NCEA Review and Maintenance Programme – 2026 updates

Review and maintenance work has been undertaken for all three levels of NZC NCEA for 2026. This pdf document contains the updated assessment materials for **Agricultural and Horticultural Science Level 2**. In January 2026 the NCEA website will be updated with these changes for Level 1, and the pdf version will be removed as it will no longer be necessary. For Levels 2 and 3, assessment materials will be updated on TKI in January. For external assessment specifications, refer to the NZQA website.

Subject: Agricultural and Horticultural Science Level 2

Product	What's changed?
AS2.5 91293 Internal Assessment Activities	Updated to align with changes to the Achievement Standard.

Contents

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

Internal Assessment Resource
Agricultural and Horticultural Science Level 2

This resource supports assessment against:

Achievement Standard 91293 version 3

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

Resource title: Reproductive choices

4 credits

This resource:

- Clarifies the requirements of the standard
- Supports good assessment practice
- Should be subjected to the school's usual assessment quality assurance process
- Should be modified to make the context relevant to students in their school environment and ensure that submitted evidence is authentic

Date version published by Ministry of Education	October 2025 Version 3 To support internal assessment from 2026
Authenticity of evidence	Teachers must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material. Using this assessment resource without modification may mean that students' work is not authentic. The teacher may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform.

Internal Assessment Resource

Achievement Standard Agricultural and Horticultural Science 91293: Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand

Resource reference: Agricultural and Horticultural Science 2.5A v3

Resource title: Reproductive choices

Credits: 4

Teacher guidelines

The following guidelines are designed to ensure that teachers can carry out valid and consistent assessment using this internal assessment resource.

Teachers need to be very familiar with the outcome being assessed by the Achievement Standard Agricultural and Horticultural Science 91293. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students against it.

Context/setting

This assessment activity requires students to undertake research and then demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.

Students will develop A4-size fact sheets about three reproductive technologies that are commonly used by New Zealand dairy farmers. Then students will then use the factsheets as background material to write an article about the reproductive technologies used by dairy farmers.

The context for this activity is reproductive technologies used by dairy farmers. You could adapt this resource for other types of farming, for example, sheep or beef farming.

Conditions

This is an individual assessment activity. Students have two weeks of in and out-of-class time to complete it.

Writing the magazine article could be completed as an in-class task with the students working from their fact sheets and previous research. Adapt the time allowed to meet the outcome and need or opportunity you have selected. Schedule at least one progress checkpoint during this activity.

Resource requirements

Students will require Internet and library access for research. Interviews with appropriate farmers, technicians etc. would also be appropriate. They will also require access to desktop publishing software to produce their fact sheets and magazine article.

Additional information

None.

Internal Assessment Resource

Achievement Standard Agricultural and Horticultural Science 91293: Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand

Resource reference: Agricultural and Horticultural Science 2.5A v3

Resource title: Reproductive choices

Credits: 4

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.	Demonstrate in-depth understanding of livestock reproductive techniques in commercial production in New Zealand.	Demonstrate comprehensive understanding of livestock reproductive techniques in commercial production in New Zealand.

Student instructions

Introduction

You are to imagine that you are an agricultural science student being hosted by the local Young Farmers Club. You are interested in finding out about the range of reproductive technologies that New Zealand livestock farmers have available to them.

This assessment activity has two parts.

First you will develop A4-size fact sheets about THREE reproductive technologies that are commonly used by New Zealand dairy farmers. The purpose of the fact sheets is to provide information about reproduction technologies, for example, how the technology works and how it supports New Zealand farmers to operate their farms at peak reproductive performance.

> Teacher note: The context for this activity is reproductive technologies used by dairy farmers. Adapt this resource for other types of farming, for example, sheep or beef farming.

After you have gathered the appropriate information and developed your factsheets you will use the factsheets as background material for an article you are writing about the reproductive technologies used by dairy farmers.

This is an individual assessment activity. You have two weeks of in and out-of-class time to complete it.

Task

Fact sheets

There are a number of reproductive technologies used by dairy farmers to improve the performance of their farming operation, for example:

- artificial insemination (cervical and uterine)
- scanning
- artificial hormone application (for example, CIDR).

Research these technologies and develop fact sheets for each one.

