

# **ASSESSMENT GUIDELINES**

## **Unit 22175**

Demonstrate knowledge of soil properties and their effect on plant growth

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Level 3, Credit 10, Version 1

# Demonstrate knowledge of soil properties and their effect on plant growth

Unit standard 22175

Level 3, Credit 10, Version 1

## Level of performance required for this unit standard

This is a level 3 unit standard. At this level trainees are expected to demonstrate the following abilities when completing assessment tasks:

- To work under general supervision, with some independence; with significant responsibility for the standard of the outcome achieved.
- To apply technical skills and knowledge to complete the task to the specified standard, in a familiar context.
- To interpret available information, and use discretion and judgment.

## Workplace assessment:

For guidelines on Workplace Assessment, please refer to the NZHITO Workplace Assessors Manual, and for further information, please contact: NZHITO, P O Box 8638, Christchurch. Ph 03 9644 735, fax 03 9644 737, website [www.hortito.org.nz](http://www.hortito.org.nz)

## Special notes:

1. The New Zealand Soil Classification is used in this unit standard as the basis for describing soils in New Zealand. Information on the New Zealand Soil Classification is available at <http://soils.landcareresearch.co.nz>

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<b>ELEMENT</b>	<b>Competent</b>	<b>Range of evidence an assessor should consider</b>
<b>Element 1</b> Describe the formation of soil	<b>Yes/No</b>	<ul style="list-style-type: none"> <li>▪ Describe soil formation in terms of the major factors, support your description with examples. Range: contributing factors may include but are not limited to - parent material, climate, topography, organisms time, aspect and vegetation.</li> <li>▪ Describe the formation of soil profiles in terms of horizons, support the description with examples. Range: O, A, B, C horizons.</li> <li>▪ Describe the formation of soil texture and structure in terms of the influence on soil properties. Range: properties – water and air movement, pore space, structural stability, soil warming, nutrient retention and leaching, plant root penetration, ease of cultivation.</li> </ul>
<b>Element 2</b> Describe the soil water properties of soil	<b>Yes/No</b>	<ul style="list-style-type: none"> <li>▪ Define soil water in terms of levels, movement and retention characteristics and factors.</li> <li>▪ Describe soil water in terms of saturation, field capacity, easily available water, and permanent wilting point.</li> <li>▪ Outline excess and insufficient water effects in terms of soil properties and plant growth.</li> </ul>
<b>Element 3</b> Describe the chemical properties of soils	<b>Yes/No</b>	<ul style="list-style-type: none"> <li>▪ Outline soil pH in terms of its range and effect on nutrient availability, soil structure and organisms, and plant growth tolerances.</li> <li>▪ Identify the factors that influence the soils nutrient availability of the soil. Range: pH, nitrogen and phosphate fixation, texture, soil organisms, mycorrhizal association.</li> <li>▪ Identify by name and chemical symbols, the macronutrients and major trace elements. Range: all macronutrients and trace elements significant to one type of horticulture production.</li> <li>▪ Describe common nutrient deficiencies of New Zealand soils in terms of their symptoms and effect on plant growth. Range: five elements – phosphorus, potassium, sulphur, nitrogen, magnesium; and three micronutrients.</li> </ul>
<b>Element 4</b> Describe the biological properties of soil.	<b>Yes/No</b>	<ul style="list-style-type: none"> <li>▪ Describe how humus is formed, with regard to the decomposition of organic matter by soil organisms and favourable conditions.</li> <li>▪ Define the influences of organic matter on soil in terms of the physical and chemical properties. Range: water and nutrient retention, soil structure, soil organisms, soil texture, soil temperature carbon/nitrogen ratios.</li> <li>▪ Outline the function of soil organisms in terms of their effects on plant growth. Range: bacteria, fungi, earthworms, soil pests and pathogens.</li> <li>▪ Describe the functions trichoderma and other beneficial micro organisms on soil properties and plant growth.</li> </ul>

<p><b>Element 5</b> Describe how modifying soil properties can influence plant growth.</p>	<p><b>Yes/No</b></p>	<ul style="list-style-type: none"> <li>▪ Describe the major soil modification factors that affect the suitability of soil for plant growth. Range: nutrient retention and availability, water holding capacity, drainage, organic matter, compaction.</li> <li>▪ Outline the practices used by producers to maintain and improve soil suitability for plant growth. Range: select five from – conservation and/or minimum tillage, conventional tillage, drainage, irrigation, green crops, crop residues, liming, fertilising, crop rotations.</li> <li>▪ Describe how soil management techniques can modify physical, chemical and biological properties.</li> <li>▪ Describe management techniques used to maintain sustainable soil status. Range: fertiliser usage, erosion control, reducing nutrient leaching, contouring, mulching, crop planting, inter planting, riparian planting.</li> </ul>
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\_\_\_\_\_ *(Name of Apprentice)*

is **Competent / Not yet competent** in Unit Standard 22175, version 1

**Signed (Assessor):** \_\_\_\_\_

WPA Registration Number: \_\_\_\_\_ Date: \_\_\_\_\_

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**(Assessor copy)**

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\_\_\_\_\_ (Name of Apprentice)

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**Signed (Assessor):** \_\_\_\_\_

WPA Registration Number: \_\_\_\_\_ Date: \_\_\_\_\_

Please send this page to your NZHITO Regional Manager, who will forward it to National Office to register the credits on your NZQA Record of Learning.

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*(Name of Apprentice)*

**is Competent in Unit Standard 22175. (version 1)**

**Signed (Assessor):**

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WPA Registration Number: \_\_\_\_\_

Date: \_\_\_\_\_