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90158



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

*For Supervisor's use only*

# Level 1 Agricultural and Horticultural Science, 2007

## 90158 Describe the properties and management of soil

Credits: Four

9.30 am Wednesday 5 December 2007

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

<i>For Assessor's use only</i>		<b>Achievement Criteria</b>			
<b>Achievement</b>	<input type="checkbox"/>	<b>Achievement with Merit</b>	<input type="checkbox"/>	<b>Achievement with Excellence</b>	<input type="checkbox"/>
Describe the components of soil and their effects on the properties of soil.	<input type="checkbox"/>	Explain the components of soil and their effects on the properties of soil and relate these to plant growth.	<input type="checkbox"/>	Explain the components of soil and their effects on the properties of soil and relate these to plant growth.	<input type="checkbox"/>
Describe the effects of management practices used to modify soil.	<input type="checkbox"/>	Explain the effects of management practices used to modify soil and relate these to plant growth.	<input type="checkbox"/>	Explain the effects of management practices used to modify soil and relate these to plant growth.	<input type="checkbox"/>
				Select and justify management practices used to modify soil in response to given conditions.	<input type="checkbox"/>
<b>Overall Level of Performance (all criteria within a column are met)</b>					<input type="checkbox"/>

You are advised to spend 40 minutes answering the questions in this booklet.

Assessor's  
use only



The students at Happy Valley High School who take Agricultural and Horticultural Science carried out a number of tests on the soil in their plots. The following questions relate to these tests.

### QUESTION ONE: PHYSICAL CHARACTERISTICS

The students carried out a test on the texture of the soil by feeling a small sample of soil in their hands. This is often called the **texture feel test**.

(a) Describe how damp sandy soils and clay soils **feel** when they are rubbed between the fingers.

(i) **Sandy** soil feels:

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(ii) **Clay** soil feels:

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(b) Apart from clay and sand, identify and describe TWO other **non-living components** that are usually found in soil. How do these components affect **plant growth**?

Soil component (1):

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Explain how this soil component affects plant growth.

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Soil component (2):

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Explain how this soil component affects plant growth.

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Some of the plots at the school were found to contain soil of a **sandy loam** texture, and the soil in the other plots was a **clay loam** texture.

(c) How would each of these loam soils **affect plant growth**?

(i) Effect of **sandy loam** on plant growth:

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(ii) Effect of **clay loam** on plant growth:

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Because of the differences in **aeration** and **drainage** of these two types of soils, the students will have to carry out different **management practices** to make sure that crops grow successfully in the plots.

(d) Describe ONE management practice that would need to be carried out to make sure plants grow successfully in each type of soil. How do these management practices **improve plant growth**?

(i) Management practice for **sandy loam**:

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Explain how this management practice improves plant growth.

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(ii) Management practice for **clay loam**:

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Explain how this management practice improves plant growth.

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## QUESTION TWO: CHEMICAL PROPERTIES

The students carried out a test on the pH of the soil in the plots. The test produced the following results:

- in the plots containing **sandy loam**, the soil pH was 6.5
- in the plots containing **clay loam**, the soil pH was 5.9.

(a) (i) **Based only on pH**, which soil type would provide **better growing conditions** for most plants?

Soil type:            sandy loam            clay loam  
(Circle ONE)

(ii) **Why** would this soil type provide better growing conditions for most plants?

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**QUESTION THREE: THE LIVING EARTH**

The plots with the sandy loam soil contained many more **earthworms** than the plots with clay loam.

- (a) (i) Describe how earthworms **affect soil properties**.

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- (ii) Explain how earthworms **improve plant growth**.

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The students tested the soil in the plots for **disease status**. One of the plots was found to contain many soil diseases, while the other plots had very few. The plot with many diseases had been used to grow crops for several years.

- (b) (i) Explain **why** this plot is likely to have had many diseases.

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- (ii) Describe ONE **management practice** that should have been used to **prevent** the diseases in this plot.

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**QUESTION FOUR: SOIL STRUCTURE**

The students tested the structure of the soil to find out how the soil particles fitted together.

- (a) (i) Describe a soil with **very good soil structure**. You may draw a labelled diagram in the space provided, if necessary.

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Diagram (if necessary)



- (ii) Explain why this soil structure is good for **plant growth**.

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All of the plots were found to have **poor soil structure**.

- (b) What could have **caused** this poor structure?

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