

90158



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

*For Supervisor's use only*

## Level 1 Agricultural and Horticultural Science, 2008

### 90158 Describe the properties and management of soil

Credits: Four

9.30 am Thursday 20 November 2008

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>		<b>Achievement with Merit</b>	<b>Achievement with Excellence</b>
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"/>
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"/>
			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.

### QUESTION ONE

Soils in cricket pitches have mainly a **clay** texture, while soils in soccer grounds have more of a **sandy** texture.

- (a) Describe the main difference in **size** between clay particles and sand particles.

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- (b) (i) Describe the difference in **soil temperature** between a sandy loam soil and a clay loam soil in **early spring**.

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- (ii) Explain how soil temperature affects **plant growth**.

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- (c) (i) Describe the difference in **nutrient retention** of sandy loam soils **compared** with clay loam soils during **wet winters**.

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- (ii) Explain how nutrient retention affects **grass growth**.

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Many sports grounds have low numbers of soil organisms, such as earthworms, living in the soil.

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- (d) (i) Describe the effect of low numbers of soil organisms on the **decomposition** of organic matter.

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- (ii) Explain how having low numbers of soil organisms affects **grass growth**.

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Puddles are more likely to form on clay loam soils than on sandy loam soils.

- (e) Explain why this is the case.

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**QUESTION TWO**

A common management practice carried out on clay loam soils is to add lime.

- (a) Explain how **adding lime** to a clay loam soil affects **plant growth**.

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Once an area becomes a sports ground, the aim is to grow only one type of grass. This means that crop rotation cannot be carried out.

- (b) Describe the effect of **not** carrying out crop rotation on the following soil properties.

- (i) Nutrient status:

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- (ii) Disease status:

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Two management practices carried out on all sports grounds are **fertiliser application** and **irrigation**.

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- (c) (i) Describe the effect of **fertiliser application** on sandy loam soil in terms of **nutrient status**.

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- (ii) Explain why fertiliser application is needed to ensure **good grass growth** in sandy loam soils.

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- (d) (i) Describe the effect of **irrigation** on sandy loam soil in terms of **water-holding capacity**.

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- (ii) Explain why irrigation is needed to ensure **good grass growth** in sandy loam soils.

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- (e) Management practices that could be used to improve grass growth on a sports ground that has a sandy loam texture are:
- liming
  - fertiliser application
  - irrigation.

Rank the management practices in the order that you would recommend ground-staff use to **improve grass growth**.

Most recommended: \_\_\_\_\_

Second most recommended: \_\_\_\_\_

Least recommended: \_\_\_\_\_

Justify your selection of the most recommended management practice by explaining how it would more effectively improve grass growth in a sandy loam soil **compared** with ONE of the other management practices.

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**QUESTION THREE**Assessor's  
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Despite adequate rainfall, another sports ground has had poor grass growth and is prone to puddles.

The ground-staff have the following management practices available to solve these problems:

- cultivation
- liming
- drainage.

Rank the management practices in the order that you would recommend ground-staff use to **improve grass growth** and **reduce puddles**.

Most recommended: \_\_\_\_\_

Second most recommended: \_\_\_\_\_

Least recommended: \_\_\_\_\_

Justify your selection of the most recommended management practice by explaining how it would more effectively improve grass growth and reduce puddles **compared** with ONE of the other management practices.

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