

Assessment Schedule – 2017

Subject: Agricultural and Horticultural Science: Demonstrate knowledge of horticultural plant management practices and related plant physiology (90924)

Assessment Criteria

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
Describes horticultural plant management practices and related plant physiology and/or growing conditions.				Links ideas to explain why horticultural plant management practices or steps within practices are carried out.		Applies knowledge of horticultural plant management practices to given situations. This may involve comparing and contrasting or justifying management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at Achievement level.	Describes TWO ideas at Achievement level.	Describes THREE ideas at Achievement level.	Describes FOUR ideas at Achievement level.	Explains THREE ideas at Merit level.	Explains FOUR ideas at Merit level.	Compares and contrasts the methods.	Fully compares and contrasts the methods.
N0 = No response; no relevant evidence.							

Question One: Nutrients

Examples of evidence for answers															
(a)	<p>Identifies (Achievement) the nutrients and describes (Achievement) the effect on growth.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Letter</th> <th>Macronutrient</th> <th>Effect on growth</th> </tr> </thead> <tbody> <tr> <td>N</td> <td>Nitrogen</td> <td>Leafy growth and / or chlorophyll production.</td> </tr> <tr> <td>P</td> <td>Phosphorus</td> <td>Root growth.</td> </tr> <tr> <td>K</td> <td>Potassium</td> <td>Photosynthesis, flowering, fruit ripening.</td> </tr> </tbody> </table>			Letter	Macronutrient	Effect on growth	N	Nitrogen	Leafy growth and / or chlorophyll production.	P	Phosphorus	Root growth.	K	Potassium	Photosynthesis, flowering, fruit ripening.
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(b)	<p>Explains (Merit) how nutrients are taken into plants, using plant structures and processes in the answer.</p> <p>Nutrients are taken up through the plant’s roots (Achievement). Nutrients must be dissolved in water (Achievement), and can then be absorbed by the root hairs (Merit) and travel to the rest of the plant through the xylem (Merit), transpiration helps pull the water and nutrients through the plant (Merit) through capillary action (Merit), nutrients are needed for plant processes such as growth and repair (Merit).</p>														

Examples of evidence for answers

(c) **Describes / Explains / Compares and contrasts** which of the management practices is best.

Sports turf needs fertilisers to:

- replace lost nutrients (Achievement) through mowing, runoff, leaching, or turf use (Merit)
- supply nutrients for grass growth (Achievement) and repair damage by players (Merit) to ensure a rich green colour / aesthetically pleasing for spectators / TV (Merit).

Liquid fertilisers can be applied through a specialised irrigation system or via tankers (Achievement).

Solid fertilisers can be applied via hand / mechanical spreaders (Achievement).

Solid fertiliser	Liquid fertiliser
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Longer lasting (Achievement), so needs to be applied less often (Merit). • Needs less frequent application (Achievement), so doesn't cost as much (Merit). • Easier to vary the rate of fertiliser application for different areas and /or spot treatment. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Can be applied using a specialised irrigation system (Achievement), so water is applied as well (Merit). • Fast-acting (Achievement), so rapid greening for audience / TV (Merit). • Application is quicker (Achievement), so more cost / time efficient (Merit).
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Slower acting. • May require machinery (Achievement), which can damage soil structure / compact soil (Merit). • Takes more time to apply. • Can burn leaves if not washed into soil. • Needs water / irrigation to dissolve. • May disrupt playing surface. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Needs more frequent application (Achievement), so can end up costing more in the long run (Merit). • Water can burn leaves if applied on hot days. • More difficult to vary the rate of fertiliser application for spots that need it (Achievement), so some areas may get more – leading to leaching, or less – leading to areas of poor growth (Merit).

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Question Two: Vegetable gardens

Examples of evidence for answers	
(a)	<p>Writes (Achievement) word equation for respiration: glucose + oxygen → carbon dioxide + water + energy</p> <p>Describes (Achievement) / Explains (Merit) why plants need to carry out respiration. Respiration is used by the plant to convert glucose / sugars into useable energy (Achievement), so that the plant's cells can carry out cell processes including growth and repair (Merit).</p>
(b)	<p>Describes (Achievement) / Explains (Merit) how the spacing between plants will affect plant processes and growth.</p> <ul style="list-style-type: none"> Planting plants too close to each other means they will compete for light (Achievement), reducing the amount of photosynthesis they can carry out (Merit), which in turn reduces growth (Merit). Planting plants too close to each other reduces airflow between plants (Achievement), increasing the possibility of fungal and bacterial diseases (Merit). Planting plants too close to each other means they will compete for space (Achievement), which can affect their form, producing undesirable shapes (Merit). Planting plants too far apart from each other reduces the crop density (Achievement), reducing yields (Merit). Planting plants too far apart from each other allows empty space for weeds to colonise (Achievement), which will compete with the crop, reducing growth (Merit).

