



National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Exemplar for Internal Achievement Standard Agricultural and Horticultural Science Level 2

This exemplar supports assessment against:

Achievement Standard 91295

**Demonstrate understanding of interactions between livestock behaviour
and N Z commercial management practices**

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Low Excellence
1.	<p>For Excellence, the student needs to demonstrate comprehensive understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves evaluating the interactions between livestock behaviour and management practices in commercial production in New Zealand. This evaluation involves comparing and contrasting or justifying the use of these management practices in response to livestock behaviours. Management practices refer to actions taken that impact on the quantity, quality, genetic potential, timing, and the economics of production.</p> <p>The student compares and contrasts the two management practices of splitting a larger herd into two smaller herds and the farmer herding the stock quietly (1), and also justifies their decision (2) using impact on the quantity (3), quality (4), and the economics of production (5). The student briefly justifies genetic potential and timing (6).</p> <p>For a more secure Excellence, the student could provide a more extensive comparison using genetic potential and timing.</p>

Student 1.

Livestock Behaviour.

Livestock behaviour greatly effects production on commercial dairy farms. This is mainly due to the stress levels of the cows as they are greatly affected by this. The two main management practices to improve the stress and behaviour of the stock: one splitting a large herd of 800 into smaller herds of 400, and two the farmer quietly herding the stock. Both these management practices greatly affect the cow's behaviour and stress levels.

The first management practice of splitting a larger herd of 800 down to two smaller herds of 400 has a great positive impact on how the cows behave and does lower their stress levels.

This is done by splitting a larger herd into two equal sized groups, some farmers tend to split the herd into skinny and fat mobs to control their conditions easily. But this way of splitting this doesn't tend to work for both mobs as the skinny mob would be mostly full of the submissive cows as this is why they are skinny as they have been eating less due to bullying. Therefore the fat mob would be full of cows higher up the hierachal social order, meaning these cows would still be very stressed as they would still be fighting and bullying each other as there is so many bossy cows in this herd, any submissive cow in this herd would be bullied more than in the big 800 herd as there are less submissive cows for the others to bully as well. So the farmer should try to split the herds up as equally as they can. For example the farmer could draft half of each row into separate herds as the bossy cows tend to get milked first as they go out to the pasture first so they are most always at the front [4].

This management practice impacts the cows both in the cow shed and paddock. This is due to less bullying and challenging amongst the herd in the paddock. This management practice reduces the cow's stress as when they are in the paddock the cows are more at rest and are not bullying the others as much for food, space and water, which can really stress the cows out if they are constantly moving around. In the larger herd of 800 the cows would be a lot more stressed out due to the constant bullying which can result in cows not producing a good quantity and quality of milk and not letting their milk down especially the younger cows which sometimes have trouble letting their milk down [3] already this is why some farmer use a hormone as a temporary fix for particular cows. This all results in a loss of profit for the farmer as there is less milk than there could be. Another loss of profit is the chance of cows slipping or not getting pregnant due to lack of condition or stress. As if a cow is too stressed the body will abort the pregnancy as the cow is not fit to have a calf [5, 6]. In the smaller herd of 400 the farmer can watch for symptoms of sickness, lameness, empty cows etc in the smaller herd easier than in the larger herd. This increased the profit of the farm as sick cows can be helped earlier therefore having a greater chance for a better recovery. Stressed cows also so tend to excrete more runny faeces which means that they are not digesting their food as well as they could be, which would result in lower condition rates (as well as the calf's condition if the cow is in calf) and less milk production [3, 4, 5].

Splitting the larger herd into smaller herds also helps the cows stress in the cow shed as they are not having to stand cramped in the yard for such a long period of time, which increases

their stress level as first of all they don't like being cramped in a confined space but second of all bullying does go on a lot in the yard and the longer they are in there the more irritated they get and the more bullying and shoving that goes on which not only effects the cow getting bullied but all the cows that is had to push past to get away. In the summer having too many cows in the yard is worse as they get really hot and bothered as most cowsheds don't have shade from the sun and are sheltered from the breeze. The cows are most irritated by flies all this make the cows a lot more stressed and irritated which results in a more stress full milking for both the farmer and cows. As the cows tend to urinate and excrete faeces more often than normal and they do tend to kick their cups off and rush the gate which can be a safety hazard for the farmer. This all results as loss of profit as less milk both in quantity and quality is supplied, as well as the possible cost of damage to equipment. There would be a lot of faeces and muck to hose out which takes longer wastes water, power and time as well as it may clog up the sand trap quicker which on most farms takes a lot of time and money. This could all be avoided by splitting the herd into two smaller herds and milking them separately this cuts time and amount of cows waiting in half in increases the profit and again makes it easier for the farmer to spot sickness lameness etc. The less time the cows spend in the shed results in higher milk production as the spend more relaxing producing milk in the paddock, which makes the cows overall more relaxed [3, 4, 5].

