



Australian Government

MSS024008 Recognise common geological landforms and samples

Release: 1

MSS024008 Recognise common geological landforms and samples

Modification History

Release 1. Supersedes and is equivalent to MSS024008A Recognise common geological landforms and samples

Application

This unit of competency covers the ability to recognise common geological landforms and relate these to basic geological processes and other ecosystem components. Personnel are also expected to obtain (near) surface samples of common rocks, minerals and soils and identify them using classification tables and charts.

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as environmental services (e.g. sampling and monitoring of air quality, water, soil and noise); environmental compliance, auditing and inspection; groundwater and clean water (e.g. catchments, supply and environmental flows); solid and hazardous waste management; management of contaminated sites; site remediation or rehabilitation; geotechnical services and civil engineering; natural resource management.

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

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 | Prepare for field work | 1.1 | Review job request to identify the equipment involved, samples to be collected and/or test methods. |
| | | 1.2 | Identify hazards and workplace safe work procedures associated with the site, samples, test methods and |

		equipment used.
	1.3	Confirm site location, access, timing and any client requirements.
	1.4	Assemble all required equipment/materials and check that they are fit for purpose.
	1.5	Stow equipment/materials to ensure their safe transport, as necessary.
	1.6	Arrange transport to site, as necessary.
	1.7	Liaise with appropriate personnel on arrival at site to ensure safety and minimise disruption to others, as necessary.
2	Recognise geological structures and processes	2.1 Recognise common landforms and relate these to geological processes. 2.2 Interpret simple geological maps, diagrams and aerial photos. 2.3 Apply principles of geological processes and the geological timescale to explain the formation and occurrence of common rocks, minerals, soils and aquifers.
3	Identify common rocks and minerals	3.1 Sort handheld specimens of common sedimentary, igneous and metamorphic rocks by observing their textural, structural and mineralogical properties. 3.2 Identify handheld specimens of common rocks and minerals by comparing their physical properties with classification charts and tables.
4	Identify common soil types and their properties	4.1 Obtain soil samples using specified sampling equipment and methods. 4.2 Examine soil colour, texture and properties of soil components to classify common soils. 4.3 Identify and describe simple soil profiles at field sites.

		4.4	Recognise influences of rock type, drainage, age and climate on development of soil profiles.
		4.5	Recognise common forms of soil degradation.
5	Relate local geology to flora and fauna and land use	5.1	Apply the basic relationships between parent material, climate, topography, soils and living ecosystem components to interpret sites.
		5.2	Recognise how local geology can influence the revegetation or rehabilitation of sites.
6	Maintain a safe work environment	6.1	Use safe work procedures and protective equipment to ensure personal safety and that of others.
		6.2	Minimise environmental impacts of sampling/testing and generation of waste.
		6.3	Collect and/or dispose of all waste in accordance with environmental/quarantine requirements and workplace procedures.
7	Report data and finalise documentation	7.1	Report field data in the required formats and expected timeframe.
		7.2	Complete all required documentation.
		7.3	Maintain the security and confidentiality of data and documentation in accordance with workplace requirements.

Foundation Skills

This section describes those required skills (language, literacy and numeracy) 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.

Legislation, regulations, standards, codes, workplace procedures and requirements include the latest version of one or more of:

- federal legislation such as the Environment Protection and Biodiversity Conservation Act, Australian Heritage Council Act, Native Title Act and National Environmental Protection Measures
- state/territory government legislation and local government by-laws, policies, regulations and plans dealing with land use, acquisition and planning; environmental protection; cultural/heritage sites; vegetation management; nature conservation and wildlife/plant protection; water management; soil conservation; pollution and contaminated sites; fisheries, forestry and mining operations
- legislation, standards and codes of practice for work health and safety (WHS), handling of dangerous goods
- Australian and international standards covering environmental management such as AS/NZS ISO 14000 Set; testing of soils such as AS 1289 series
- registration/licensing and/or accreditation requirements
- workplace or regulator's procedures for sampling and in-field testing
- workplace documents, such as standard operating procedures (SOPs), work schedules, recording and reporting procedures, equipment manuals and warranties; safety data sheets (SDS) and safety procedures; waste minimisation, containment, processing and safe disposal procedures.

Equipment and materials include one or more of:

- survey equipment, compass, global positioning system (GPS), maps and aerial photos
- tape measure, clinometers and theodolite
- hammers, picks, shovel, scoops, buckets, bags, sieves and sample containers
- coring/excavation equipment (e.g. auger)
- hand lens and microscope
- pH meter and conductivity meter
- chemical field test kits
- worksheets, sampling/test methods
- portable computers and personal digital assistants (PDAs).

Common landforms include one or more of:

- mounds, hills, ridges, cliffs, valleys, rivers, peninsulas and numerous other structural and size-scaled (i.e. ponds vs. lakes, hills vs. mountains) elements, including various kinds of inland and oceanic water bodies and sub-surface features
- geological features characterised by physical attributes, such as elevation, slope, orientation, stratification, rock exposure and soil type.

Geological processes include one or more of:

- plate tectonics
- glaciation
- vulcanism
- action of wind and water
- weathering
- mass wasting or erosion
- action of groundwater and surface water.

Physical properties of common rocks and minerals include one or more of:

- composition, texture and structure
- colour, streak, crystal form, habit, cleavage, fracture and hardness.

