

**Assessment Schedule – 2011**

**Subject: Demonstrate knowledge of soil management practices (90919)**

**Evidence Statement**

**Question One**

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.	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.
<p>Examples of evidence for <b>described</b> answers may include:</p> <p>In (a) describes the tools / machinery used as EITHER horticultural equipment OR farm equipment (must be valid equipment for selected method) OR describes how equipment is used OR describes the effect of the equipment on the compacted soil, eg loosens soil, less compact, more aeration.</p> <p>In (b) describes a physical factor of compacted soil, eg reduced aeration, drainage or cooler soil or poor structure OR describes how the plant is affected, but does not link to plant growth, eg poor root penetration, poor nutrient uptake, less air for plant.</p> <p>In (c) describes the effect of EITHER horticultural equipment OR farm equipment on plant roots or soil properties.</p> <p><i>Examples:</i> <u>Lawns or sports fields</u> Garden fork or coring machine can be used. Fork is pushed down to produce “tunnels” to break through compacted areas; coring machine removes “plugs” of soil from compacted soil surface. <u>Paddocks – clay pan</u> Cultivation equipment such as a plough or ripper is adjusted to go deeper into soil to break up the compacted clay pan. A tractor-drawn subsoiler or soil aerator could be used at a lower level than normal cultivation equipment.</p>				<p>Examples of evidence for <b>explained</b> answers may include:</p> <p>In (b) explains how the physical properties of soil are affected by soil compaction OR explains how plant growth is affected by compacted soil. Must link to specific plant processes, ie respiration, photosynthesis, water uptake (osmosis) in the roots.</p> <p>In (c) provides accurate explanations as to how EITHER horticultural equipment OR farm equipment impact on soil structure and soil properties related to plant growth – eg fracturing the compacted layer, resulting in improved aeration for root activity.</p>		<p>Examples of evidence for <b>justified</b> answers may include:</p> <p>In (c) fully justifies the use of a method to reduce soil compaction by applying comprehensive knowledge of soil management practices. Must give ONE advantage and ONE disadvantage.</p> <p>For E8, must provide a valid comparison to another method.</p>	

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

**Question Two**

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.	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.
<p>Examples of evidence for <b>described</b> answers may include:</p> <p>In (a) describes the form of EITHER compost OR animal effluent, ie liquid or solid OR describes how EITHER compost OR animal effluent is spread.</p> <p>In (b) describes an effect of EITHER compost OR animal effluent application on soil properties – eg improved structure, increased water content, more nutrients, increased bio activity.</p> <p>In (c) describes an advantage OR disadvantage relating to EITHER compost OR animal effluent application.</p> <p><i>Examples:</i> Composted material suitable for spreading is dark brown to black, friable material with an earthy smell. Spread well before planting compost is forked into the soil. Composted material is a useful source of organic matter and plant nutrients. Animal effluent from dairy sheds is usually pumped in a liquid form through irrigators. If the soil is saturated, then effluent is stored until soil conditions dry out. Animal effluent is a useful source of organic matter, water and plant nutrients.</p>				<p>Examples of evidence for <b>explained</b> answers may include:</p> <p>In (b) explains how soil properties are affected, following application of EITHER compost OR animal effluent, eg nutrients are recycled back into the soil, organic matter acts as a glue and improves soil structure, water from effluent available for photosynthesis. OR explains why plant growth is improved following application of EITHER compost OR animal effluent. Must link to specific plant processes.</p> <p>In (c) provides accurate statements as to how EITHER compost OR animal effluent impact on soil fertility.</p> <p><i>Examples:</i> Composted material is a useful source of organic matter and plant nutrients. In addition, it helps build soil structure, aids water retention and aeration, and encourages biological activity such as earthworms. In doing so, the plant's soil input requirements for the processes of respiration, photosynthesis and nutrient uptake are increased.</p>		<p>Examples of evidence for <b>justified</b> answers may include:</p> <p>In (c) fully justifies the use of fertilisers by providing the clear advantages fertilisers have over EITHER compost OR animal effluent in terms of plant nutrient availability and the relative advantages / disadvantages to soil properties and /or environmental considerations (TWO out of the THREE points to be discussed). <i>Example ideas to come from:</i> <u>Inorganic fertilisers</u></p> <ul style="list-style-type: none"> <li>• High in plant nutrients.</li> <li>• Release nutrients rapidly.</li> <li>• Prone to loss by leaching.</li> <li>• Can “burn” seedlings.</li> <li>• Highly soluble fertilisers can contaminate waterways.</li> <li>• No effect on soil physical properties.</li> <li>• Able to customise application to soil needs.</li> </ul> <p><u>Compost / effluent</u></p> <ul style="list-style-type: none"> <li>• Bulky, low in nutrients.</li> <li>• Slow nutrient release – dependent on microorganisms.</li> <li>• Little plant damage.</li> <li>• Wider range of nutrients.</li> </ul>	

