Australian Government

Department of Education, Employment and Workplace Relations

MSL973004A Perform aseptic techniques

Revision Number: 1

MSL973004A Perform aseptic techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform aseptic techniques to maintain the integrity of both the sample source and the sample. It applies to sampling techniques in tissue culture and to generic microbiological procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and technicians working in the field or laboratory in the biomedical, biological, food processing and environmental industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for aseptic sampling or transfer	1.1. Ensure that any sampling procedure conforms with the requirements of the sampling plan 1.2. Use specified personal protective clothing and equipment 1.3. Prepare the work area for safe and effective sample transfer 1.4. Select equipment and materials specified by the procedure 1.5. Organise equipment to minimise contamination during manipulations 1.6. Label containers for clear identification 1.7. Record details in relevant log or database
2. Transfer materials aseptically	2.1. Protect the integrity of the sample source by sterilising the sampling site and the mouth of transport or culture vessel 2.2. Sterilise inoculating loops and/or pipette where used to prevent contamination 2.3. Perform transfer while minimising opportunities for contamination and cross-infection 2.4. After transfer, and before sealing the transport or culture vessel, flame the vessel mouth to maintain sterility 2.5. Re-sterilise inoculating loops, minimising the generation of aerosols 2.6. Perform quality control checks, if required 2.7. Label transport or culture vessels for clear identification
3. Maintain work area and equipment to prevent cross-infection and contamination	3.1. Place disposable and reusable items into relevant receptacles 3.2. Clean and disinfect work area and equipment after use 3.3. Transport disposable and reusable contaminated materials to relevant areas for disinfection, sterilisation and cleaning or disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- sterilising equipment such as flasks, loops and pipettes
- handling of laboratory equipment and glassware to prevent contamination
- streak plating of inoculations
- sampling transfers
- labelling and storing culture media according to enterprise procedures
- recording data accurately
- reporting non-compliance, anomalies or outofspecification results
- sorting, collecting, treating, recycling or disposing of waste
- following enterprise procedures consistently
- using appropriate personal protective equipment

Required knowledge

Required knowledge includes:

- the relationship between sterile practices, hygiene procedures and the ability to obtain growth free of contamination
- cleaning and sanitising requirements of equipment and work areaand effects of physical and chemical agents on microbial growth and death
- principles of infection control related to occupational health and safety (OHS), sampling and transfer of materials in microbiological investigations
- disinfection and sterilisation procedures used in the collection, processing and safe disposal of samples and materials
- importance of pure culture techniques and aseptic transfer to the successful microbiological investigation and correct interpretation of laboratory results
- growth requirements of micro-organisms (bacteria, fungi, protozoans, viruses and multi-cellular parasites) in terms of their laboratory culture
- relevant health, safety and environment requirements

Specific industry

Additional knowledge requirements may apply for different industry sectors. For example:

Food processing:

- food spoilage symptoms
- food safety principles
- beneficial/detrimental organisms relevant to specific food industry sector

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	In particular, assessors should look to see that the candidate: • follows established laboratory procedures, including recording of samples, operation of equipment and cleaning/decontamination • prevents cross-contamination of sample source and sample • manipulates equipment to prevent contamination of culture medium during transfer • sterilises equipment as required to prevent cross-contamination of work area, personnel and environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety* • *MSL973003A Prepare culture media*. Resources may include: • standard laboratory with appropriate equipment and materials • enterprise procedures and standard methods • MSDS.
Method of assessment	The following assessment methods are suggested: • review of quality assurance results and examination of samples transferred by the candidate • observation of the candidate successfully transferring a range of samples • written and/or oral questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Food processing** As part of the quality assurance program at an ice-cream manufacturer, six ice-creams were removed from the production line, placed in sterile bags and then stored in a freezer in the microbiology laboratory. Later in the morning, the laboratory assistant removed the samples from the freezer, registered the samples with the date received and test code and signed the register book. She/he then placed the samples in a water bath set at 42(C. While the samples were melting, the laboratory assistant labelled the respective agar plates with the registered codes. Using aseptic techniques she/he carefully transferred 1ml of ice-cream mix into the total plate count agar. The plates were then placed in the incubator. The final results were noted and recorded. **Biomedical** In preparation for antibiotic sensitivity testing and biochemical identification of presumed pathogenic bacteria, a technical assistant was asked to prepare a sterile peptone suspension of a lactose fermenting colony. The colony had been previously identified by the supervisor on a MacConkey's agar plate. The assistant labelled a 5mL tube of peptone broth with the sample number and a code for the identified colony and then donned a pair of disposable gloves. Bringing the labelled tube and the MacConkey's plate near to the Bunsen, she/he took an inoculating loop and sterilised it in the

