Assessment Schedule – 2020

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 two management practices that are carried out to increase survival and growth under changing unfavourable environmental conditions.	**Explains** how the two management practices increase survival and growth under unfavourable environmental conditions.	**Justifies** which management practice would have the greatest potential impact for your selected livestock in terms of quality and economics of production.

Evidence

Question ONE	Evidence
(a) *Demonstrates understanding of how two management practices are carried out to increase survival and growth during unfavourable environmental conditions.*	*Possible evidence for sheep as the selected livestock.* **Environment and climate** Sheep have evolved and have been bred to withstand cold and snowy conditions. However, their lambs are vulnerable, as are the adults, if shearing is done before lambing. How much intervention is required to prevent lamb / ewe mortality depends on the breed of sheep and the local climate of the farm. In addition, there is the necessity for accurate weather forecasts and the presence or absence of facilities to accommodate changes in weather. **Possible management practices** 1. Lambing dates – start later, so there is less likelihood of snowstorms decimating lamb numbers. The problem with this is that spring grass flush may be missed, which may prevent lambs being ready for the traditional Christmas market. Requires forward planning. 2. Move pregnant ewes to more sheltered paddocks. This has to be timed carefully so as not to run out of feed before lambing. 3. Feed out hay / silage – this is an expensive option and will reduce profits. 4. Lambing indoors – this also combines point 3 above. 5. Breed for single lambs – generally speaking, more money will be made per ewe if she gives births to multiples (although less so for triplets and quads, as some may need to be hand-reared). However, multiples are born smaller, and smaller lambs struggle to survive in adverse weather conditions. Traditionally Merino (high country sheep, bred for high-value wool) are not bred for multiple births, as this assists lamb survival because the lambs are born larger. 6. Lamb hoggets separately in the most sheltered conditions – hoggets lambing for the first time tend to have more difficulty birthing and tend to be less likely to bond with, and look after, the lamb(s). 7. De-stock – it is possible to decide to reduce stock numbers before a bad winter is predicted in order to ensure enough feed is available in lambing paddocks. 8. Plant shelter belts – these will prevent cold winds from chilling lambs.

	Lambs are vulnerable to cold because they have a low surface area to volume ratio. If they cannot take in enough energy to keep warm, they will die. This will be exacerbated when there are multiple lambs / hoggets / hilly paddocks, as lambs can get mis-mothered in those conditions. Deaths can be prevented by providing shelter and feed for the ewes, which will keep them closer to the lambs. All of this also applies to ewes shorn before lambing.
(b) Demonstrates understanding of which management practice would have the greatest potential impact in terms of quality and economics of production.	**Feeding out** • For most farmers, the short-term solution to unfavourable environmental conditions is to feed out, e.g. hay. This is particularly necessary if grass is covered by snow. The feed will provide additional energy, which will allow the ewes to keep warm. • Feeding out allows ewes easier access to food, as they do not have to walk far to find it, further contributing positively to the energy budget so it is easier for them to keep warm and feed their lambs. • Feeding out also serves to help keep the ewes in one place and so helps prevent mismothering. This is important because the lambs need regular feeds from the ewe in order to ingest sufficient energy to keep warm. **Providing shelter** • Shelter can be provided in a variety of ways: - Lower paddocks, where the temperature will be warmer, and the valley side may provide protection against wind chill. This will prevent ewes and lambs using up energy to keep warm. - Big bales or balage can be put up as a temporary shelter against the prevailing wind. This will reduce wind chill and energy wasted keeping warm instead of growing. - Sheep can be housed, which has the additional advantage of preventing the ewes, and more particularly the lambs, from getting wet through and chilled, and possibly hypothermic and dying. - Long-term shelter belts can be grown to stop the chilling effect of southerly winds. Southerlies are particularly cold and can cause lamps to die from exposure. **Quality** • A cold lamb will need to use energy for warmth that they would otherwise use for growth, so their growth rate will be slowed. • A quality lamb needs to be in prime condition before slaughter. This relates to weight, and to fat coverage at the 12^{th} rib. • Lambs can be overfat, in which case they would be downgraded at the works. Likewise, they can be too lean (although they are unlikely to be sent at this stage). **Economics** • Downgrading means less profit for the farmer. • Additional feed costs money, so less profit per livestock unit. • Housing sheep costs money in terms of feed and labour, so less profit for the farmer. • Creating artificial or natural shelter will also cost money over the short term but will increase production and therefore profit in the long term. • Feeding out has costs in terms of feed and labour, so further loss of profit.

