

90919



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

Level 1 Agricultural and Horticultural Science, 2011

90919 Demonstrate knowledge of soil management practices

9.30 am Thursday 17 November 2011

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate knowledge of soil management practices.	Demonstrate in-depth knowledge of soil management practices.	Demonstrate comprehensive knowledge of soil management practices.

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 attempt ALL questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

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.

TOTAL

ASSESSOR'S USE ONLY

You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: REDUCING SOIL COMPACTION

Soil compaction can sometimes cause problems in lawns and on sports fields. It is also a problem when growing crops in clay soils when a hard layer, called a clay pan, has formed.

Compacted soil



(a) Select ONE of the following problems:

- soil compaction caused by people on lawns or sports fields
- soil compaction caused by machinery, resulting in a clay pan.

Selected problem: _____

(i) Describe the tool or equipment that could be used to reduce soil compaction.

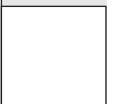
(ii) Describe how the equipment is used to cultivate the soil.

(b) Explain how soil compaction affects:

(i) physical soil properties

(ii) plant growth

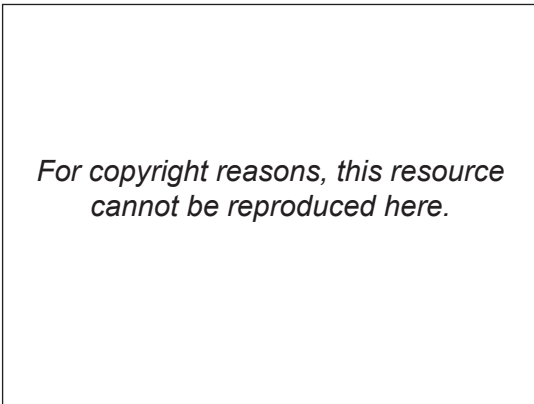
(c) Justify the method you have chosen to reduce soil compaction. In your answer, you should consider the advantages and disadvantages of your chosen method compared with other methods of reducing soil compaction for the problem you have chosen.



QUESTION TWO: SOIL NUTRIENTS

The use of compost and the return of animal effluent are regarded as having beneficial effects on soil fertility.

Compost bins



Effluent from dairy sheds



Source: www.cb garden.org/blog/

(a) Select ONE of the following practices:

- adding compost material to garden soil
- the application of animal manure from dairy sheds to farm paddocks.

Selected practice: _____

(i) Describe the form in which the compost/effluent is applied.

(ii) Describe the method of application.

(b) Your selected practice will improve soil conditions for plant growth.

Explain how it will affect:

(i) soil properties such as physical, chemical, or biological properties

(ii) plant growth requirements

(c) The use of inorganic fertilisers is an alternative to adding compost or animal effluent to improve soil fertility.

Justify the use of fertilisers by comparing the ability of fertilisers with the ability of compost or effluent to improve soil fertility.

Include in your answer:

- nutrient availability
- soil chemical and physical properties
- environmental considerations.

QUESTION THREE: LIMING

Plant growth on a large farm property is described as poor. The soil on the property has the following description:

Soil description

- sandy silt loam
- pH = 5.8
- organic matter = 3%.

To improve plant production, especially during summer months, a soil consultant has advised that the soil should be limed before new crops are sown.

(a) Describe how this property should be limed.

In your answer you should describe:

- the method of application
- the time of year lime should be applied.

(b) Explain how liming the property will help improve plant growth.

In your answer you should explain:

- soil nutrient availability
- biological activity in the soil.
