Assessment Schedule – 2022

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 commercial livestock production in New Zealand.	**Explains** how management practices influence livestock growth and development in commercial livestock production in New Zealand.	**Evaluates** how management practices influence livestock growth and development in commercial livestock production in New Zealand. This may involve **justifying**, **comparing and contrasting**, or **analysing** the use of the techniques.

Evidence

Question One: Managing temperature

	Sample evidence
(a)	*Describes two methods used to modify the temperature for chosen livestock.* **Stabling horses** Farmers can provide artificial shelter for young thoroughbred horses in the form of stables. These stables are often large sheds that contain partitioned-off stalls. The stalls are lined with wood and usually have straw or sawdust as bedding. Both food (often hay) and water are provided in the stable. A small half door can be opened to allow the horse to place its head outside the stall, and this can either face into an indoor breezeway or outside. **Providing shelter** Farmers can place three-sided shelters / sheds in the paddock for the horse to use for shade when the weather is very hot, or to reduce the effects of wind and / or rain during cold weather.

(b)	*Explains how the temperature of a chosen livestock's environment impacts growth and development.* Thoroughbred horses are generally bred for flat racing. Often the greater the amount of muscle the horse grows, and the larger they grow, the faster they are able to run once they begin racing. Thoroughbreds are a light breed horse and often have less body fat and a lighter coat than other breeds of horse. This means they are more susceptible to the impacts of cold temperatures. If a horse is cold, it may decrease how far it walks to get food, reducing its intake, and it may also shiver to keep warm. Shivering converts food energy into heat, which means the horse will be using its energy for warmth rather than growth and development. By providing shelter in the form of a stable, the young horse is able to utilise all the energy from its food rather than using it to keep warm, to maximise its rate of growth and development. This will result in a larger, well-muscled horse when it begins racing.
(c)	*Discusses how managing the temperature of a chosen livestock improves growth and development by discussing the impacts on the economics of production and timing.* Providing shelter, in the form of stables, will increase the growth and development of young thoroughbred horses to ensure they are well-grown for racing and reach their optimal size when they begin their race training. Cold temperatures, rain, and wind can reduce growth, as the horse will put its energy towards keeping warm via shivering. This energy would have otherwise been used for growth of the horse and development of muscles. By providing stables, the horse is able to remain warm and dry, which will reduce the requirement for the horse to use energy to maintain its body temperature. The young horse will be able to maximise the amount of energy used to grow and develop into a racehorse. Thoroughbred horse racing involves horses sprinting in races, ridden by jockeys, with the ultimate goal of winning the race. Race winners receive a 'purse' or winnings, which is then distributed to the owners, trainers, and jockey. The more races the horse wins, the greater the profit made, therefore growing a well-muscled horse for racing will increase the likelihood of productivity. Thoroughbred horses also make money by being sold at auctions such as the Karaka Sales. Although the bloodline of the horse is important, the muscling and size of the young horse will also have an impact on the price received at the sale. The greater the amount of money the young horse is sold for, the greater the profit received by the breeder / owner. Thoroughbred horses have a set birthday, being the first of August each year. Horses are then raced in age groups based on this system. If a horse does not grow to its optimal size compared to others in its age group, it will be less likely to be competitive. Therefore, it is important the cold temperatures do not decrease the growth and development of the young horse. If a horse is not well-grown by the time it begins its racing career, it will either underperform or may be held back to race the following year in the next age bracket. However, this will mean competing against horses that have already been racing for a year, which will further reduce its ability to meet the level of its age group. By stabling young horses, they are more likely to reach their optimal size in time for their first race and be better able to compete against other horses in their age group.

