

Title	Demonstrate knowledge of earth science for commercial forestry		
Level	4	Credits	4

Purpose	People credited with this unit standard are able to: describe geological processes that affect the formation of soils; demonstrate knowledge of the physical and chemical characteristics of soils; interpret the soil characteristics for a given site; explain the interaction between geology, soils and forestry operations; and explain the impact of forestry on site hydrology.
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Classification	Forestry > Forestry Knowledge
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Available grade	Achieved
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Guidance Information

- All performance criteria must be demonstrated and assessed in accordance with these reference texts:
 Gibbs, H.S. *New Zealand Soils: An Introduction*. (1980). Wellington, NZ: Oxford University Press.
 Molloy, L. *Soils in the New Zealand Landscape: The Living Mantle*. 2nd ed (1998) Canterbury, NZ: New Zealand Society of Soil Science, available at <http://www.mwpress.co.nz>.
- Definition
Worksite procedures – documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

Outcomes and performance criteria

Outcome 1

Describe geological processes that affect the formation of soils.

Performance criteria

- The processes of geomorphology are described.

Range plate tectonics, uplift, debris movement, parent materials, rock types.

1.2 The processes of erosion are described.

Range weathering, mass wasting, fluvial erosion, wind erosion.

1.3 The processes involved in the formation and development of soils are described.

Range parent material, climate, ageing, topography, vegetation cover, human and animal influences.

Outcome 2

Demonstrate knowledge of the physical and chemical characteristics of soils.

Performance criteria

2.1 Major soil types in New Zealand forestry are defined.

Range clay, sand, silt, gravel, pumice, loam.

2.2 Soil textures are recognised by feel.

Range clay, sand, silt, gravel, pumice, loam.

2.3 The physical properties of soils are described.

Range water holding capacity, aeration, particle size.

2.4 The chemical characteristics of soils are described.

Range nutrient status, cation exchange capacity, soil acidity.

Outcome 3

Interpret the soil characteristics for a given site.

Performance criteria

3.1 Soil maps and geology maps are interpreted to determine soil and geology type for a given location.

3.2 A soil profile is determined and drawn for a given site.

3.3 The procedure used for testing soil nutrient levels is explained in accordance with worksite procedures.

3.4 Soil sample results are interpreted and explained in terms of the implications for forest management.

Outcome 4

Explain the interaction between geology, soils, and forestry operations.

Performance criteria

- 4.1 The impacts that geology and soils have on forestry operations and tree growth are explained.
Range parent material, pans, drainage, mineral deficiencies.
- 4.2 The positive and/or negative impacts of forest operations on soils are explained.
Range harvesting, land preparation, roading.
- 4.3 Soil acidity and its impact on forests and forest management is explained.
Range low pH, neutral, high pH.
- 4.4 The method for measuring and treating soil fertility is explained.

Outcome 5

Explain the impact of forestry on site hydrology.

Performance criteria

- 5.1 The effect of forests on water yield and water quality is explained.
- 5.2 The impacts of forestry on site hydrology are explained.
Range erosion, soil movement, soil loss, siltation, soil pH.
- 5.3 The role that forests play in nutrient stripping is explained.
- 5.4 The impacts of hydrological factors on forest management are explained.
Range chemical use, operational planning, species selection, riparian areas.

Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 May 1998	N/A
Review	2	27 May 2002	N/A
Review	3	16 October 2009	31 December 2017
Review	4	10 December 2015	N/A
Rollover and Revision	5	28 May 2020	N/A

Consent and Moderation Requirements (CMR) reference

0173

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.