Use the Internet, library, or interview local farmers to collect relevant and detailed information about three reproductive technologies. The information should include diagrams and:

- a description of the steps taken in the order in which they are performed, the equipment/materials used, and the reproductive structures involved when performing the technique
- an explanation of how the steps described are important to the overall success of the technique (this will typically involve reference to both the hormones involved and the physical components of the reproductive systems).

Once you have collected the relevant information, use it to write text for three fact sheets. The fact sheets should include pictures and/or diagrams, as well as informative text. Use publishing software to create your fact sheets.

Note: You will not be assessed on the layout and design of your fact sheets.

Magazine article

During your stay with the Young Farmers Club, you have decided to write an article for a local farming magazine. The subject of your article is the "justification of the use of reproductive technologies by dairy farmers". This is required for Excellence.

You begin by asking a farmer about the reproductive management of dairy farmers. He said the most common technologies are:

- artificial insemination using semen from selected bulls
- scanning to assess reproductive status
- using CIDRs to manipulate the timing and reliability of ovulation throughout the herd.

Use the fact sheets and your research notes as background material to write your magazine article. You may also need to undertake additional research for your article.

Teacher note: You may wish to add a recommended word length for the article.

In your article, you will need to justify the use of each technology on New Zealand dairy farms in terms of how each technology affects:

- the number of cows getting in calf each year
- the genetic potential of the offspring
- the effect on the timing of calving
- the economics of milk production from the farm.

Assessment schedule: Agricultural and Horticultural Science 91293 Reproductive choices

Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
The student's factsheets or magazine article demonstrate their understanding of two livestock reproductive technologies by describing: The steps/actions typically taken when carrying out the technology in the correct order including the equipment/materials used The reproductive structures involved/relevant to the technology. For example: *The CIDR is loaded into an applicator with its wings flattened, then inserted into the vagina with plastic removal tag exposed to the exterior of the cow. Insert CIDR into the vagina by depressing the plunger and remove applicator from the cow. By doing so the CIDR device will remain internal and the presence of the tag allows for easy removal of device.* *When carrying out artificial insemination (AI), the farmer needs to identify cows in oestrus and retain them in the dairy shed for the AI technician. The technician thaws only the amount of semen that is required. The pistulet is loaded with one semen straw. The cow's vulva is wiped clean and the pistulet is inserted into the cow's vagina and guided into the cervix by a gloved hand in the rectum. The hand in the rectum needs to be palpating the cervix, to ensure a smooth passage and also guide the pistulet tip into the right place, near the entrance to the uterus. The semen is then*	The student's factsheets or magazine article demonstrate their in-depth understanding of two livestock reproductive technologies by explaining: The steps/actions typically taken when carrying out the technology in the correct order and how each step can influence the ultimate success of the technology The hormones involved and their function and the physical components of the reproductive systems as appropriate. For example: *The CIDR is loaded into an applicator with its wings flattened, then inserted into the vagina with plastic removal tag exposed to the exterior of the cow. Insert CIDR into the vagina by depressing the plunger and remove applicator from the cow. By doing so the CIDR device will remain internal and the hormone progesterone that the CIDR contains is absorbed via the vaginal walls. The presence of the tag allows for easy removal of device.* *The CIDR controls the oestrous cycle – its removal produces a predictable response in that heat will occur within two to three days. The farmer can thus regulate heat to accommodate the desired mating programme (either natural or artificial) and predetermine calving dates.* *When carrying out artificial insemination (AI), the farmer needs to identify cows in oestrus and retain them in the dairy shed for the AI technician. The*	The student's factsheets and magazine article demonstrate their comprehensive understanding of two livestock reproductive technologies including: The steps/actions typically taken when carrying out the technology in the correct order and how each step can influence the ultimate success of the technology An explanation of how the steps described are important to the overall success when the technology is used and justifying its use in dairying through its impacts on herd fertility, timing of calving, genetic improvement, and the economics of milk production. For example: *The CIDR is loaded into an applicator with its wings flattened, then inserted into the vagina with plastic removal tag exposed to the exterior of the cow. Insert CIDR into the vagina by depressing the plunger and remove applicator from the cow. By doing so the CIDR device will remain internal and the hormone progesterone that the CIDR contains is absorbed via the vaginal walls. The presence of the tag allows for easy removal of device.* *The CIDR controls the oestrous cycle – its removal produces a predictable response in that heat will occur within two to three days. The farmer can thus regulate heat to accommodate the desired mating programme (either natural or artificial) and predetermine calving dates.* *Therefore the farmer can arrange a condensed calving period to coincide with the beginning of*

