parts and functions of common microscopes, set-up procedures and common causes and solutions for sub-optimal performance
- microscopy techniques
- cell theory, basic structure and function of cells and organelles
- cell physiology and processes, including simple and facilitated diffusion, plasmolysis, osmosis, tonicity, active transport, energy production, mitosis, motility, phagocytosis and pinocytosis
- purposes and mechanisms of staining (including Gram +ve and -ve)
- equipment, materials and systems used
- artefacts or image aberrations attributable to misalignment or obstruction of light paths or condensers used in bright field, dark ground, and phase contrast microscopy, or with other steps in microscopic examinations
- workplace and legal traceability requirements
- hazards, controls and safety procedures associated with handling microorganisms.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of facilities, equipment and resources, including:
 - standard microbiology laboratory
 - sampling and testing equipment, materials and reagents
 - work request, workplace procedures, sampling and test methods, equipment manuals, safety procedures
- modelling of industry operating conditions, including:
 - biological samples and organisms must be of a risk category that is compatible with laboratory as defined in AS/NZS 2243.3 Safety in laboratories - Microbiological safety and containment.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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