

No part of the candidate evidence in this exemplar material may be presented in an external assessment for the purpose of gaining credits towards an NCEA qualification.

2

91290



912900



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

SUPERVISOR'S USE ONLY

Level 2 Agricultural and Horticultural Science, 2018

91290 Demonstrate understanding of techniques used to modify physical factors of the environment for NZ plant production

9.30 a.m. Wednesday 28 November 2018
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of techniques used to modify physical factors of the environment for commercial plant production in New Zealand.	Demonstrate in-depth understanding of techniques used to modify physical factors of the environment for commercial plant production in New Zealand.	Demonstrate comprehensive understanding of techniques used to modify physical factors of the environment for commercial plant production in New Zealand.

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 the 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 2–12 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.

Achievement

TOTAL

11

ASSESSOR'S USE ONLY

QUESTION ONE: GLASSHOUSES

Glasshouses are used to control the physical environment for plant production.

Modern glasshouse

Source: http://www.wintergardenz.co.nz/uploads/3/0/5/9/30594579/7436057_orig.jpg.

- (a) Describe how the level of carbon dioxide can be controlled in glasshouses.

Glasshouses has vents in it that can be opened to get rid of excess carbon dioxide. Diesel ^{heater} can be used to produce carbon dioxide, ^{and it also} ~~the glasshouses~~ also provides heat. //

- (b) Explain the effect of carbon dioxide enrichment on crop yield.

Carbon dioxide is a key component of photosynthesis. The plant needs carbon dioxide to grow and produce crop so by enhancing the CO_2 in the air means the plants can grow quicker therefore producing a crop faster. //

Two methods used to control light levels in glasshouses are diffused glass and temporary sprayed glass coatings, such as whitewash, as shown in the photographs below.

ASSESSOR'S
USE ONLY

Regular (left) and diffused glass



<http://www.agf.nl/nieuws/2015/0203/smartglass.jpg>

Whitewash



https://www.redusystems.com/public/upload/application_techniques/image/Helikopter.jpg

- (c) (i) Explain why light levels need to be controlled in a glasshouse.

The light levels need to be controlled in a glasshouse because too much light can burn the plants and heat up the glasshouse too much which will cause the plants to dehydrate.

- (ii) Justify the use of ONE of these methods in terms of economic **and** environmental factors for new and existing glasshouses.

Diffused glass can be put in a new glass house easily while it is being built. It is permanent which means it doesn't need to be replaced or re-applied unlike whitewash. //
It is environmentally friendly because it is only being applied once. //

ASSESSOR'S
USE ONLY

M5

QUESTION TWO: CITRUS

Citrus orchard



Source: http://www.uncleggong.com/data/file/bod_33/236990270_mKLpJoSw_Farmer27s_005.jpg

- (a) Describe how the use of reflective mulches in commercial orchards increases the quality of fruit.

~~It~~ Reflexive mulches means that the light can hit all of the tree from above and underneath maximising the light contact with the leaves which means it puts more energy into growing fruit. //

Citrus are generally not tolerant of 'wet feet'. An orchardist has the choice of using either mounding or subsurface drains to control soil water levels.

- (b) (i) Describe the effect of drainage on plant growth, and explain how this will impact on crop yield, quality, and timing.

Drainage allows water to flow away from the trees' roots leaving enough water to grow ~~good and~~ strong, and because citrus don't like wet feet they will grow better with less water around them. //

- (ii) Justify the use of either mounding or subsurface drainage in a citrus orchard by comparing and contrasting the two methods in terms of economic and environmental impacts.

The use of mounding allows the ^{excess} water to drain ^{is} away from the root area. This method is easier and cheaper than subsurface drainage. Subsurface drainage would be more costly to put in due to the need for specialty tools and labour costs. It also means ~~us~~ you are digging up soil around the root area of the plant. //

QUESTION THREE: VITICULTURE

Vineyard



Source: <http://www.instituteofhospitality.org/wp-content/uploads/2018/06/01-vineyard1.jpg>.

- (a) Describe what a microclimate is, and explain its effect on vineyard production.

A microclimate is an area that may be ~~shelter~~ sheltered by a hill or shelter belts. It could also be situated in a valley. It is an area where the weather or climate is altered by the topography of the surrounding land area. This allows grapes to be grown in areas where the soil is better ~~but~~ the climate might not be.

A vineyard owner can use either helicopters or frost sprinklers to prevent frost from damaging the grapes.

- (b) Justify the use of ONE of these methods to manage frost in vineyards by comparing and contrasting it with the other method.

Selected method: Frost Sprinklers.

In your answer:

- explain how both helicopters and frost sprinklers modify the environment
- analyse the practices in terms of economic, social, and environmental impacts.

~~Frost sprinklers are cheaper~~

Frost sprinklers spray warm water on the vineyard to stop frost settling on the grapevines, whereas helicopters fly around above the vineyard pushing the warm air down and forcing the cold, damp air up. Sprinklers may cost more straight away but are cheaper over the long run compared to helicopters which are expensive to operate and you have to have a pilot on call ready to fly all night. //

ASSESSOR'S
USE ONLY

A3

Achievement Exemplar 2018

Subject	Level 2 Agricultural and Horticultural Science		Standard	91290	Total score	11
Q	Grade score	Annotation				
1	M5	<p>The candidate explains how carbon dioxide can be controlled in glass houses, with reference to plant processes.</p> <p>The response could have been lifted to an M6 grade with a more in-depth explanation in relation to plant processes and growth rates.</p>				
2	A3	<p>The candidate describes how reflective mulches effect citrus.</p> <p>The response could have been improved by accurately explaining how drainage effects the growth of citrus, specifically in relation to plant processes, crop yield and quality.</p>				
3	A3	<p>The candidate describes a microclimate.</p> <p>The response could have been improved by fully explaining a microclimate and its effect on production and also explaining correct how frost sprinklers or helicopters prevent frost.</p>				