deposited slowly. The pistulet is withdrawn slowly out and the hand removed from the rectum.	*technician thaws only the amount of semen that is required. The pistulet is loaded with one semen straw. The cow's vulva is wiped clean and the pistulet is inserted into the cow's vagina and guided into the cervix by a gloved hand in the rectum. The hand in the rectum needs to be palpating the cervix, to ensure a smooth passage and also guide the pistulet tip into the right place, near the entrance to the uterus. The semen is then deposited slowly. The pistulet is withdrawn slowly out and the hand removed from the rectum. It is essential that semen is deposited as close to the opening of the uterus as possible, in order that a high number of sperm pass through the convoluted cervix into the uterus to fertilise the eggs present in the oviducts.*	*peak spring pasture-growth, and thereby maximise cows' milk production. It is also used to help bring 'non cycling' cows (those that are not ovulating and having 'heats') into oestrus, thereby allowing them to be successfully mated – either naturally or via artificial insemination using semen from bulls with improved genetic potential/greater breeding value.* *The overall value of the use of this technology to the farmer is significant. The productivity of the herd in terms of total milk yield is higher due to the fact that more cows are producing milk for more days within the milking season. The use of CIDR's is a relatively low-cost exercise involving minimal outlay for a substantial return. While the animals need to be in reasonable condition in order for the CIDR to have a high likelihood of being successful, this can be managed. The alternative for an increasingly late mating/late calving/late milking cow is to 'hold' her over for a year as a non milking cow to allow it to be mated 'on time' the following year (involving considerable expense if grazed off the farm or waste of valuable feed if grazed on farm), or to cull the animal – thereby losing a valuable animal and potential genetics for the future of the herd.* *AI is a process that maximises the number of progeny from parents with high genetic merit within a given time frame. This means that AI allows for the use of genetically superior bulls over a large number of cows. Thus, more offspring possess the desirable genes present in the bull. These genes will relate to productive features, such as fertility or milk quantity, that have a positive economic implication.* *By using AI, the farmer can arrange a condensed calving period to coincide with the beginning of peak spring pasture-growth, and thereby maximise*

		cows' milk production. The overall value of the use of this technology to the farmer is significant. The productivity of the herd in terms of total milk yield is higher due to the fact that more cows are producing milk for more days within the milking season.

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.

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Internal Assessment Resource
Agricultural and Horticultural Science Level 2

This resource supports assessment against:

Achievement Standard 91293 version 3

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

Resource title: The birds and the bees

4 credits

This resource:

- Clarifies the requirements of the standard
- Supports good assessment practice
- Should be subjected to the school's usual assessment quality assurance process
- Should be modified to make the context relevant to students in their school environment and ensure that submitted evidence is authentic

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Internal Assessment Resource

Achievement Standard Agricultural and Horticultural Science 91293: Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.

Resource reference: Agricultural and Horticultural Science 2.5B v3

Resource title: The birds and the bees

Credits: 4

Teacher guidelines

The following guidelines are designed to ensure that teachers can carry out valid and consistent assessment using this internal assessment resource.

Teachers need to be very familiar with the outcome being assessed by the Achievement Standard Agricultural and Horticultural Science 91293. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students against it.

Context/setting

In this assessment activity, students will demonstrate an understanding of reproductive technologies commonly used by New Zealand farmers. They will also select and justify the use of two of the technologies for a given situation.

New Zealand farmers have a range of reproductive technologies available to them to improve the reproductive performance of their farming operation.

This assessment activity is made up of two parts.

First students will research three examples of reproductive technologies used by New Zealand sheep farmers.

Then students will choose two reproductive technologies that they believe are the most significant for a sheep farmer and justify their use in terms of timing, quantity and genetic potential, and the economics of production.

You could adapt this activity for other contexts, for example, dairy farming.

Students will present their findings as an oral presentation to the class. This activity can be adapted for other presentation mediums, for example, a slideshow, a report, or a radio item.

Conditions

This is an individual assessment activity. Students have two weeks of in-class and homework time to complete it.

