Australian Government

Department of Education, Employment and Workplace Relations

MSL924001A Process and interpret data

Revision Number: 1

MSL924001A Process and interpret data

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to retrieve data, evaluate formulae and perform scientific calculations, present and interpret information in tables and graphs and keep accurate records. The unit requires personnel to solve problems of limited complexity where the information may be less obvious, but not contradictory, and can be determined by direct reasoning.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants, field/laboratory technicians and instrument operators in all 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. Retrieve and check data	1.1. Store and retrieve data using appropriate files and/or application software 1.2. Verify the quality of data using enterprise procedures 1.3. Rectify errors in data using enterprise procedures
2. Calculate scientific quantities	2.1. Calculate statistical values for given data 2.2. Calculate scientific quantities using given formulae and data and estimate uncertainties 2.3. Ensure calculated quantities are consistent with estimations and expectations 2.4. Report all calculated quantities using the appropriate units and correct number of significant figures
3. Present data in tables, charts and graphs	3.1. Present data in clearly labelled tables and charts 3.2. Graph data using appropriate scales to span the range of data or display trends 3.3. Report all data using the appropriate units and number of significant figures
4. Interpret data in tables, charts and graphs	4.1. Interpret significant features of graphs, such as gradients, intercepts, maximum and minimum values, and limit lines 4.2. Recognise and report trends in data
5. Keep accurate records and maintain confidentiality	5.1. Transcribe information accurately 5.2. Verify the accuracy of records following enterprise procedures 5.3. File and store workplace records in accordance with enterprise procedures 5.4. File all reference documents logically and keep them up-to-date and secured 5.5. Observe enterprise confidentiality standards

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- performing calculations of scientific quantities
- using scientific notation
- applying the concepts of metrology
- applying calculations to the workplace
- coding, recording and checking of data accurately
- presenting accurate results in the required format
- preparing graphs, tables and charts (pie, bar, histogram) and interpreting trends
- preparing and interpreting process control charts
- maintaining the confidentiality of data in accordance with workplace and regulatory requirements

Required knowledge

Required knowledge includes:

- concepts of metrology
- the international system of units (SI)
- relevant scientific and technical terminology
- uncertainty associated with measurement steps
- procedures for coding, entering, storing, retrieving and communicating data
- procedures for verifying data and rectifying mistakes
- converting units involving multiples and submultiples
- significant figures, rounding off, estimating, approximating
- transposing and evaluating formulae
- calculations involving fractions, decimals, proportions and percent
- determining statistical values of data such as mean, median, mode and standard deviation
- procedures for maintaining and filing records, and maintaining security of data

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	Assessors should ensure that candidates can: • code, record and check the documentation of data • calculatescientific and statistical quantities relevant to the workplace and present accurate results in the required format • recognise anomalies and trends in data • maintain the confidentiality of data in accordance with workplace and regulatory requirements • keep records up-to-date and secure.

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:
	• *MSL924002A Use laboratory application software*
	• technical units, such as:
	  • *relevant MSL973000 series units of competency*
	  • *relevant MSL974000 series units of competency*.
	Resources may include:
	• data sets and records
	• computer and relevant software or laboratory information system
	• relevant workplace procedures.

Method of assessment	The following assessment methods are suggested: • review of data worksheets, calculations, computer files (such as spreadsheets, databases, statistical analysis), graphs, tables and/or charts prepared by the candidate • review of records transcribed, maintained or stored by the candidate • feedback from supervisors and peers • questions to assess understanding of relevant procedures and trends in data • observation of the candidate as they process data, file

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	and store records. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess 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 to show its relevance in a workplace setting. **Manufacturing** A laboratory assistant in a materials testing laboratory was performing routine tensile tests on samples of vinyl sheet. The assistant converted the readings from the machine to appropriate units using a simple calculation and recorded them in the logbook for that test method. After comparing these test results with previous results for the same type of vinyl material, the assistant found that the tensile strength was within the required range. However, it was at the lower rather than the upper end of the range as in previous testing. The assistant discussed the results with the laboratory supervisor. The calibration file for that machine showed that it had been calibrated four months previously and had not needed adjustment. Test results for the same period showed that the machine was giving lower than normal tensile strength readings for the few higher strength materials tested over the last two months. The assistant did some more checks and confirmed this trend. The machine was re-calibrated by the instrument company and the frequency of internal calibration checks by the laboratory assistant was increased. This problem would not have been detected or corrected as quickly without the assistant's initiative and competent recording and retrieval of test results and