Common soil properties include one or more of:

- colour
- structure (i.e. size and shape of aggregate particles)
- texture (i.e. varying percentages of sand, silt or clay, and organic matter)
- water retention and water repellence
- depth to bedrock
- pH
- chemical properties (e.g. nitrates, sulphates, phosphates and carbonates)
- electrical resistivity and conductivity.

Soil degradation includes one or more of:

- forms of erosion, such as gully, sheet, landslide, tunnel and stream bank
- erosion agents, such as wind, water, heating and cooling of rocks, freezing of water in cracks, plant roots, upheaval of trees and chemicals
- weathering
- decomposition of organic material
- salinity
- acidification

- structural degradation
- soil pollution (e.g. hydrocarbons and heavy metals).

Hazards include one or more of:

- sunlight, dust, noise and heat
- extreme weather conditions (e.g. fire, flood and storms)
- manual/handling of heavy equipment or materials
- crushing, entanglement and cuts associated with moving machinery
- vehicular traffic on roads and sites
- injuries caused by falling objects and working conditions, such as uneven surfaces, heights, slopes, wet surfaces, trenches and confined spaces
- biohazards (e.g. microbiological organisms in soils)
- chemical hazards/contaminants in soils.

WHS requirements include:

- compliance with relevant federal/state/territory WHS legislation at all times
- assuming that samples are potentially hazardous and applying standard precautions
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and state/territory Departments of Health, where relevant.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSS024008A Recognise common geological landforms and samples

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MSS024008 Recognise common geological landforms and samples

Modification History

Release 1. Supersedes and is equivalent to MSS024008A Recognise common geological landforms and samples

Performance Evidence

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

- recognising and accurately describing the geological landforms and associated geological processes for at least two (2) different sites
- identifying and accurately describing the common rocks, minerals and soil types associated with at least two (2) different sites
- planning and organising resources for efficient field work
- following legislative requirements, standard methods, workplace procedures and/or instructions governing geological sampling and in-field testing
- interpreting topographical maps and aerial photos; simple geological maps; classification charts and tables for rocks, minerals and soils
- recognising common geological landforms and explaining their formation
- identifying handheld specimens of common rocks and minerals
- obtaining and classifying samples of common soils
- collecting, collating and accurately recording simple geological information for a site
- relating local geology to the flora and fauna present and land-use at the site
- seeking advice when issues/problems are beyond scope of competence/responsibility
- reporting field data in the required formats and expected timeframe
- safely using, maintaining, transporting and storing equipment and/or materials and disposing of waste
- following procedures for working safely, minimising environmental impacts and responding to emergency incidents and accidents.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- an overview of major fields of geology
- basic structure of the earth, including the core, crust and major components
- basic geomorphology and landforms, including agents of erosion and transportation, stability of rocks and minerals in different environments and depositional processes
- regolith, including physical and chemical weathering, climatic effects, stability of minerals, weathering processes, soil formation, common soil types and composition
- rock cycle

- introduction to igneous rocks, including origin of magma, movement of magma, volcanic, plutonic, types of volcanoes and simple tectonic setting
- introduction to sedimentary rocks, including clastic, chemical, organic types, grain size and composition, sorting, roundness, lithification, sedimentary structures and environments of deposition
- introduction to metamorphic rocks, including regional, contact, dynamic metamorphic zones, rock textures and fabrics
- structural geology concepts including: folds, faults, tilts and uplifts
- overview of geological time, including eras, periods, relative time, stratigraphic methods for establishing relative ages of strata, and radiometric dating
- introduction to palaeontology, including preservation of fossils and their role in dating strata
- introduction to the links between local geology, climate, topography and living components of ecosystems
- geological sampling and in-field test methods routinely used in job role, including:
 - pre-use checks and safe operating procedures for sampling/test equipment
 - sampling procedures
 - purpose, principles and measurement steps of test
 - calculation steps to give results in appropriate units and precision
 - expected values for sample type
- relevant hazards; health, safety and environment requirements.

Assessment Conditions

- Judgement 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).
- Holistic assessment methods include:
 - review of geological site reports generated by the candidate, including details of the landforms present, geological processes involved and relationship of local geology to other ecosystem components
 - review of the accuracy of identification/classification records generated by the candidate for rocks, minerals and soils

- feedback from supervisors that the candidate is able to organise and safely conduct basic field work; identify common rocks, minerals and soils; recognise common landforms and evidence of geological processes at sites and relate these to other ecosystem components
- oral and/or written questions to assess the candidate's knowledge of basic sampling and in-field testing of common rocks, mineral and soils; identification/classification procedures, and the ability to 'read the landscape.'
- Access is required to all instruments, equipment, materials, workplace documentation, procedures, and specifications associated with this unit including, but not limited to:
 - access to suitable sites and vehicle
 - suitable survey, sampling and testing equipment
 - documentation including: maps and aerial photos; classification charts and tables for rocks, minerals and soils; user manuals, workplace safety procedures, test/survey methods, workplace procedures governing geological sampling and in-field testing.
- 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 competency 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 an organisation providing environmental monitoring, management or technology related services about performing the competency being assessed within the last twelve months.

Links

Companion Volume implementation guides are found in VETNet -

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