

Assessment Schedule – 2021

Agricultural and Horticultural Science: Demonstrate understanding of how NZ commercial management practices influence livestock growth and development (91294)

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Describes how management practices influence livestock growth and development in livestock production.	Explains in depth how management practices influence livestock growth and development in livestock production.	Justifies a management practice that influences livestock growth and development of the livestock, and explains how it affects the economics of production

Evidence

Shelter

Question ONE	Evidence
(a)	<p>Describes how farmers provide shelter for the candidate’s selected livestock and explains how it leads to improved growth and development.</p> <p>These are potential examples; other methods to provide shelter for other livestock can be accepted.</p> <p><i>Providing shelter for pigs</i></p> <p>Farmers can provide artificial shelter for free-range pigs in the form of wooden huts. These huts are placed within each paddock to house the pigs. Each hut must have enough space for all the pigs within the paddock to move and turn around. The shelter must also have adequate ventilation and some form of bedding material. Providing shelter for pigs reduces the effects of weather on growth and development.</p> <p>If pigs do not have adequate shelter during cold weather, they may use the energy obtained from their food to keep warm, rather than converting it into growing larger and developing more muscle. Wind and rain can also result in the pig using energy for warmth rather than growth and development. Pigs do not have sweat glands, so cannot cool themselves down. It is important to provide shelter from hot weather to prevent heat stress, which can reduce the rate of growth and development. By providing shelter, the pig is able to utilise all the energy from its food to maximise its rate of growth and development. This will result in a greater amount of pork being produced per pig.</p>
(b)	<p>Analyses how providing shelter impacts on the economics of production and the quality of products.</p> <p>Providing shelter, such as wooden huts, to free-range pigs ensures that the pigs are protected from any weather, which may influence their growth and development.</p> <p>By providing wooden huts, the pig is able to shelter from the weather, enabling the pig to stay warm and dry, which will reduce the requirement for the pig to use energy to maintain its body temperature. The pig will be able to maximise the amount of energy used to grow and develop. The farmer pays directly for feed provided to the pigs up front, and feed not utilised for growth and development is wasted money. By providing shelter such as wooden huts, farmers maximise the use of the feed they purchase and also maximise the amount of pork meat each pig produces.</p> <p>Profitability and productivity will be increased by the use of shelter, which has a positive impact on the economics of production.</p>

Pigs are unable to sweat to cool down, as they do not have sweat glands. It is therefore important to provide pigs with shelter during hot weather, so they do not overheat. Getting too hot can result in heat stress, which reduces the growth rates of the pig. The quality of the meat can also be affected by stress, as the hormones involved can make the pork tougher and have a poor flavour. By reducing the likelihood of heat stress by using wooden huts, a farmer will produce a higher quality pork that is tender and has a desirable flavour.

N1	N2	A3	A4	M5	M6	E7	E8
<p>Describes a shelter that doesn't relate to selected livestock.</p>	<p>Partially describes how farmers provide shelter for selected livestock but gives an insufficient description.</p>	<p>Describes how farmers provide shelter for selected livestock.</p>	<p>Describes in detail how farmers provide shelter for selected livestock, with reference to growth rate.</p>	<p>Explains how providing shelter for selected livestock improves growth and development.</p>	<p>Explains in detail how providing shelter for selected livestock affects growth and development, linking energy intake or feed utilisation to growth rate or increased production.</p>	<p>Justifies the use of a technique of providing shelter by explaining how the improved growth and development of the livestock impacts on the economics of production and the quality of product.</p> <p>Comprehensive evidence addressing ONE of these aspects, with the remaining aspect well supported.</p>	<p>Justifies the use of a technique of providing shelter by explaining how the improved growth and development of the livestock impacts on the economics of production and the quality of product.</p> <p>Comprehensive evidence addressing in BOTH aspects.</p>

N0 = No response; no relevant evidence.

