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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Agricultural and Horticultural Science, 2009

90158 Describe the properties and management of soil

Credits: Four
9.30 am Monday 16 November 2009

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 2–11 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.

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

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

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QUESTION ONE

(a) Explain how the **size of soil particles** affects both water availability and plant growth.

(b) Strawberries grown in sandy soil are prone to drought. To ensure plants have enough water available in the soil, a grower may consider the following management practices:

- adding water by irrigating, OR
- adding compost material.

(i) Select the management practice that would **best** improve the water availability for plant growth.

Selected management practice: _____

Use this management practice to answer sections (ii) and (iii) below.

(ii) Explain how this management practice **improves soil water availability** for plant growth.

(iii) Give reasons why this management practice is **better** than the other practice for improving soil water availability, in relation to:

- physical properties of soil
- plant growth.

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QUESTION TWO

(a) Describe how soil texture affects the **temperature** of soil and explain how this affects plant **growth in spring**.

(b) A market gardener has been told that plant growth will increase if soil temperature is higher. The market gardener has chosen to **install drainage** rather than **add compost material** to increase soil temperature.

(i) Explain how installing drainage improves soil temperature.

(ii) Give reasons to **support** the gardener's decision to install drainage rather than add compost material to increase soil temperature, in relation to:

- seasons
- ease and effectiveness.

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QUESTION THREE

(a) Explain how the size of soil particles affects both **nutrient retention** and **plant growth**.

(b) The pasture on a clay soil is growing poorly. An advisor to the farmer has suggested that the pasture growth can be improved by the following management practices:

- applying effluent, OR
- adding lime.

(i) Select the management practice that would **best** improve nutrient availability for plant growth.

Selected management practice: _____

Use this management practice to answer sections (ii) and (iii) below.

(ii) Explain how this management practice improves nutrient availability.

(iii) Give reasons why this management practice is **better** than the other practice for improving pasture growth, in relation to:

- chemical properties of soil
- physical properties of soil.

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QUESTION FOUR

Earthworms affect both the chemical and physical properties of soil, and plant growth.

(a) Explain how earthworms affect either chemical OR physical properties of soil, and plant growth.

Circle one: chemical properties and plant growth physical properties and plant growth

Explanation: _____

_____

_____

_____

_____

(b) A home gardener has been growing tomatoes in the same place for 5 years. Each year, compost has been applied to the soil. For the last two years, the yield of tomatoes has been decreasing.
The gardener is considering the following management practices:

- applying fertiliser, OR
- rotating the crops.

(i) Select the management practice that would **best** increase the yield of tomatoes from the garden.

Selected management practice: _____

Use this management practice to answer sections (ii) and (iii) below.

(ii) Explain how this management practice would increase the yield of tomatoes from the garden.

_____

_____

_____

_____

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(iii) Give reasons why this management practice is **better** than the other practice for increasing the yield of tomatoes, in relation to:

- chemical properties of soil
- physical properties of soil.

Extra paper for continuation of answers if required.
Clearly number the question.

Question number

Assessor's use only

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Clearly number the question.

Question number

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