	<p>Animal effluent is a useful source of organic matter, water and plant nutrients. In addition, it helps build soil structure, aids water retention and aeration and encourages biological activity such as earthworms. In doing so, the plants' soil input requirements for the processes of respiration, photosynthesis and nutrient uptake are increased.</p> <p>OR</p> <p>how inorganic matter contains specific nutrients, and how this improves soil fertility.</p>	<ul style="list-style-type: none"> <li>• Improves physical conditions of soil.</li> <li>• Variable environmental risk – effluent can be damaging, composting can produce odours.</li> </ul>
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**NØ** = No response; no relevant evidence.

**Question Three**

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.	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 to liming.
<p>Examples of evidence for <b>described</b> answers may include:</p> <p>In (a) describes how lime is spread <i>OR</i> describes when lime is spread (summer and autumn not acceptable).</p> <p>In (b) describes an effect of liming that enhances plant production, eg increased pH, more nutrients available (not flocculation, as not a clay soil).</p> <p>In (c) describes an aspect of carrying out EITHER irrigation <i>OR</i> liming [only if not gained in (a) and (b)] <i>OR</i> crop rotation.</p> <p><i>Examples:</i></p> <p><u>Liming</u> on a large property would require the use of a bulk spreader, such as a truck mounted with a spinning device, about a month before the planting of a new crop. Liming will raise the soil pH above 5.8 and in so doing, improve the availability of nutrients present in the soil.</p>				<p>Examples of evidence for <b>explained</b> answers may include:</p> <p>In (b) explains why plant growth is improved following application of lime.</p> <p><i>Example:</i></p> <p>Liming will raise the soil pH above 5.8 and in so doing, improve the availability of nutrients present in the soil.</p> <p>Because acidity levels are reduced, conditions for microorganisms such as earthworms and bacteria are improved. This increases their beneficial activities, such as increased nutrient availability from organic matter decomposition or aerated soils from burrowing.</p> <p>In (c) provides explanations as to how EITHER irrigation <i>OR</i> crop rotations impact on the properties of soil and/or plant growth.</p>		<p>Examples of evidence for <b>justified</b> answers may include:</p> <p>In (c) justifies the use of the selected method to improve plant production on the property, by applying comprehensive knowledge of how the soil management practices impact on soil properties, and how these relate to plant growth.</p> <p><i>Ideas could come from:</i></p> <p><u>Irrigation rather than liming</u></p> <ul style="list-style-type: none"> <li>• Water is available in summer for photosynthesis.</li> <li>• Water is more of a limiting factor than pH.</li> <li>• Dissolved nutrients available for the plant.</li> <li>• Possibility of leaching.</li> </ul> <p><u>Crop rotation rather than liming</u></p> <ul style="list-style-type: none"> <li>• Differing root depth.</li> <li>• Plant-specific nutrients.</li> <li>• Legumes only if specify nitrogen.</li> <li>• Disease status needs to be linked to plant growth.</li> <li>• Increases organic matter if cultivated in, or minimum tillage.</li> </ul>	

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

**Judgement Statement**

	<b>Not Achieved</b>	<b>Achievement</b>	<b>Achievement with Merit</b>	<b>Achievement with Excellence</b>
<b>Score range</b>	0 – 7	8 – 12	13 – 18	19 – 24