Evidence

Feeding livestock

Question TWO	Evidence
(a)	<p>Describes the types of feed young stock are given, and explains how this affects growth and development.</p> <p><i>Cattle</i></p> <p>Young calves are fed milk in the first few weeks of life. The calf's digestive system is unable to digest plant matter when they are first born, so they need to be fed milk, which is a very easily digestible feed. Milk bypasses the rumen, and is digested in the abomasum. Milk contains all the protein, nutrients, and carbohydrates that a young calf needs for growth and development in the first few weeks of life. By feeding milk to young calves, they are provided with a feed that is easily digestible, unlike grass, so they are able to gain the maximum amount of nutrients and energy from their feed, which will allow them to grow at their optimum rate.</p> <p>As calves get older, they are still fed milk, but are also given a small amount of plant-based feed, such as hay or grass, or a pelleted feed, such as calf meal, with additives including a coccidiostat such as Rumensin. By giving the calf a small amount of these feeds, it begins to develop the rumen so that when the calf stops drinking milk, it is able to fully digest grass. A calf with a well-developed rumen at weaning will be more able to fully utilise plant-based feed, and to grow and develop at a faster rate.</p>
(b)	<p>Compares and contrasts how the types of feed and / or feeding management practices differ between young and adult livestock, and discusses how the growth and development affects the economics of production and timing.</p> <p><i>Cattle</i></p> <p>Young calves should be fed differently to adult cows, due to the need for the rumen to fully develop before calves can digest plant matter such as grass. The rumen in a calf does not yet have papillae or bacteria to aid in the digestion of grass and absorption of nutrients and energy. A calf that is fed grass too early will not be able to obtain the required energy and nutrients for growth and development, and will, therefore, not meet the target weight gains. Adult cows have fully developed rumens, so are able to fully digest grass and obtain the required energy for body maintenance and production.</p> <p>By feeding calves milk initially, the poorly developed rumen is bypassed via the oesophageal groove, so that milk is digested in the abomasum. Milk is able to provide the calf with all the required energy and nutrients in the early stages of life, which ensures that growth and development is maximised, and the calf will reach its genetic potential. As the calf gets larger, milk is no longer able to provide enough energy for growth. By gradually developing the rumen prior to weaning through feeding small amounts of grass or hay, or a pelleted feed like calf meal, the calf's digestive system is able to slowly adapt to digesting grass before milk is removed as the main source of feed. By doing this, the calf still receives all the nutrients and energy required for growth, but will be well prepared for the digestion of grass once the calf is weaned. A calf that is able to fully digest and utilise grass after weaning will be able to continue to grow and develop at its maximum rate and meet its genetic potential for size. A larger cow will be able to produce more milk if it is a dairy cow, which will mean farmers will receive a greater amount of profit due to the additional milk in the vat. If the cow does not reach its potential for size, then it will never produce as much milk as it was genetically capable of, which reduces profit. Farmers may also have invested in improving the genetic merit of a cow through artificial insemination (AI), so by reaching its genetic potential, farmers will be maximising profits from this investment, gaining a more productive cow.</p> <p>If the cow is used for beef production, then having a well-developed rumen will ensure the cow is maximising the energy obtained from grass and can fully utilise this energy for growth and development. A larger cow will have a greater capacity for meat and will also develop muscle at a faster rate than a cow with a poorly developed rumen. The faster the cow grows and develops, the earlier it will reach the target liveweight for slaughter. This also reduces the amount of time the cow is on the farm, which reduces costs and further increases profits.</p>

N1	N2	A3	A4	M5	M6	E7	E8
<p>Describes a type of feed young stock are provided with, but not relevant to chosen stock.</p>	<p>Describes the type(s) of feed young stock are provided with but gives an insufficient description.</p>	<p>Describes the type(s) of feed young stock are provided with.</p>	<p>Describes in detail the type(s) of feed young stock are provided with.</p>	<p>Explains how the feeding of young stock affects growth and development of the chosen livestock, linking to growth rates.</p>	<p>Explains how the feeding of young stock affects growth and development of the chosen livestock, linking food utilisation and energy intake to growth rates.</p>	<p>Compares and contrasts the practice of feeding young stock differently to adult stock by discussing the impacts on growth and development, with reference to economics and timing of production.</p> <p>Comprehensive evidence addressing ONE aspect, with the other aspect well supported.</p>	<p>Compares and contrasts the practice of feeding young stock differently to adult stock by discussing the impacts on growth and development, with reference to economics and timing of production.</p> <p>Comprehensive evidence addressing BOTH aspects.</p>

N0 = No response; no relevant evidence.

