



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 91293

**Demonstrate understanding of livestock reproductive techniques in
commercial production in New Zealand**

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 livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves justifying the use of a selected reproductive technique in terms of timing, quantity, genetic potential, and the economics of production.</p> <p>The student justifies the use of the reproductive technique of Controlled Internal Drug Release (CIDR) and has linked it to the quantity (1), timing (2), genetic potential (3) and the economics of milk production (4).</p> <p>For a more secure Excellence, the student could provide more extensive justification, linked to genetic potential, quantity, timing and the economics of production, such as quantifying the increases in milk produced or the additional profit that is provided by using CIDRs.</p>

Why CIDR'S?

Student 1.

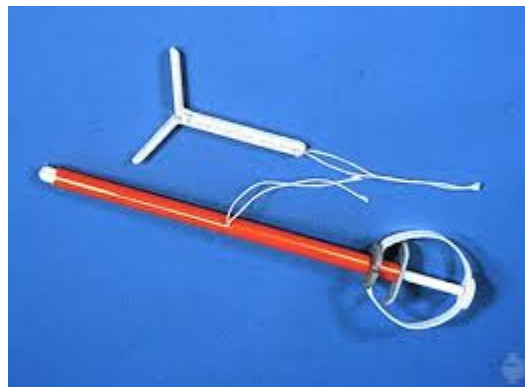
CIDR's greatly increase the number of stock getting pregnant each year as it increased the estrous produced and starts ovulation which increases the chance of pregnancy [1]. CIDR'S are also very useful for bringing stock to cycle at the same time so that a large number of cows will give birth around a set date. This means less late or early cows which is more efficient for the farmer [2] and ensures that the cow can be mated successfully improving breeding value [3]. CIDR'S are also good for financial returns as it means calving dates can be selected as earlier which means the farmer can have a longer milking season bringing more profit [4]. As the pros heavily out weight the cons, this makes CIDR'S a good option for dairy farmers than other reproductive practices. For example, CIDR'S are better than inducing as the calf is able to be kept and still have a relatively early calving date.

	Grade Boundary: High Merit
2.	<p>For Merit, the student needs to demonstrate in-depth understanding of livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves explaining how the steps taken when performing each reproductive technique influence the success of the reproductive technique. Reference to livestock reproductive systems and the hormonal control relevant to the technique is required.</p> <p>The student explains how one reproductive technique, Controlled Internal Drug Release (CIDR), successfully controls the oestrous cycle (1) to improve reproduction. References are made to the relevant hormones (2) and parts of the reproductive system involved (3).</p> <p>To reach Excellence, the student could justify the use of CIDRs in terms of quantity, timing, genetic potential and economics of production.</p>

Student 2.

The Hormones Involved

The CIDR temporarily puts the reproductive system on hold. It releases progesterone, which stops the cow making estrogen [2]. Once the CIDR is withdrawn the reproductive system goes back to normal. It starts to cycle again and the egg follicle is released from the ovaries into the horn, and down to the uterus [1, 3].



	Grade Boundary: Low Merit
3.	<p>For Merit, the student needs to demonstrate in-depth understanding of livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves explaining how the steps taken when performing each reproductive technique influence the success of the reproductive technique. Reference to livestock reproductive systems and the hormonal control relevant to the technique is required.</p> <p>The student briefly explains how one reproductive technique, embryo transfer, successfully improves reproduction (1). References are made to the relevant hormones (2) and the parts of the reproductive system involved (3).</p> <p>For a more secure Merit, the student could provide more detail in the explanations, linking each of the steps taken to the success of the technique.</p>

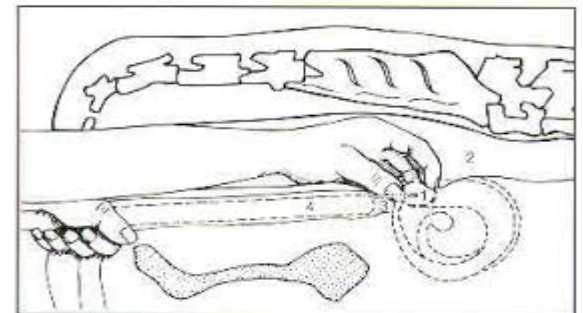
Student 3.

Embryo Transfers

Embryo transfer allows the best quality cows to have a greater influence on the genetic enhancement of the herd [1].