N1	N2	A3	A4	M5	M6	E7	E8
Partially describes a method that farmers use to modify the temperature for livestock.	Partially describes a method that farmers use to modify the temperature for livestock, but insufficient description.	Describes a method that farmers use to modify the temperature for livestock.	Describes TWO methods that farmers use to modify the temperature for livestock, with reference to growth rate.	Explains how the temperature of a selected livestock affects growth and development.	Explains in detail how the temperature of a selected livestock affects growth and development, linking energy intake or feed utilisation to growth rate or increased production.	Discusses how managing the temperature of a selected livestock improves growth and development by discussing the impacts on the economics of production and timing. Comprehensive evidence for ONE of these aspects, with the remaining aspect well supported.	Discusses how managing the temperature of a selected livestock improves growth and development by discussing the impacts on the economics of production and timing. Comprehensive evidence in BOTH aspects.

N0 = No response; no relevant evidence.

Question Two: Parasites

	Sample evidence
(a)	*Describes how internal parasites can cause health problems for chosen livestock.* **Lambs** Internal parasites live in the small intestines of the lamb where they attach to the lining of the intestinal wall (D). They then ingest the nutrient-rich blood, so the lamb does not receive these nutrients (D). This can cause a number of health problems in young lambs. The lamb can lose weight (D) because the nutrients that have been eaten and digested by the lamb are being taken up by the internal parasites rather than being used by the lamb to maintain its weight (E). Taking in less nutrients than it digests will have an impact on growth rates and development as the lamb will grow much slower than lambs without parasites (E). The lamb can get diarrhoea (D), which is caused by the parasite damaging the intestinal system (E). Diarrhoea also reduces absorption of nutrients, which will further reduce the utilisation of the feed and result in a slower growth and development rate (E). This diarrhoea can also cause the lamb to get dags (D), and this could lead to flystrike, which would reduce the amount of food the lamb eats, as it will not walk as far to get food due to the pain (E), and it will also have lower growth rates due to the stress caused by being ill (E). As the lamb is losing blood, it could get anaemia (D), which would reduce the amount of oxygen moving around the lamb's body, lowering its growth rate (E). In extreme cases, this could lead to the death of the lamb (D).
(b)	*Evaluates the treatment of chosen livestock for internal parasites by discussing the impacts on growth and development, with reference to quality and quantity.* Treating lambs for internal parasites will improve growth and development and ensure high-quality meat and a large quantity at slaughter. Internal parasites live in the small intestines of lambs. The small intestine is the main site for the absorption of the nutrients that have been broken down from ingested food. By attaching to the wall of the small intestines, the internal parasites are able to feed on nutrient-rich blood, robbing lambs of the nutrients that they have ingested and digested. If lambs do not receive treatment for internal parasites, they will not be able to utilise all the nutrients from food, which will reduce the rate of growth. A lower growth rate will result in lambs having smaller body frames, meaning a reduction in the amount of meat that is grown. This reduces the overall volume of meat grown so that come slaughter time, they will be lighter and less muscled than lambs that do not have internal parasites. The farmer will be providing livestock for slaughter that has a lower quantity of meat per animal than if they did not have internal parasites. Not treating lambs for internal parasites may cause them to suffer from ill health such as anaemia, dags, and diarrhoea, putting them under stress. Stress can result in hormones being released, which can impact the quality of the meat. Stress hormones can make the meat tough and impact the colour and flavour. As consumers desire tender, flavoursome meat that is a dark red colour, any deviation from these requirements will lower the quality of the meat and consumers will not want it. By drenching lambs for internal parasites, it prevents the parasites removing nutrient-rich blood from the small intestines and causing animal health problems. This means that the lamb will be using all of its energy for the growth of its body and the development of muscle, which will increase the quantity of meat produced. By preventing lamb stress due to illness, the meat will not be affected by stress hormones so will be of a high quality for consumption by consumers. Therefore, the treatment of lambs for internal parasites will have a positive impact on improving the growth and development of lambs.