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	calibration information. **Biomedical** A technical assistant works in a team with laboratory scientists and technical officers. Analyses of electrolytes are routine and occur in large volume throughput even in this small diagnostic laboratory. The assistant is assigned tasks that contribute to the overall production of results, their reporting and the quality control evaluation of the results. One task is the daily collection of the electrolyte analyses from the internal quality control area. In this case, the technical assistant plots the results on a Levy-Jennings graph and computes the mean value. The assistant reports immediately to the supervisor if the plots show deviations which indicate out-of-control results. **Food processing** Cooking and holding temperatures greatly affect the nutrient composition of processed foods. The CSIRO provides documentation of nutrient losses with temperature variations. For cooked foods, there is the added problem of microbial growth in the so called 'danger zone'. In one laboratory, the technical assistant conducts simple testing of foods using a temperature probe and also measures the temperature of the storage areas, holding trays or bainmaries and individual tray units. Careful documentation of the temperatures of the foods and times of measurement must be kept. The technical assistant supplies the data as tables and a plot of temperature versus time. For quality control purposes, the assistant is directed to use a cross reference of mercury thermometer readings versus probe measurements for ambient temperature. The assistant plots the thermometer readings against the probe readings and reports to the supervisor if the plot shows a slope other than the defined value.

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 ISO 1000-1998 The international system of units (SI) and its application
	  • ISO 5725 Accuracy (trueness and precision) of measurement methods and results
	  • ISO/IEC Guide 98-3:2008 Uncertainty of measurement - Part 3 Guide to the expression of uncertainty in measurement (GUM)
	• Eurachem/CITAC Guide CG4 Quantifying uncertainty in analytical measurement
	• national measurement regulations and guidelines
	• National Association of Testing Authorities (NATA) Technical notes
	• material safety data sheets (MSDS)
	• equipment manuals and warranty, supplier catalogues and handbooks
	• sampling and test procedures and standard operating procedures (SOPs)
	• enterprise quality manual and customer quality plan
	• validation of the equipment and associated software where applicable
	• validation of spreadsheets developed in-house for assay and process calculations

Concepts of metrology	Concepts of metrology may include:

RANGE STATEMENT	
	• that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Data	Data may be recorded on: • worksheets • spreadsheets • databases linked to information management systems Data may include results of: • observations • tests and measurements • analyses • surveys • quality assurance and control assessments Data may be presented in the form of: • graphs • tables • histograms • pie charts • bar charts • control charts • semi-quantitative observations and be expressed on a scale (for example, 1 to 4 or + to ++++)
Calculations	Calculations may be performed: • with or without a calculator • using computer software, spreadsheets, databases and statistical packages
Calculations of scientific quantities	Calculated of scientific quantities may include: • converting units involving multiples and submultiples

RANGE STATEMENT	
	• significant figures, round off, estimate and approximate • transposing and evaluating formulae • fractions, decimals, proportions and percentages • perimeters and angles • percentage and absolute uncertainties in measurements and test results • statistical values of data, such as mean, median, mode and standard deviation • areas (m^2) and volumes (mL, L, m^3) of regular shapes, such as packaging • dose (mg), average mass, mass percentage, density, specific gravity, moisture, relative and absolute humidity, viscosity and permeability • ratios, such as mass to mass, mass to volume and volume to volume percentages • concentration, such as molarity, g/100mL, mg/L, mg/(L, ppm, ppb, dilution mL/L • average count, colonies per swab surface and cell counts, such as live and dead/total • process variables, such as pressure, gauge pressure, velocity and flow rates • biological oxygen demand (BOD), chemical oxygen demand (COD) and total organic carbons (TOC) • % content of moisture, ash, fat, protein, alcohol, sulphur dioxide and trace metals, such as calcium or zinc • food properties, such as % concentration (dry), friability, bitterness, brix, free amino nitrogen, diastatic power, calorific content and yeast viability • stress, strain, moduli and force
Records	Records could include information associated with: • purchase of equipment and materials, service records • safety procedures • history of calibration and test results
Occupational health and safety (OHS) and environmental	OHS and environmental management requirements:

RANGE STATEMENT	
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	Data

Competency field

Competency field	

Co-requisite units

Co-requisite units		