Examples of evidence for answers

(c) **Describes / Explains / Justifies** which of the management practices is best, by comparing and contrasting the two options.

How it is done

- Weeds are pulled out by hand or with hand tools, e.g. push hoe (Achievement).
- A chemical which is toxic to plants is sprayed on the weeds (Achievement).

Effect of weeds

- Weeds compete for space, light, and nutrients (Achievement), blocking the light from the crop plants, reducing the rate of photosynthesis in the crops (Merit).
- Weeds can act as hosts for pests and diseases (Achievement), which can eat the plant and/or slow plant growth (Merit).
- Weeds can make garden management practices difficult (Achievement); can have thorns/taproots/toxins that can make cultivation/harvest/maintenance difficult (Merit).
- Dense weeds reduce airflow (Achievement), increasing humidity and potential for fungal outbreaks (Merit). Dense weeds can also act as hosts to plant pests, such as snails and aphids (Merit).

Chemical	Manual
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Very effective. • Quick. • Easy. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Cheaper. • Can be done in any weather. • Less chance of damaging desired plants. • Makes the garden look attractive. • Can be used as a mulch.
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Can be harmful if not washed off the crop before eating. • Greater chance of damaging/killing desired plants. • Doesn't remove the weeds. • More expensive. • Leaves dead plants in the garden. • Can look unsightly while they die. • Can only be carried out in fine / non-windy weather. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Difficult. • Time-consuming. • Often doesn't kill the weeds. • Can damage neighbouring plants when removing weeds.

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Question Three: Avocado orchards

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(a)	<p>Describes (Achievement) THREE actions when staking an avocado tree, and explains (Merit) why each action is carried out.</p> <table border="1"> <thead> <tr> <th>Action</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>Insert stakes first.</td> <td>To avoid putting through the roots, as this could damage roots and reduce water and nutrient uptake.</td> </tr> <tr> <td>Stakes must be dug in/sturdy.</td> <td>To ensure the stabilise the tree sufficiently enough to provide support.</td> </tr> <tr> <td>Use flexible ties.</td> <td>This allows the plant to grow straight, and avoids cutting into the stem / xylem / phloem.</td> </tr> <tr> <td>Use two or three opposing stakes.</td> <td>This holds the tree in place, no matter which direction the wind is blowing.</td> </tr> </tbody> </table>	Action	Explanation	Insert stakes first.	To avoid putting through the roots, as this could damage roots and reduce water and nutrient uptake.	Stakes must be dug in/sturdy.	To ensure the stabilise the tree sufficiently enough to provide support.	Use flexible ties.	This allows the plant to grow straight, and avoids cutting into the stem / xylem / phloem.	Use two or three opposing stakes.	This holds the tree in place, no matter which direction the wind is blowing.
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Use two or three opposing stakes.	This holds the tree in place, no matter which direction the wind is blowing.										
(b)	<p>Describes (Achievement) one other management practice, and explains (Merit) how this alternative practice would affect plant growth.</p> <ul style="list-style-type: none"> • Apply slow-release fertiliser (Achievement) to provide easy access to nutrients, to allow rapid growth (Merit). • Water thoroughly (Achievement) to prevent water stress in newly planted tree (Merit). • Dig hole twice as deep (Achievement), to allow easy penetration for new roots (Merit). • Apply mulch (Achievement) to prevent water loss and water stress (Merit) prevent weed growth (Merit). 										

Examples of evidence for answers

(c) **Describes / Explains / Justifies** why one type is better than the other type.

- Shelterbelts reduce the effects of wind (Achievement), reducing the loss of water through evapotranspiration (Merit), and also reducing damage to trees/ branches (Merit); this increases the ability to continue producing in following seasons (Merit), with reduced damage to fruit due to less movement (Merit), which increases yield/ saleable product (Merit).
- Both cost money to install and maintain (Achievement).
- Can cause frost (Achievement), as the air cannot move, and so cold air settles in the orchard (Merit); frost can damage buds / fruitlets and reduce yield (Merit).

Natural	Artificial
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Long-lasting. • Provides a habitat for pollinators. • Reduces noise pollution from orchard practices. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Quick to install. • Doesn't compete for water-borne nutrients. • Doesn't act as host for pests. • Easy to replace/ repair. • Takes up less space.
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Slow to establish. • Acts as host to pests. • Needs more maintenance. • Competes for water and nutrients. • Takes up more space. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Needs to be replaced more frequently. • Damage/ tears can spread to an entire section meaning it has to be replaced. • Costly to set up.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 6	7 – 12	13 – 18	19 – 24