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	incandescent flame. She/he carefully cooled the loop in a sterile area of the agar and gently scraped off half the colony. With the other hand, and in the vicinity of the heated air of the Bunsen, she/he removed the cover of the peptone tube in her/his crooked finger. In a continuous and coordinated way she/he flamed the lip of the tube and emulsified the colony in the broth. She/he then flamed the lip of the tube and replaced its cover. Finally, the technical assistant re-sterilised the inoculating loop by introducing and holding it in the Bunsen flame to minimise the generation of bacterial aerosols.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• client and product specifications
	• manufacturer's instructions or verbal direction from laboratory manager, supervisor or senior technician
	• material safety data sheets (MSDS)
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• National Health and Medical Research Council (NHMRC) Guidelines
	• OHS national standards and codes of practice

RANGE STATEMENT	
	• operation and maintenance manuals for automated media preparation equipment • principles of good laboratory practice (GLP) • production schedules and instructions • standard operating procedures (SOPs)
Personal protective equipment	Personal protective equipment may include: • gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits and respirators • biohazard containers and laminar flow cabinets
Sample pot and transfer media and the subculturing and/or passaging of culture	Sample pot and transfer media and the subculturing and/or passaging of culture to: • sterile broth • media for isolation of colony • tissue culture media • media for continuous culture systems
Samples	Samples may include: • body fluids and liquids • water and soil • sterile pharmaceuticals • yeasts and moulds • milk and yoghurt • swabs and smears • propagation tissue • plant material • fermented foods and beverages
Equipment	Equipment may include: • transfer equipment, such as inoculating loops, pipettes (quantitative and qualitative), flasks, tubes and spatulas • Bunsen burners and bench incinerators • anaerobic jars • incubators, water baths, refrigerators, freezers and possibly dry ice and liquid nitrogen cylinders • laminar flow units and biohazard cabinets • autoclave or pressure cooker • swabs • continuous culture systems

RANGE STATEMENT	
The range of material	The range of material may involve: • solid and/or liquid media • supplied media, such as media manufactured in the enterprise or raw material supplies for media • disinfecting and sterilising agents and materials, such as methylated spirits, ethanol and ether • disposable equipment and clothing • tissue culture media • growth media in broths, plates, deeps or slopes • receptacles for safe disposal of wastes and for processing of reusable materials • bar coding material and labels
Sterilisation techniques	Sterilisation techniques may include: • autoclaving • flaming • steam and membrane filtration • boiling • microwaving • radiation • high temperature • high pressure steam • gas and chemical treatments
Quality control checks	Quality control checks may include: • streaking out of cultures to a single colony • lawn cultures
Hazards	Hazards may include: • accessing the sample from difficult or dangerous areas • dry ice and liquid nitrogen vapour • ultraviolet (UV) light sources • heat from Bunsen burners • molten agar • sharps • hazardous substances and/or infectious agents
Workplace information	Workplace information may include: • SOPs

RANGE STATEMENT	
	• specifications for safe waste disposal of bio-hazardous materials • production schedules and instructions • work notes • MSDS • manufacturer's instructions • verbal instructions from laboratory manager, supervisor or senior technician • guidelines for small scale genetic manipulation work
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		