N1	N2	A3	A4	M5	M6	E7	E8
Partially describes how internal parasites can cause health problems.	Partially describes how internal parasites can cause health problems but gives an insufficient description.	Describes ONE health problem caused by internal parasites.	Describes how internal parasites impact on growth and development.	Explains how internal parasites impact on growth and development, linking to growth rates.	Fully explains how internal parasites impact on growth and development, linking food utilisation and energy intake to growth rates.	Evaluates the treatment of animals for internal parasites by discussing the impacts on growth and development, with reference to quality and quantity. Provides comprehensive evidence for ONE aspect, with the other aspect well supported.	Evaluates the treatment of animals for internal parasites by discussing the impacts on growth and development, with reference to quality and quantity. Provides comprehensive evidence in BOTH aspects.

N0 = No response; no relevant evidence.

Question Three: Genetic selection

	Sample evidence
(a)	*Describes which two characteristics a producer would select to improve growth and development in chosen livestock, explaining why these characteristics are important.* **Dairy cattle** When producers select which bull semen to use when undertaking artificial insemination on their cows, they consider several characteristics. They will choose the bull that has the greatest likelihood of passing on these desirable traits. Producers will often select for larger cows (D), as this will mean that the offspring are more likely to be larger than the previous generation (E). They will also select the characteristic of cows having a larger udder (D), which will result in any heifer calves born developing a larger udder than their mother (E). Teat placement can be selected for (D), as this influences where the teats are placed on the udder as it develops (E). Feed conversion efficiency can also be selected for (D). This characteristic ensures that more of the feed the cow eats is converted into growth (and eventually into milk) than the previous generation (E).
(b)	*Analyses the impact that genetic selection has on the growth and development of chosen livestock by discussing the improvement to the economics of production and quantity.* When producers undertake artificial insemination in dairy cattle, they are able to use genetic catalogues that provide a large amount of information about the possible sires. Farmers can then purchase semen straws of their selected sire to breed with their cows to hopefully improve the genetics of their herd. Specifically selecting for characteristics required within the herd can result in an increase in the number of products and improve the profitability of the farm. When selecting for a larger liveweight / body size, the farmer is hoping that the next generation of dairy cows will be larger than the previous. During the growth phase, the cow will grow bigger than its mother, if provided with the correct amount and type of food. A larger cow is able to eat more food and convert more of this food to milk, meaning that a greater amount of milk will be available to be sold to the milk processing company, increasing the profits that the farmer will make. A cow with a better feed conversion efficiency will use more of its feed for growth and development than a cow with a low feed conversion efficiency. This means that for the same amount of food, the cow with the better feed conversion efficiency will grow larger and develop better. Improved feed utilisation means that the money spent on feed is also better utilised, improving profitability. By selecting for a larger udder size, the calf will develop a larger sized udder than its mother. A larger udder should produce greater volumes of milk than a smaller udder, which will increase the amount of milk produced per cow. This results in more milk being available to be sold, and as a result, a greater profit for the farmer. Although using bull semen from companies that specialise in genetics is more expensive than purchasing a bull, the farmer is able to specifically select characteristics that increase the growth rates and size of the cow and improve the development of the udder. Both of these factors increase the amount of milk that the cow can produce, which results in a greater profit. The increased profit made from these genetic improvements outweighs the cost of the semen.

N1	N2	A3	A4	M5	M6	E7	E8
Partially describes livestock characteristics that a producer would select.	Partially describes livestock characteristics that a producer would select but gives an insufficient description.	Describes ONE livestock characteristic that a producer would select.	Describes TWO livestock characteristics that a producer would select.	Explains how selecting for specific livestock characteristics improves growth and development, and why.	Fully explains how selecting specific livestock characteristics improves growth and development, linking why this is important.	Analyses the impact that genetic selection has on growth and development by discussing how the practice improves the economics of production and quantity. Provides comprehensive evidence ONE aspect, with the other aspect well supported.	Analyses the impact that genetic selection has on growth and development by discussing how the practice improves the economics of production and quantity. Provides comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Cut Scores

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