N1	N2	A3	A4	M5	M6	E7	E8
Some writing but does not describe how or why management practices are carried out to increase survival and growth under unfavourable environmental conditions.	Partial or insufficient description of how or why management practices are carried out to increase survival and growth under unfavourable environmental conditions.	Describes how ONE or partially describes how or why TWO management practices are carried out to increase survival and growth under unfavourable environmental conditions.	Fully describes how or why TWO management practices are carried out to increase survival and growth under unfavourable environmental conditions.	Explains how or why ONE or partially describes how or why TWO management practices increase survival and growth under unfavourable environmental conditions.	Fully explains how or why TWO management practices increase survival and growth under unfavourable environmental conditions	Justifies which management practice would have the greatest potential impact for the selected livestock in terms of quality and economics of production. Comprehensive evidence for ONE aspect, with the other aspect supported.	Justifies which management practice would have the greatest potential impact for the selected livestock in terms of quality and economics of production. Comprehensive evidence for ONE aspect, with the other aspect well supported.

N0 = No response; no relevant evidence.

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Describes two breeding management practices that affect the quality and / or quantity of offspring.	**Explains** how two breeding management practices affect the quality and / or quantity of offspring.	**Justifies** the use of one of the breeding management practices compared to not using it in terms of timing and economics of production.

Question TWO	Evidence
(a) Demonstrates understanding of how two breeding management practices are carried out in terms of quantity and / or quality of offspring.	*Possible evidence of thoroughbred horse-breeding management practices.* **Early breeding** • UV light in stables. • Rising plane of nutrition and / or hormones – progesterone / oestrogen / hCG (human chorionic gonadotropin) or GnRH (Gonadotropin releasing hormone). **Detection and elimination of twins** • Ultrasound scanning needs to take place before breeding to identify any cysts so they are not confused with twin conceptuses. • Scanning around day 14 allows twin foetuses to be detected, and then one can be crushed. The only problem is that this tends to perpetuate the twinning genetics. *Possible evidence of how management practices affect the quality and / or quantity of offspring.* **Early breeding** • All thoroughbreds are given a universal birthday (1 August in the Southern Hemisphere and 1 January in the Northern Hemisphere), regardless of actual birth date, to allow horses to be put into age groups for the purpose of age-graded racing. This means that foals born in August will have a maturity advantage over foals born later. • Mares are very seasonally oestrous and typically go into anoestrous in the winter, and if they are straight off the track the pressures of training can often leave them anoestrus. • The gestation period for a mare is around 330 days (i.e.11 months), so rebreeding in the same season produces an immature foal. **Detection and elimination of twins** • Significant numbers spontaneously abort within the first six weeks of pregnancy so of those present at day 40, about 80% will subsequently abort, most often after the eighth month of pregnancy. • Late-term abortions come with complications, including trauma, illness, infection, inflammation of the laminae (causing founder) and reduced fertility for the next breeding season. • In rare cases, the mare delivers one or two live foals, but there are increased foaling problems and greater loss of life for the foals during the first two weeks. • Combined birth weight of twins equals the size of one normal single foal, and twins never catch up to normal weight and size because the entire surface area of the uterus is required to provide enough nutrition for one. • Even if two foals are born successfully, the mare struggles to produce enough milk for two. • Crushing one foetus allows the other one to develop normally. This is best to happen before day 25.

(b) Demonstrates understanding of ONE breeding management practice that has the greatest potential in terms of timing and economics of production.	**Early breeding** Advantages: • As near as possible to 1st August allows the birth of foals that will be more mature and therefore have a competitive advantage when they race. Disadvantages: • Costly interventions such as lights, covers, stabling, uv lights, and feeding and hormones. **Detection and elimination of twins** Advantages: • Elimination of twins prevents the mare going through part or all of a pregnancy that is unlikely to end up with a live birth, and if it does, the foal(s) will be sickly and small. Disadvantages: • Elimination of a second foal early on in pregnancy allows mares that conceive twins to breed again and again, hence perpetuating the genetic trait. **Timing** • Birth needs to take place as near to 1st August as possible to allow yearlings to be large / mature at the yearling sales 16 months hence. This will allow the yearling to fetch a higher price. **Economics** • With an average price of $13,000 and a top price of $700,000, it is easy to justify breeding interventions that can produce mature healthy yearlings.

N1	N2	A3	A4	M5	M6	E7	E8
Some writing but does not describe a breeding management practice.	Partial or insufficient description of how or why a breeding management practice is carried out.	Describes how or why ONE or partially describes how or why TWO breeding management practices are carried out.	Fully describes how or why TWO breeding management practices are carried out, with reference to quality and quantity of offspring.	Explains how or why ONE or partially explains how or why TWO of these breeding management practices affects quantity and quality of offspring.	Fully explains how or why TWO of these breeding management practices affect quantity and quality of the chosen livestock species.	Justifies the use of ONE breeding management practice by discussing how it improves the timing and economics of production. Comprehensive evidence in ONE aspect, with the other aspect supported.	Justifies the use of ONE breeding management practice by discussing how it improves the timing and economics of production. Comprehensive evidence in ONE aspect, with the other aspect well supported.