Evidence

Livestock health

Question THREE	Evidence
(a)	<p>Describes how a nutrient and / or mineral deficiency can cause health problems and how that can affect the growth and development of livestock.</p> <p><i>Cobalt deficiency in lambs</i></p> <p>Nutrients and minerals are often required by lambs in small amounts to ensure they are able to grow and develop at their maximum rate. If lambs are deficient in a mineral, such as selenium or cobalt, it can cause illness, which can reduce the growth rate and can cause other symptoms, such as a loss of appetite, muscle loss, or even death.</p> <p>Cobalt is required by lambs in order for certain microbes in the rumen to convert it to Vitamin B12, to be utilised by the animal. Vitamin B12 affects the lamb's ability to utilise energy obtained from food. A deficiency in cobalt can result in reduced growth rates, especially as the lamb often has a reduced appetite due to the deficiency. Reduced growth rates will result in the lamb growing and developing at a slower rate than if it did not have a deficiency. This means the lamb will not be utilising the food it eats, as it won't be growing at its maximum rate. Having a reduced appetite will further reduce growth and development, as the lamb will not be eating as much as it would have if it were not deficient, therefore reducing growth rates further.</p>
(b)	<p>Justifies how meeting the nutrient and mineral requirements for the chosen livestock ensures optimal growth and development with regard to quantity and economics of production.</p> <p>Although animals require energy from feed for growth and development, they also require specific nutrients and minerals in certain amounts to prevent animal health problems. By meeting the nutrient and mineral requirements of lambs, farmers ensure that the animal reaches target weights, providing a large quantity of meat of a high quality.</p> <p>Nutrients such as cobalt can cause reduced growth rates as it reduces the amount of B12 the lamb can absorb in the rumen. This reduces the amount of energy the animal can obtain and use for growth and development. Copper deficiencies can cause bone problems, which further reduce the size of the lamb, as it is unable to grow and develop at its maximum rate. Reduced growth rates will result in the lamb being smaller than it would have been, meaning farmers will have smaller lambs, with less meat, when they sell their lambs to the processor. This reduces the quantity of meat produced per lamb, which reduces the production for the farm. A lower on-farm production will reduce the farmer's profit.</p> <p>Other missing nutrients can cause animal health problems that reduce the quality of the meat. Selenium deficiencies in lambs can result in white muscle disease, which is where the lamb's muscles start to degrade. This results in very poor muscle quality and can cause death in young lambs. The stress of being deficient in key nutrients can also reduce the quality of the meat. If the lamb's immune system is compromised by deficiency, it can also easily get other illnesses that can reduce the quality of the meat.</p>

N1	N2	A3	A4	M5	M6	E7	E8
Describes a specific nutrient or mineral deficiency in general terms.	Partially describes how a specific nutrient or mineral deficiency can cause health problems, but gives an insufficient description.	Describes how a specific nutrient or mineral deficiency can cause health problems that impact on growth and development.	Describes how a specific nutrient or mineral deficiency can cause health problems that impact on growth and development, making some reference to growth rates.	Explains how specific nutrient or mineral deficiency impacts on growth and development, linking to growth rates.	Explains how a specific nutrient or mineral deficiency impacts on growth and development, linking food utilisation and energy intake to growth rates.	Justifies how meeting the nutrient and mineral requirements for the chosen livestock ensures optimal growth and development in regard to quality, quantity and economics of production. Comprehensive evidence addressing ONE aspect, with one other aspect well supported.	Justifies how meeting the nutrient and mineral requirements for the chosen livestock ensures optimal growth and development in regard to quality, quantity and economics of production. Comprehensive supporting evidence addressing TWO aspects.

N0 = No response; no relevant evidence.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 7	8 – 12	13 – 18	19 – 24