This management practice has been used as it has observed in the larger herds they tend to fight, be more stressed and produce lower milk production average per cow than cows in smaller herds this is why this management practice is so widely used and successful. This management practice considers the outcomes of the observed livestock behaviour of bullying and the hierarchal order amongst cows in larger smaller herds.

I consider the management practice of splitting a larger herd of 800 into two smaller herds of 400 to be most rewarding management practice of the two to both the livestock and their behaviour and the farms profits as these come hand in hand. I believe that splitting a larger herd into two smaller herds is more important for the herd's behaviour and stress levels than the farmer quietly herding the stock, as the cows spend every hour of the day in the herd and only a restricted amount of time with the farmer as well. However, I would recommend for a farmer to use both of these behavioural techniques. Since the cows are always in the herd it would be most important to reduce as much bullying and stress in the herd as possible. Splitting a larger herd into two smaller herds does just that, reduces a high amount of the cows stress. Since the farmer only interacts with the cows for such a limited time the stress he might cause is nowhere like it would be for the cows in a large herd compared with the cows being in two smaller herds. The farmer herding the stock quietly does not really improve the cows stress as they can have a calm milking and walk to milking but again, this is for only a short period of time compared to the time the cow spend with the herd [1]. So therefore I conclude that the management practice of splitting a larger herd of 800 into two smaller herds of 400 is more effective than the management practice of herding the cows quietly. This therefore means that the cows would be less stressful in the smaller herd resulting in many benefits such as higher immunity in the cows, higher milk production, better conditioned cows and therefore higher profit for the farm [2].

	Grade Boundary: High Merit
2.	<p>For Merit, the student needs to demonstrate in-depth understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves explaining the interactions between livestock behaviour and management practices in commercial production in New Zealand. This explanation involves how management practices take account of livestock behaviours, and how livestock respond to different management practices.</p> <p>The student explains how the management practices of splitting a larger herd into two smaller herds (1), and herding the stock quietly (2), take account of livestock behaviours (3), and how livestock respond to these different management practices (4).</p> <p>To reach Excellence, the student could either compare and contrast the two management practices or justify their decision on utilising one of the management practices using actions that impact on the quantity, quality, genetic potential, timing, and economics of production.</p>

Student 2. Mind your behaviour.

Management practice One. Reducing a large herd of 800 cows down to two smaller herds of 400 cows.

Introduction. The benefits of having two smaller herds is that they will be separated into two different paddocks to stop bullying and confusion in the social order. The benefit of milking at different times is that they won't be in the shed all day on their feet which can cause many types of foot injuries. The less time they have in the shed the more time they have in the paddock feeding which will express maximum milk product.

Explanation of the management practice. Reducing herd of 800 cows down to two herds of 400 cows is a lot more beneficial because it cuts back the amount of time they spend in the shed. Instead of them being in the shed the whole day they can go back to their paddock which is less stressful for the cows. It will increase the milk volume produced. A cow in a 800 cow herd will have more stress and less time feeding in the paddock which will result in less production [1].

Social position and herd size. When running herd of 800 cows it causes many problems, it upsets the eating, space and water of the cows. When you have two herds of 400 cows they can find their social position in the herd. There is a lot less interruptions for the cows as in a herd of 800 there is new entry's coming in and out for calving, works, new farms etc [3]. It helps the cows relax when in a smaller herd which means they are fully relaxed to eat and can express maximum milk [4].

Hierarchical social order and herd size. When running two herds of 400 cows it lets them find where they stand in the social order. It also stops the bullying that occurs when you have a big herd [4]. It minimises the challenges that other cows want to start. So it helps them to produce milk at their optimum level. When you have two smaller herds of 400 the cows know where they stand in the hierarchical order. When in a bigger herd there is too many other cows and they start to stress out a lot and they don't know where they stand in the order [3].

