



Australian Government

Department of Education, Employment and Workplace Relations

MSS024008A Recognise common geological landforms and samples

Release: 1

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Modification History

Not applicable.

Unit Descriptor

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.

Application of the Unit

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.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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| 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 enterprise 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 |

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| 4 | Identify common soil types and their properties | 4.1 | Obtain soil samples using specified sampling equipment and methods
Examine soil colour, texture and properties of soil components to classify common soils |
| | | 4.2 | Identify and describe simple soil profiles at field sites |
| | | 4.3 | Recognise influences of rock type, drainage, age and climate on development of soil profiles |
| | | 4.4 | 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 enterprise 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 enterprise requirements |

Required Skills and Knowledge

Required skills

Required skills include:

- planning and organising resources for field work
- following legislative requirements, standard methods, enterprise procedures and instructions governing geological sampling and in-field testing
- reading topographical maps and aerial photos, and simple geological maps
- collecting, collating and recording simple geological information for a site
- using and maintaining equipment to undertake required field work
- preparing brief oral/written reports
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

Required knowledge includes:

- 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, climactic 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

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • planning and preparing for field work • following relevant procedures and methods for conducting field surveys • recognising common geological landforms and explaining their formation • identifying handheld specimens of common rocks and minerals • obtaining and classifying samples of common soils • relating local geology to other ecosystem components • accurately recording field data • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • <i>MSL952001A Collect routine site samples</i> • <i>MSS024003A Apply an understanding of environmental principles to a site</i> • <i>MSS024005A Collect spatial and discrete environmental data.</i> The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.

	Resources may include: • access to suitable sites and vehicle • enterprise procedures governing geological sampling and in-field testing • maps and aerial photos • suitable survey, sampling and testing equipment.
Method of assessment	The following assessment methods are suggested: • review of field data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures and works safely • oral/written questioning associated with basic sampling and in-field testing of common rocks, mineral and soils and their identification, and ‘reading the landscape’ • observation of the candidate undertaking basic geological field work. 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. 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.
Guidance information for assessment	

Range Statement

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
Legislation, standards, codes, procedures and/or enterprise	Legislation, standards, codes, procedures and/or enterprise requirements may include:

requirements	• federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS 1289 series Methods of testing soils for engineering purposes - Sampling and preparation of soils • enterprise or regulator procedures for sampling and in-field testing • material safety data sheets (MSDS) • safe work procedures
Hazards	Hazards may include: • 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
Equipment and materials	Equipment and materials may include: • 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 PDAs
Common landforms	Common landforms may include: • 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	Geological processes that are responsible for most landforms may include: • 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	Physical properties of common rocks and minerals may include: • composition, texture and structure • colour, streak, crystal form, habit, cleavage, fracture and hardness
Common soil properties	Common soil properties may include: • colour • structure (size and shape of aggregate particles) • texture (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	Soil degradation may include: - 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)
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)

Environmental

Custom Content Section

Not applicable.