

**Assessment Schedule – 2012**

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

**Evidence Statement**

**Question One – Weed control**

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 <b>comparing and contrasting</b> or <b>justifying</b> management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level, including at least TWO Explained ideas and at least ONE Described idea.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

**N0** = No response; no relevant evidence.

**Examples of evidence for answers**

<p>In (a) describes (Achievement)/explains (Merit) how students can control their weeds by physical methods:</p> <ul style="list-style-type: none"> <li>• Use a hoe to cut the top off the weeds (Achievement), so the weed roots cannot get glucose from photosynthesis (Merit).</li> <li>• Pull the weed roots out from the ground (Achievement), so the weed cannot re-grow from the roots (Merit).</li> <li>• Safety involved in spraying.</li> </ul>
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In (b) describes (Achievement)/explains (Merit) the effects that weeds have on the growing conditions required for plant production:

- Weeds grow fast, blocking light to the plant (Achievement) and reducing the plants' ability to photosynthesise (Merit).
- Weeds compete for nutrients, so the plant gets less of these (Achievement) and chemical processes do not occur as quickly (Merit).
- Weeds can harbour pests which suck the sap from the plant (Achievement), reducing the amount of glucose for the plant to convert to energy through respiration (Merit).
- Weeds can create a more humid environment conducive to disease development (Achievement), which reduces the photosynthetic area of the leaves (Merit).
- Weeds compete for growing space (Achievement), so the plant product may be distorted in shape (Merit).
- Weeds compete for water (Achievement), which is a raw material of photosynthesis (Merit).

In (c) describes/explains/justifies either chemical or physical control over the other control method.

<b>Chemical control</b>	<b>Physical control</b>
<p>Advantages</p> <ul style="list-style-type: none"> <li>• It is quicker, and therefore reduces labour costs.</li> <li>• Systemic herbicides kill the whole plant, whereas physical weeding can pull the leaves off, leaving the root to re-grow.</li> <li>• Effective when large-scale control is required.</li> </ul>	<p>Advantages</p> <ul style="list-style-type: none"> <li>• It can be done selectively around desirable plants, so they are not damaged or killed.</li> <li>• Effective immediately.</li> <li>• Can ensure all tap roots are removed.</li> </ul>
<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Spray drift can damage desirable plants.</li> <li>• Application requires calm conditions without imminent rain.</li> <li>• Slower to take effect.</li> </ul>	<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Labour-intensive and time-consuming.</li> <li>• Lazy weeding can result in living parts of the weed re-growing.</li> <li>• Needs to be done regularly.</li> </ul>

**Question Two – Shelter**

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 <b>comparing and contrasting</b> or <b>justifying</b> management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level, including at least TWO Explained ideas and at least ONE Described idea.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

**N0** = No response; no relevant evidence.

**Examples of evidence for answers**

In (a) describes (Achievement) how shelter affects the growing conditions of plants.

Shelter reduces air movement (Achievement), so a micro-climate of warm air is created around the plant (Merit). Shelter reduces movement of the plant (Achievement), so wind is less likely to break the plant or parts of it (Merit).

Negative effects:

- May cause shading (Achievement), which will reduce photosynthesis.
- Competition for water and nutrients.

In (b) describes (Achievement)/explains (Merit) how transpiration occurs, and how shelter affects it.

**Translocation** is the flow of water through the plant. As water evaporates through the stomata in the leaves, it creates negative pressure which pulls water from the xylem inside the plant (Achievement). The negative pressure then pulls water into the roots from the soil (Merit). Shelter reduces the air movement around the leaf (Achievement) so that a micro-climate with higher humidity is created, reducing the amount of water loss from the plant (Merit).

**Transpiration** is the loss of water from the leaves (Achievement). Water is lost through holes in the leaves called stomata, which are controlled by the guard cells. (Merit); this process is increased with air movement.

Shelter decreases air movement, which decreases the loss of water from the leaf.

In (c) describes/explains/justifies either shelterbelts or cloches over the other shelter option.