Summary of herd size. When running a small herd it reduces the time the cows have to stand on the concrete when milking which causes all sorts of foot problems and it allows them to go back to grazing. They don't have to compete for their food because they know where they stand in the social order. It cuts back the amount of stress levels the cow gets so they can express maximum milk. It increases the milk production of each cow in the herd. When you have smaller herds it lowers the chances of bullying. If the farmer doesn't pick up in a cow that is sick, lame or bullying it starts to make an impact on the other cows in the herd, and it is easier for a farmer to pick up and treat these things in two smaller herds.

Management practice two. The farmer herds the cows quietly from their paddock and walks them down the race to the milking shed.

Explanation of the management practice.

Farmers herd the cows quietly and peacefully from their paddock to the shed making sure to not rush or make the cows run. The farmer doesn't chase the cows with the motorbike or dogs, which causes a lot of stress on the cows when they are rushed into the shed [2].

The effect of quietly and calmly moving the herd. When quietly herding the cows it reduces the stress levels and helps the cows to relax. They don't push, shove and bunch when trying to get in to the shed [3]. Which means they're less stressed when they arrive at the milking shed [4] so they won't be defecating everywhere and will let down their milk calmly having a positive effect on total milk production.

The effect of quietly herding on animal behaviour. It helps a lot when you quietly herd the cows because they don't poo a great deal, when they are completely relaxed. When they are walking down the race they can see where they are putting their feet so it stops bunching and shoving [3]. It reduces the amount of water that is used in the shed when they are not quietly walked to the shed because they defecate more in the shed. When they are relaxed and stress free it allows them to let down all their milk for maximum production [4].

Summary of quietly herding cows. When quietly herding cows to the shed it reduces the stress on the cows. Cows that are rushed to the shed stress out and don't produce milk at their optimum level. When cows are quietly walking to the shed at their own pace are less likely to defecate in the yard. A calm cow will also produce and let down more milk than a stressed cow [4]. It benefits the farmer a lot it gives good productivity and profits overall.

Justification. I think that the management practice one reducing a large herd of 800 down to two herds of 400 is a lot more beneficial because it causes less stress and bullying on the cows. They are in the shed for a smaller period of time, which means they have more time in the paddock to feed which means more milk to produce. Where if they were in a herd of 800 cows it stresses the cows out because they get bullied for food, space and water etc. And also their social order gets mucked up. In a herd of 800 they are in the shed longer each day. Which means less feeding time they won't fully express maximum milk. Compared to two herds of 400 cows they are in the shed for less time each day which means more grazing time. It also minimises bullying. A herd of 400 know where they stand in the social order. A herd of 800 stresses the cows as there is too many other cows around. They don't have to fight for food, water, and space in a herd of 400. This management practice has a greater effect on the cows than quietly herding as it affects the cow 24 hours a day, 7 days a week. Where quietly herding cows only impacts the herd twice a day for around half an hour during the milking season.

	Grade Boundary: Low Merit
3.	<p>For Merit, the student needs to demonstrate in-depth understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves explaining the interactions between livestock behaviour and management practices in commercial production in New Zealand. This explanation involves how management practices take account of livestock behaviours, and how livestock respond to different management practices.</p> <p>The student explains how the management practices of splitting a larger herd into two smaller herds, and herding the stock quietly, take account of livestock behaviours (1) and briefly outlines how livestock respond to these different management practices (2).</p> <p>For a secure Merit, the student could provide a more detailed explanation of how the livestock have responded to the implementation of these different management practices.</p>

Student 3. Demonstrate understanding of interactions between livestock behaviour and New Zealand management practices.

Quietly Herding Stock.

Quietly herding stock is when the farmer walks the cows in a calm and quiet way. The farmer can do this by not rushing the cattle so no pushing or shoving occurs. The farmer can also ease of the cattle and give them room so no pressure is put on, also if the farmer has a dog he can make sure the dog doesn't run around the cattle and bark because this will apply stress. For the cows to produce milk at their highest possible level, they need to be kept calm, happy and not be engaging in conflict [2].

Two behavioural responses from livestock when they are herded quietly can be calm and stress free cow, that will have a nicer mannerism and let down more of her milk because she is less stressed [2]. This management practice considers livestock behaviour and uses knowledge of their behaviour to increase the farm commercial production because the farmer takes in to consideration how the cow will behave when she becomes stressed and knows that he will not get the highest possible level of milk production when his cows are stressed and feel uncomfortable in there milking shed [1].