1. Choose a cow with great genetics to be the donor cow, and a cow to be the surrogate (the cows that will have calve, but not be genetically related to the calf).
2. Give the donor cow **FSH hormone, which will make the donor cow produce multiple eggs** [2].
3. All the cows involved are given **CIDRs to synchronise their reproductive cycles. A CIDR is inserted in the vagina of the cow and slowly releases the hormone progesterone, which puts the reproductive system on hold, by stopping the cow producing oestrogen** [2].

5. After a period of time, the CIDR is removed and two days later the reproductive cycle starts up again with the release of eggs.
6. The donor cow is then artificially inseminated, fertilisation takes place and embryos will form.
7. Through key hole surgery, the embryos are flushed out into the uterus of the cow and are sucked up by a syringe.
8. Because the reproductive cycles of all the cows are at the same point in time, the embryos can be implanted into the surrogate cows straight away.
9. The embryo is implanted into the surrogate cow with a catheter that is inserted through the vagina, cervix and released in the uterus [3].
10. Normal pregnancy then continues.



	Grade Boundary: High Achieved
4.	<p>For Achieved, the student needs to demonstrate understanding livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves describing the steps taken when performing each reproductive technique. Reference to the structure of livestock reproductive systems is required.</p> <p>The student provides a sequential description of most steps involved in the artificial insemination technique (1) and reference to livestock reproductive systems was made (2).</p> <p>To reach Merit, the student could include more detail linking the steps taken to the overall success of the technique and make references to hormonal control and livestock reproductive systems.</p>

Student 4.

Artificial Insemination

1. Make sure that the cow that is being artificial inseminated is in oestrus.
2. Keep the inseminating rod clean and dry and protect from contamination and cold temperatures.
3. Do not allow lubricating materials used on the rectum to come in contact with the vulva region. Lubes are generally spermicidal which may kill the sperm.
4. Insert one hand up the rectum and insert the other up the vagina with the inseminating device.
5. The hand up the rectum holds the cervix and guides the rod tip through the cervix [2].
6. When it is in line with the cervix, the semen is deposited into the cervix. Gently remove the inseminating rod [1].

	Grade Boundary: Low Achieved
5.	<p>For Achieved, the student needs to demonstrate understanding livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves describing the steps taken when performing each reproductive technique. Reference to the structure of livestock reproductive systems is required.</p> <p>The student begins to describe a broad perspective of how inter-uterine artificial insemination (AI) is performed on ewes (1). The relevant reproductive parts have been identified (2).</p> <p>For a more secure Achieved, the student could more clearly describe the steps taken, in the order they are taken, and by making reference to and expanding on what is happening using the image of an AI technician performing the technique.</p>



Student 5.

Laparoscopic AI

AI in sheep can be done laparoscopically because the ewe's cervix can not be penetrated by the insemination rod in normal AI because of the cross-pleating inside the cervix [2]. This has to be done by a trained vet and is not practical to do masses of ewes because it is a time consuming process.

1. The ewe has to be drugged and put in to a cradle with its head facing down.
2. The vet shaves the area and makes two small incisions where he can insert a laparoscope and a manipulating probe which he uses to put the semen directly in to the uterine horns [1].
3. CO₂ is put in to the stomach to hold the uterus open more so there is more room to move the tools around.

	Grade Boundary: High Not Achieved
6.	<p>For Achieved, the student needs to demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.</p> <p>This involves describing the steps taken when performing each reproductive technique. Reference to the structure of livestock reproductive systems is required.</p> <p>The student briefly describes basic knowledge of what flushing involves (1). Reference is made to short term increased nutrition (2).</p> <p>To reach Achieved, the student could provide more detailed and accurate descriptions of the steps involved in carrying out the flushing technique. For example, the student could provide details about the use of high quality feed sources such as leafy pasture and silage that are capable of promoting liveweight gain, and about the increased effectiveness of the technique when ewes are fed such feeds prior to and during mating.</p>

Student 6.

Flushing

What is flushing? - Flushing is a practice of increasing the intake or feeding of the ewe so she is gaining weight and is in prime condition about 2 weeks before mating. Flushing helps to increase the percentage of lambs by increasing the number of eggs that the ewes ovulate [1]. This technique works best on thin ewes but usually has no effect on ewes that are already in good condition. Flushing is also more effective on mature ewes rather than yearlings.

What are the benefits of flushing? - Flushing increases the amount of eggs being shed and causes the ewes to come into heat more promptly therefore giving higher lambing percentages. This technique works well because ovulation rate is increased due to the response of short term increased nutrition [2].