Writing notes for the oral presentation could be completed as an in-class task with the student working from their answers and previous research. Adapt the time allowed to meet the outcome and the need or opportunity you have selected.

Schedule at least one progress checkpoint during this activity.

Resource requirements

Students will require Internet and library access for research.

Additional information

None.

Internal Assessment Resource

Achievement Standard Agricultural and Horticultural Science 91293: Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.

Resource reference: Agricultural and Horticultural Science 2.5B v3

Resource title: The birds and the bees

Credits: 4

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of livestock reproductive techniques in commercial production in New Zealand.	Demonstrate in-depth understanding of livestock reproductive techniques in commercial production in New Zealand.	Demonstrate comprehensive understanding of livestock reproductive techniques in commercial production in New Zealand.

Student instructions

Introduction

New Zealand sheep farmers have a range of reproductive technologies available to them to improve the reproductive performance of their farming operation. This assessment activity requires you to demonstrate an understanding of reproductive technologies commonly used by New Zealand sheep farmers.

This assessment activity is made up of two parts.

You will research three reproductive technologies that have been designed to improve reproductive performance on New Zealand sheep farms.

Then you will choose the two reproductive technologies that are the most significant for a sheep farmer. You will explain and justify your choices in terms of timing, quantity and genetic potential, and the economics of production.

> Teacher note: The context for the task is a sheep farm. Adapt this activity to meet the needs of your students.

This is an individual assessment activity. You have two weeks of in and out-of-class time to complete it.

Task

1) Research and reporting

There are a number of reproductive technologies used by farmers to improve the reproductive performance of their farming operation, for example:

- artificial insemination (uterine)
- sire recording and selection
- scanning/pregnancy testing
- flushing
- embryo transfer
- artificial hormone application (for example, CIDR, synchronising drugs).

Teacher note: Adapt this list to suit the context chosen.

Choose THREE of the technologies listed above and explain in a written format how a sheep farmer would use each technology to improve the reproductive performance and hence the profitability of their farm.

Teacher note: Adapt this activity to meet the needs of your students, for example, focus on farms in the local community, for example, dairy, beef, sheep, or deer farms.

Include the following in your answer:

- A description of the steps taken when performing each technology, the order in which they are done, equipment/materials used and the reproductive structures involved. Use annotated diagrams to support your answer.
- Explain how the steps taken influence the success of each reproductive technology. Consider the hormones involved and the physical components of the reproductive technologies.

2) Oral presentation

You are a farm advisor and you have been asked by a local sheep farmer to review the technologies on their farm. As part of the review, you will need to recommend two reproductive technologies and justify your recommendation during an oral presentation to your class.

Teacher note: Adapt this activity to meet the needs of your students, for example, focus on farms in the local community, for example, dairy, beef, sheep, or deer farms. Teacher should provide details of the sheep farmer's property so that the recommended technologies can be evaluated. For example, a hill country property in an above average rainfall area prone to snow.

Choose the TWO reproductive technologies that you consider to be the most significant in terms of the economics of production for a sheep farmer.

In your oral presentation:

Justify the two recommended reproductive technologies on the basis of their significance to the economics of production on the sheep farm described. Consider:

- the number of female stock getting pregnant each year
- the genetic potential of the offspring
- the effect on the time the ewes give birth.

Teacher note: Adapt the Student instructions sheet as required.

Assessment schedule: Agricultural and Horticultural Science 91293 The birds and the bees

Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
The student demonstrates understanding by describing two reproductive technologies in terms of: the steps/actions typically taken when carrying out the technique in the correct order the reproductive structures involved/relevant to the technique. *For example:* *In a sheep flock: The use of sire recording and selection.* *This involves the farmer having all breeding stock tagged and recorded and the basis of selection (e.g. lambing %, rearing twins, wool weight clipped, etc) established. Rams are selected on the basis of the targeted attribute as are the ewes being mated and when the lambs are born, they are tagged and recorded. Lower-producing breeding stock are culled over subsequent seasons and higher-producing animals are retained as the next year's breeding stock.* *In a sheep flock: The use of flushing.* *Flushing involves feeding ewes extra high-quality feed three weeks prior to, and three weeks during, the mating process. Flushing may take place over a reduced timeframe, depending on feed availability. Flushing ewes with high quality feed prior to and during mating results in an increase in liveweight that is associated with a higher ovulation rate.*	The student demonstrates an in-depth understanding by explaining two reproductive technologies in terms of: the steps/actions typically taken when carrying out the technique in the correct order and how each step can influence the ultimate success of the technique Reference is made to the hormones involved, their function, and the physical components of the reproductive structures as appropriate. *For example:* *In a sheep flock: The use of sire recording and selection.* *This involves the farmer having all breeding stock tagged and recorded and the basis of selection (e.g. lambing %, rearing twins, wool weight clipped, etc) established. Rams are selected on the basis of the targeted attribute as are the ewes being mated and when the lambs are born, they are tagged and recorded. Lower-producing breeding stock are culled over subsequent seasons and higher-producing animals are retained as the next year's breeding stock.* *The importance of accurate tagging and recording is vital in terms of the success of any selection programme as it depends on the accurate identification of high and low producing animals. Also important is selecting on the basis of a characteristic that is clearly identifiable and can be measured. Without these aspects, genetic and productive improvement will be difficult.*	The student demonstrates comprehensive understanding by justifying the use of the two recommended technologies based on their ability to improve the economics of production through their impact on number of live births, timing of production and genetic potential. *For example:* *In a sheep flock: The use of sire recording and selection.* *This involves the farmer having all breeding stock tagged and recorded and the basis of selection (e.g. lambing %, rearing twins, wool weight clipped, etc) established. Rams are selected on the basis of the targeted attribute as are the ewes being mated and when the lambs are born, they are tagged and recorded. Lower-producing breeding stock are culled over subsequent seasons and higher-producing animals are retained as the next year's breeding stock.* *The importance of accurate tagging and recording is vital in terms of the success of any selection programme as it depends on the accurate identification of high and low producing animals. Also important is selecting on the basis of a characteristic that is clearly identifiable and can be measured. Without these aspects, genetic and productive improvement will be difficult.* *As a result of this process, the genetic potential of the flock increases as time goes on and this also is reflected in the productivity of the whole flock. A 10% increase in the number of lambs sent to the*

	In a sheep flock: The use of flushing. *Flushing involves feeding ewes extra high-quality feed three weeks prior to, and three weeks during, the mating process. Flushing may take place over a reduced timeframe, depending on feed availability. Flushing ewes with high quality feed prior to and during mating results in an increase in liveweight that is associated with a higher ovulation rate.* *The increase in nutrition supplied to ewes during the period prior to and during mating, and the significant resulting increase in liveweight, causes an increase in ovulation rate. Provided that an efficient mating programme is in place (viz. fertile rams and appropriate ram : ewe ratios) then higher ovulation rates will result in a higher lambing percentage. (A 4 kg increase in ewe liveweight is reflected in a 6% increase in lambing.)*	*works on a farm running 4000 ewes could represent a $30,000 increase in financial returns.* *In a sheep flock: The use of flushing.* *Flushing involves feeding ewes extra high-quality feed three weeks prior to, and three weeks during, the mating process. Flushing may take place over a reduced timeframe, depending on feed availability. Flushing ewes with high quality feed prior to and during mating results in an increase in liveweight that is associated with a higher ovulation rate.* *The increase in nutrition supplied to ewes during the period prior to and during mating, and the significant resulting increase in liveweight, causes an increase in ovulation rate. Provided that an efficient mating programme is in place (viz. fertile rams and appropriate ram : ewe ratios) then higher ovulation rates will result in a higher lambing percentage. (A 4 kg increase in ewe liveweight is reflected in a 6% increase in lambing.)* *Flushing impacts on the ovulation rate, which sets the upper limit on the number of lambs that could be born and sold, and therefore has a very significant financial implication.* *Flushing produces more multiple ovulations, resulting in a higher number of eggs fertilised and potential for more live lambs, which increases the financial returns from lamb sales.* *Flushing is a relatively low-cost technique that is very dependent on late summer rainfall or irrigation to produce the potential benefits it is capable of. Flushing can be relied upon to produce its impact, provided that growth occurs and that some straightforward feeding choices are made.* *Flushing can maximise the number of progeny from parents with high genetic merit within a given time frame, such as the use of genetically superior rams over a large number of ewes. Thus, more offspring*

		possess the desirable genes present in the ram. These genes will relate to productive features, such as fertility that have a positive economic implication.

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.