If the cows are rushed to the shed or if too much pressure is applied in the yards it will cause the cows to wee and poo [1]. This is because the more stressed the cows are, the more bullying that will occur. Hierarchical behaviour also influences this alot because the cows behaviour in yards and in races is influenced by rank. Middle ranking diary cows lead the herd followed by high ranking and then low ranking animals. Low ranking animals may try to avoid dominating animals, if they are pushed and bunched this may occur an upset in the hierarchical order and will cause the cows to be upset and stressed [1]. This can also put pressure on the cows and will raise their stress levels. In this situation the cows can also become frightened, which will lead to less milk because the cow is not clam enough to let down her milk.

Reducing a large herd of 800 cows to two smaller herds of 400 cows.

Reducing a large herd of 800 cows to two mobs of 400 cows is carried out by the farmer. This is because when herds are large, cows can spend long periods waiting in yards to be milked. This can lead to problems such as footrot and bruising which will lead the cow to be stressed which will lower her milk production because she is unsettle and in pain. The other behavioural response to this management practice is bullying [1]. When cows are in smaller herds they sort out their social order faster, so when they eat they are not having to fight for food so they will not become stressed. If the bullying does not occur the cow will be able to consume the correct amount of food and water without having to fight for it [2].

This management practice considers livestock behaviour and uses knowledge of their behaviour to increase the farms commercial production. This is because in a smaller herd the farmer has greater chance to observe the cows behaviour and the farmer can easily see if a

cow is becoming lame or on heat. These behaviours can be dealt with earlier and milk production can return to normal as soon as possible. The farmer considers livestock behaviour because the cows in small herds have greater opportunities to express their behaviours, that the farmer will then also be able to recognise earlier. The farmer thinks about herd size because cows waiting in the yards for long periods of time, means that the cows are spending less time eating, which reduces milk production.

	Grade Boundary: High Achieved
4.	<p>For Achieved, the student needs to demonstrate understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves describing the interactions between livestock behaviour and management practices in commercial production in New Zealand. This description involves how management practices take account of livestock behaviours, and how livestock respond to different management practices.</p> <p>The student describes how two management practices, splitting a larger herd into two smaller herds, and herding the stock quietly, take account of two livestock behaviours (1), and how livestock respond to these different management practices (2).</p> <p>To reach Merit, the student could explain how management practices take account of two livestock behaviours, and how livestock respond to these different management practices.</p>

Student 4. Agricultural and Horticultural Science AS91295.

Management practice ONE:

The farmer herds the cows quietly from their paddock and walk them down the race.

This practice is a very simple technique used in farming that can have a drastic response on your herds performance if done properly. A way to do this is the farmer drives quietly down around the cows, alerting them but no frightening them, and walk them down the race. The farmer must ensure that they are not running but just slowly walking [1].

This will decreased the stress levels of the cows as they are not being pushed or being made to run. The cows will be able to sort themselves into a specific order that they walk in when on the move and they will have more space around them so they know where their feet are going [2].

With stress levels at a low, the farms production will increase. This is because when cows are calm they will happily do what the farmer tells them, this will lead to cows letting all of their milk out when in the cowshed effectively resulting in an increase in milk solids produced. If cows are pushed down the race their stress levels will more than likely increased which could increase the cell count, resulting in grades and loss of production.

The hierarchical behaviour in a herd is important. This is where the herd moves in a specific order with the middle ranking cows leading, the highest ranked cows in the middle and the lowest ranked cows at the back. If this is interrupted it could results in the cows becoming aggressive causing bunching and pushing of other cows which will cause their stress levels to rise [2]. It is important that this order is kept so the cows have enough space to move and see where their feet are going [1]. If the cow does not know where it is putting its feet, the cow could stand on some foreign object such as a sharp stone, resulting in a lame cow. This will cause the cow to decrease milk production as it is putting all of its energy into healing rather than producing milk.

Management practice TWO:

Reducing a large herd of 600 cows to two smaller herds of 300 cows.

This is a commonly used practice in larger herds which involves splitting a large herd of 600 cows to two smaller herds of 300 cows.

Each herd is milked at separate times of the day. This means the cows will spend less time in the yard on concrete and more time in the paddock eating pasture.

Having two smaller herds means that the herds will be milked at separate times which results in them spending less time in the yard and more time in the paddock digesting pasture. This will increase the amount of milk produced, increased the overall production of the farm and a healthier cow as well. Reducing the herd size will also benefit the social position of the cows

[1]. There will be less cows to sort through when the cows are sorting out their hierarchal order. This will ultimately result in the cows stress levels being decreased [2]. The other behavioural response to this management practice is bullying [1]. When cows are in smaller herds they sort out their social order faster, so when they eat they are not having to fight for food so they will not become stressed. If the bullying does not occur the cow will be able to consume the correct amount of food and water without having to fight for it [2].

