Assessment Schedule – 2015 Final Version

Agricultural and Horticultural Science: Demonstrate knowledge of soil management practices (90919)

Assessment Criteria

Question One: Vegetable garden

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
Describes how soil management practices are carried out.				**Links** ideas to explain why soil management practices, or steps within practices, are carried out.		Applies knowledge of soil 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.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N**0** = No response; no relevant evidence.

Examples of evidence for answers

Describes (Achievement) / **Explains** (Merit) the effect that crop rotation has on the physical and biological properties of soil

- Different plant roots penetrate to different levels of the soil (Achievement), which means nutrients are accessed from different levels (Merit); also, the soil is broken up through varying depths, which improves drainage / aeration (Merit).
- Prevents the build-up of pests and disease (Achievement), because the host plant is removed, so the pest / disease lifecycle is broken (Merit).
- If legumes are included in the rotation, they have N-fixing bacteria in root nodules / on their roots (Achievement) which, over time, will increase nitrogen levels in the soil (Merit).

Describes (Achievement) / **Explains** (Merit) the actions carried out when cultivating a seedbed

- Kill or remove the previous plant matter / crop (Achievement); this will prevent competition for the desired crop (Merit).
- Dig / turn over topsoil (Achievement); this will turn in any organic matter (Merit), which will help to break up a pan (Merit).
- Break up larger clumps with a fork (Achievement) to create a fine tilth, so the seedlings / roots can easily push through (Merit).
- Level the seed bed (Achievement) to allow for even emergence / so the seeds will not be planted at varying depths (Merit).

Describes (Achievement) / **Explains** (Merit) / **Justifies** (Excellence) why adding compost is a better option than not

Compost

Advantages

- Helps bind soil particles together (A), which improves drainage, aeration (M), and water-holding capacity (M).
- Provides nutrients (A), which are then available for plant growth (M).
- Holds water / moisture.
- Encourages / adds earthworms / microbes (A), which break down the compost into humus / nutrients that are readily available to plants (M).
- Is darker, therefore warmer / warms the soil (A), and warmer soil means chemical processes (in the roots) are sped up (M).
- Cheap / not costly to make.
- Encourages earthworm activity (A), which improves structure, drainage, and aeration, due to their burrowing (M).

Disadvantages (must have links / explanations to gain Merit points

- Takes time to make (A).
- Low in nutrients / not nutrient-specific.
- Not suitable for larger areas.
- Can be costly if you have to buy it.
- Seeds can survive and germinate when you use it.
- Not all nutrients are readily available.
- Can be acidic.
- Pathogens.

Question Two: Clay soil

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
		Describes how soil management practices are carried out.		**Links ideas** to **explain** why soil management practices, or steps within practices, are carried out.		**Applies knowledge** of soil 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.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N**0** = No response; no relevant evidence.

Examples of evidence for answers

Describes (Achievement) a suitable drainage system for a clay soil

- Underground tile or pipe drain, mole plough drain.
- Labelled diagram.

Describes (Achievement) the effects drainage can have on soil properties / **Explains** (Merit) how these will affect the properties of soil, and plant growth

- Reduces the amount of water in the soil (Achievement), meaning there is more air available for root respiration (Merit).
- Less water in the soil increases the temperature of the soil (Achievement), which means that chemical processes (in the roots) will be faster, which will speed up growth (Merit).
- There will still be water in the soil / soil will be at field capacity (Achievement), available for plant processes (Merit) and for microbe / earthworm activity (Merit), which will break down nutrients / improve aeration (Merit).

Describes (Achievement) / **Explains** (Merit) / **Compares and contrasts** (Excellence) the two practices

Liquid fertiliser	**Solid fertiliser**
Advantages • Can be applied through an irrigation system. • Is already dissolved in water (A), so the nutrients are readily available for plant roots to uptake (M). • Is fast-acting / more readily available (A), so plant growth will improve rapidly (M).	*Advantages* • Can be applied as powder or granules (A), for either fast or slow release (M). • Easier to apply to all topographies.
Disadvantages • If too much water is added, the nutrients will be in low concentration. • If applied overhead, can burn the foliage / leaves. • Can damage equipment if not done correctly / concentrations are too high. • Could run off.	*Disadvantages* • Needs water (rainfall or irrigation) to dissolve / soak into soil. • Can be blown away into unwanted areas if windy when applying. • Could run off.

Question Three: Dairy farming

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
		Describes how soil management practices are carried out.		**Links ideas** to **explain** why soil management practices, or steps within practices, are carried out.		**Applies knowledge** of soil 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.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N**0** = No response; no relevant evidence.

Examples of evidence for answers

Describes (Achievement) two things that a soil test shows

- The pH – how acidic / basic the soil is.
- Which nutrients are present / lacking.
- Soil type – texture: sand, silt, clay (not structure).

Describes (Achievement) / **Explains** (Merit) how liming affects the properties of soil, and **Explains** (Merit) how these properties then affect plant growth

- Increases the pH / reduces acidity (Achievement), which means more nutrients are unlocked / made available for plant processes (Merit), and the soil is more desirable for soil organisms (Merit) which will break down organic matter / improve aeration and drainage (Merit), improving aeration and drainage (Merit) and aiding the breakdown of organic matter / recycling of nutrients (Merit).
- Can flocculate clay particles (Achievement), which will improve drainage / aeration / warmer soil (Merit), all of which improve plant and / or chemical processes.

Describes (Achievement) / **Explains** (Merit) / **Justifies** (Excellence) why one practice is preferable to the other

Effluent	**Irrigation**
Advantages • Increases / recycles nutrients (A) which are available for plant processes (M). • Cheap / cost-effective, as it is a waste product from the sheds. • Contains organic matter (A) which improves the soil structure (M) and soil organism activity (M), and is darker, which helps warm the soil, which in turn speeds up plant processes / chemical reactions. • Adds water (A), which is available for photosynthesis / plant processes (M).	*Advantages* • Applies water to the soil (A), which is used for plant processes (M). • Water in the soil means nutrients can be dissolved and taken up by the plants (M). • Can be applied regularly / when needed (A), meaning that it is not over- or under-done (M). • Fertilisers can be added through the irrigation system / with the water (A), providing nutrients and water to the plant (M).
Disadvantages • Can add excess water to soil (A), which leads to leaching into waterways / nutrients are leached away (M). • Can have unpleasant odour. • Can be acidic / make the soil acidic (A), which can reduce nutrient availability / soil organism activity (M).	*Disadvantages* • Can overdo it (A), which will cause nutrients to leach away (M), and soil has little air for root respiration (M). • Can underdo it (A), which means that the soil does not have enough water for plant processes (M). • Can be expensive to set up (A).

Cut Scores

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