<b>Shelter belts</b>	<b>Cloches</b>
<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Uninhibited access to plants for spraying, harvesting, etc.</li> <li>• Easier to monitor the crop at a glance.</li> <li>• More permanent, therefore no need to erect each season.</li> </ul>	<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Growing environment is small, so needs more close monitoring.</li> <li>• Effect on growing environment is immediate.</li> <li>• Increased temperature for faster crop growth.</li> <li>• Protects from large pests, eg rabbits.</li> <li>• Protects from frost, allowing crops to be grown out of season.</li> </ul>
<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• Takes a long time to grow trees and get the benefit.</li> <li>• Artificial material and structures are expensive.</li> <li>• A cost is incurred when plant shelter belts need to be trimmed.</li> <li>• They create shade, which reduces photosynthesis.</li> <li>• Competition for water and nutrients.</li> <li>• Requires regular maintenance, eg pruning.</li> </ul>	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• UV radiation deteriorates the plastic over time, so replacement cost is ongoing.</li> <li>• Plastic needs to be moved back when working with plants.</li> <li>• Reduced light results in less photosynthesis and slower growth.</li> <li>• Greater humidity increases likelihood of disease.</li> <li>• Difficult to access plants – sides have to be raised.</li> </ul>

**Question Three – Apple production**

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
Describes how apple production practices are carried out.				Links ideas to explain why apple production practices, or steps within practices, are carried out.		Applies knowledge of apple production practices to given situations. This may involve <b>comparing and contrasting</b> or <b>justifying</b> management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level, including at least TWO Explained ideas and at least ONE Described idea.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

**N0** = No response; no relevant evidence.

**Examples of evidence for answers may include:**

In (a) describes (Achievement)/explains (Merit) the actions to be taken when planting and staking apple trees.

Description (Achievement)	Explanation (Merit)
Drive stakes into the ground before planting.	So the stakes are in stable ground and the stakes will not move.
Drive stakes into the ground outside the area occupied by the root ball.	So the stakes do not penetrate the root ball and are in stable ground, and the stakes will not move.
Place stakes in line with the prevailing wind.	So the tree will pull against the stake and not move.
Use rubber tubing or material with some elasticity.	So the tree can move a little and not break when blown, and also so that the tie will not cut into the tree and either weaken or ring-bark it.
Tie the tree to stake in the shape of a figure 8.	So the tree is held securely and is less likely to rub against the stake and damage itself.
Dig the hole bigger than the root ball.	So the soil around the rootball is loose and the roots can grow into it.
Loosen the soil at the base of the hole.	So the plant roots can more easily grow into the soil and stabilise the plant.
Water the tree.	To provide water while the roots become established sufficiently to absorb water independently.

In (b) describes (Achievement)/explains (Merit) reasons for thinning the fruit production on apple trees.

Thinning:

- gives larger-sized fruit (Achievement), because the sugars produced by the plant are distributed among the remaining fruit (Merit)
- reduces the tendency for biennial cropping (Achievement), because the energy used by the plant is more uniform each year (Merit)
- avoids branches breaking due to the weight of fruit (Achievement), so productive wood for photosynthesis and fruit production is maintained (Merit)
- promotes fruit bud formation for next year's crop (Achievement), as the plant has more energy that is not going into fruit production (Merit)
- helps ripening
- decreases competition for light, water, and photosynthates.

In (c) describes/explains/justifies pruning.

<b>Pruning</b>	<b>Not pruning</b>
<p data-bbox="264 323 405 347">Advantages</p> <ul data-bbox="264 363 1189 707" style="list-style-type: none"><li data-bbox="264 363 1093 387">• Controls the number of apples, because fruiting buds are removed.</li><li data-bbox="264 395 1093 419">• Harvesting is easier, because the trees are more open and shorter.</li><li data-bbox="264 427 1178 483">• Diseased or pest-infected branches are removed to stop the spread of the disease or pest.</li><li data-bbox="264 491 1149 547">• Fruit size is increased, because the trees' sugars are distributed among fewer fruit.</li><li data-bbox="264 555 1189 611">• The colour of fruit is improved, because there is better light penetration into the tree and onto the fruit.</li><li data-bbox="264 619 1167 675">• There are fewer damaged fruit, because the weak branches are removed and there are fewer branches to rub against the fruit.</li><li data-bbox="264 683 1149 707">• "Quality" of the fruit has to be explained in terms of size <b>and</b> sweetness.</li></ul>	<p data-bbox="1249 323 1391 347">Advantages</p> <ul data-bbox="1249 363 1682 419" style="list-style-type: none"><li data-bbox="1249 363 1682 387">• Saves the cost of labour to prune.</li><li data-bbox="1249 395 1603 419">• More apples are produced.</li></ul>