	Grade Boundary: Low Achieved
5.	<p>For Achieved, the student needs to demonstrate understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves describing the interactions between livestock behaviour and management practices in commercial production in New Zealand. This description involves how management practices take account of livestock behaviours, and how livestock respond to different management practices.</p> <p>The student describes how two management practices, splitting a larger herd into two smaller herds, and herding the stock quietly, take account of two livestock behaviours (1), and how livestock respond to these different management practices (2).</p> <p>For a more secure Achieved, the student could provide a more detailed description of how livestock respond to these two different management practices.</p>

Student 5.

Livestock Behaviour.

The two management practices that I am going to look at to improve the stress of dairy cows are; splitting a large herd of 800 into smaller herds of 400, and the farmer quietly herding the stock.

Splitting a larger herd of 800 down to two smaller herds of 400:

In the larger herd of 800 the cows would be a lot more stressed due to the being bullied by other more dominant cows especially if they are constantly moving around, as they tend to fight and be more stressed. Smaller herds allow the cows to establish their social order a lot quicker than when in a large herd [1]. Reducing herd size considers the outcomes of the observed livestock behaviour of bullying and the hierarchal order amongst cows in larger herds. Being in a smaller herd, reduces the cow's stress as when they are in the paddock the cows are more at rest and are not being bullied by others as much for food, space and water. Splitting a larger herd into smaller herds also helps the cow to lower their stress levels in the cow shed due to not standing cramped up in the yard for long periods of time [2].

The farmer quietly herding the stock:

The livestock positively behave to this management practice both in the shed and in the race as they are walking, this is shown when the farmer herds them quietly they happily walk down the race slowly with room around them so they can see where they are walking and there is no bullying, pushing or shoving. This shows that the cows are happy and that this does not stress them out to walk like this. This management practice also allows the cows to maintain their social order, by allowing the cows that want to go first to go, usually the middle ranked, followed by the top ranked and then the lower ranked cows [1]. This management practice uses the knowledge that cows get stressed when they are rushed, nervous, gone in the wrong social order, or mistreated by the farmer. The cows greatly respond to this management practice in the milking shed as they are more relaxed if the farmer herds them quietly. The cows are more likely to stand there quietly and not fight or resist the farmer's orders. Cows that go in the correct social order are less stressed and more relaxed. This results in higher milk production as they have not been stressed or running so they are more likely to let their milk down [2].

If the farmer was yelling aggressively then the cows would get all up tight and not want to let their milk down when they get to the shed and they would be jumpy and nervous risking the safety of the farmer.

	Grade Boundary: High Not Achieved
6.	<p>For Achieved, the student needs to demonstrate understanding of interactions between livestock behaviour and management practices in commercial production in New Zealand.</p> <p>This involves describing the interactions between livestock behaviour and management practices in commercial production in New Zealand. This description involves how management practices take account of livestock behaviours, and how livestock respond to different management practices.</p> <p>The student describes how one management practice, splitting a larger herd into two smaller herds, takes account of one livestock behaviour (1) ,and how livestock respond to this different management practice (2).</p> <p>To reach Achieved, the student could describe another livestock behaviour and how the livestock respond to that management practice. The student also should describe how another management practice takes account of livestock behaviours and how livestock respond to this different management practice.</p>

Student 6. Mind Your Behaviour.**Explanation of the management practice:**

Reducing a large herd of 800 cows to two smaller herds of 400 gives the cows a lot more space because they would be in separate paddocks and don't interfere with other herds. Having to milk the herds of 400 at separate times reduces the time the cows spend in the shed or concrete yard, which gives the cows more time in the paddock feeding, increasing milk volume and increased profits for the farmers.

Social position and herd size.

Reducing a large herd of 800 cows to two smaller herds of 400 is better than having cows in one large herd and cows not being able to establish their social position in the herd. **Having two herds allows all the cows to find their social position in the herd** [1]. There are some interruptions from the arrival of cows that have calved or cows new to the farm and fewer opportunities to upset the social order. Having two herds of 400 cows allows cows to make clear their position in the hierarchal. For example, upon entering the milk shed the second most dominant cow go first with most dominant cow following.

Justification of herd size.

With the comfort of the cows in their chosen hierarchal social order stress levels drop and milk production is increased [2]. Smaller herd means less time in the milking shed and less time standing on the concrete yard which means they graze more therefore increased milk production. In a large herd is could cause heaps of confusion.