N0 = No response; no relevant evidence.

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Describes feed management practices at two different stages of development.	**Explains** feed management practices at two different stages of development.	**Justifies** the best choice of feed at a specific stage of development, relating the choice to quality and economics.

Question THREE	Evidence
(a) Demonstrates understanding of how two feed management practices aid livestock growth at two different stages of development.	*Possible evidence using pig feed management practice examples.* **Liveweight gain targets** • Weaning to 15 kg – 450 g/day • 15–40 kg – 600 g/day • 40–70 kg – 850 g/day • 70kg to slaughter (about 115 kg) – more than 1 kg/day **Stages and feed requirements** Piglets • Creep feeding at weaning prevents growth checks. • Start at day 12 – a sow's milk production starts declining at three weeks. • Cooked porridge, fishmeal and milk powder are good. • Can use a commercial pellet that should contain additives to improve digestion and gut integrity, e.g. organic acids, essential oils, probiotics and enzymes, 20–23% protein. Weaners • Weaning is stressful, so make dietary changes gradually. • Feed same diet as pre-weaning until about 9kg because this keeps growth checks to a minimum. • Change diet three times over weaner phase as the need for energy and protein gradually reduces, saving money. • 18–20% protein content. • Digestible energy (DE) requirement is typically about 16 megajoules (MJ) per kilogramme (kg) of dry matter, reducing to 14.8 MJ/kg. Growers • Grower pigs are capable of using higher digestible proteins, such as soya, combined with raw cereals, and have a feed conversion efficiency of less than 2:1. • DE requirement at this stage is about 14.2 MJ/kg. • 13–17% protein required – fishmeal can gradually be replaced by vegetable protein. • A typical grower ration includes wheat, barley and high protein soya, and may also include a small amount of rape meal.

	Finisher • Energy requirements at the beginning of this phase are around 13.8 MJ / kg, decreasing to 13.2 MJ / kg at finishing. • Typically include wheat, barley, wheat feed, high-protein soya, rape seed extract, and co-products of human food production such as bakery by-products, or even crisps. • 12% protein required. **Explanations** • The most rapid gain in weight as a percentage of current body weight happens soon after birth. The highest energy and protein requirements in the diet are early on and diminish through the growth stages. • Under feeding of both energy and protein at pre-puberty stage will result in permanent stunting.
(b) Demonstrates understanding of a specific stage of development and feed management practice in relation to quality and economics.	**Piglets** • Creep feeding allows piglets to move into an area that the sow cannot access and eat a balanced high-protein, high-energy feed. This will allow the piglets to grow faster than if just left to forage for themselves and / or compete with the sow. • High-quality (full range of essential amino acids) protein is necessary at the appropriate dietary percentage to allow for correct development of internal organs, and therefore, a large healthy pig. • Protein is expensive, so overfeeding causes unnecessary expense. • Commercially formulated feeds at this stage may be expensive but easily provide all necessary nutrients when not much feed is being taken in. **Weaners** • Weaning is a stressful time and the stress costs energy. Typically there is a post-weaning growth check. • This can be mitigated somewhat by feeding well during weaning, then making gradual changes in diet, post weaning. • Post-weaning growth checks affect economics in that they delay when porkers can go to slaughter, costing the farmer more. **Growers** • At this stage, savings can be made in feeding by using alternative sources of feed from commercially produced feed, so long as DE and protein percentage are maintained at required levels. • Underfeeding can produce permanent stunting, which affects the muscle:bone ratio and quality of the resultant carcass. **Finishers** • At this stage, further economies can be achieved by using a range of feed, including human food waste, as long as it has been boiled for one hour before hand if it has meat in it, or has been in contact with meat (a legal requirement in order to prevent foot and mouth disease). • Underfeeding energy at this stage will not cause permanent stunting but will delay readiness for slaughter, so can end up costing more.

N1	N2	A3	A4	M5	M6	E7	E8
Some writing but does not describe a feed management practice suitable for a stage of development.	Partially or insufficient description of a feed management practice suitable for one stage of development.	Describes a feed management practice suitable for ONE stage of development or partially describes a feed management practice for TWO stages of development.	Fully describes a feed management practice for TWO different stages of development.	Explains ONE or partially explains how two feed management practices affect livestock growth at TWO different stages of development.	Fully explains how TWO feed management practices affect livestock growth at TWO different stages of development	Justifies a choice of feed management practice at ONE stage of development, relating the choice to quality and economics. Comprehensive evidence in ONE aspect, with the other aspect well supported.	Justifies a choice of feed management practice at ONE stage of development, relating the choice to quality and economics. Comprehensive evidence in ONE aspect, with the other aspect well supported.

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