

Sustainable Dairy: Caring for Animals on Dairy Farms

An educational
resource for

**Years
7–8**

Discover Aussie Dairy

Learning Areas and Australian Curriculum Content



Design and Technologies

Analyse how people in design and technologies occupations consider ethical and sustainability factors to design and produce products, services and environments. (AC9TDE8K01).

Analyse the impact of innovation and the development of technologies on designed solutions for global preferred futures. (AC9TDE8K02).

Analyse how food and fibre are produced in managed environments and how these can become sustainable. (AC9TDE8K04).

Analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions. (AC9TDE8K06).

Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions. (AC9TDE8P01).

Lesson Objective

In this lesson, students will be introduced to various processes involved in milk production on Australian dairy farms. They will examine and apply the Five Domains of Animal Welfare to dairy processes, identifying ways that dairy farmers ensure the health and well-being of their herds. Students will be challenged to think creatively to design solutions aimed at supporting high standards of animal care within the dairy industry.

Lesson Overview

Activity 1 – Introduction to Dairy Processes (30 mins)

Activity 2 – Animal Welfare on Dairy Farms (30 mins)

Activity 3 – Creative Challenge (60 mins)

Contents

- Australian Curriculum Content | Page 2 – 3
- Resources and Equipment | Page 4
- Lesson Guide | Pages 5 – 7
- Answers | Page 8 – 9
- References | Page 10
- Student Activities | Pages 11 – 19



Teacher
guide

ATTRIBUTION, CREDIT & SHARING



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Resources and Equipment



Teacher
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Activity 1 – Introduction to Dairy Processes

- 1 Digital devices
- 2 Worksheet 1a – Glossary: Important Dairy Vocabulary
- 3 [How Cows Make Milk](#) (1:32)
- 4 [When Do Cows Make Milk](#) (1:08)
- 5 [Milking Time on the Farm](#) (1:41)
- 6 Worksheet 1b – Introduction to Dairy Processes

Activity 2 – Animal Welfare on Dairy Farms

- 1 Digital devices
- 2 Worksheet 2a – Five Domains of Animal Welfare: Family Pets
- 3 Worksheet 2b – Five Domains of Animal Welfare: Dairy Cows

Activity 3 – Creative Challenge

- 1 Worksheet 3a – Creative Challenge

Additional resources

[How Dairy Farmers Care for Their Cows](#) (2:14)

Lesson Guide



Teacher
guide

Activity 1 – Introduction to Dairy Processes

Students will be introduced to various processes involved in the production of dairy in Australia. They will be exposed to key industry vocabulary and will develop a basic understanding of dairy cow anatomy and behaviour. Students will examine a range of farming practices used to produce the milk we consume.

a Facilitate a class discussion about the Australian dairy industry, highlighting its importance as the third-largest rural industry in Australia (Department of Agriculture, Fisheries, and Forestry, 2022). Use the following questions to generate a discussion and gauge students' prior knowledge and understanding of the dairy industry (Answers page 8):

- Do all cows produce milk?
- Are there particular breeds of cows best suited to dairy production?
- Which food products are produced by the dairy industry?
- Which areas of Australia are best suited to dairy production? Why?

b Distribute a copy of **Worksheet 1a – Glossary: Important Dairy Vocabulary** to each student. Students are exposed to important vocabulary relevant to dairy production and are required to match these terms with their correct definition. Students may need to access a digital device to undertake research for the completion of this task.

c View three short introductory videos either individually or as a class.

- [How Cows Make Milk](#) (1:32)
- [When Do Cows Make Milk](#) (1:08)
- [Milking Time on the Farm](#) (1:41)

d Distribute **Worksheet 1b – Introduction to Dairy Processes** and ask students to record key points from each video. After viewing, students complete the multiple choice quiz to assess their understanding of the video content (Answers page 9).

Lesson Guide



Teacher
guide

Activity 2 – Animal Welfare on Dairy Farms

Students will be introduced to the Five Domains of Animal Welfare as a standard for optimal animal health and well-being. They will apply the framework to a personal context (caring for family pets), before examining the domains in the context of the dairy industry. Students will examine various ways Australian farmers ensure the specific welfare needs of dairy cows are addressed and maintained.

- a Facilitate a class discussion about the meaning of the term 'animal welfare' (the quality of the life experienced by an animal), with particular reference to the importance of ensuring animal welfare standards and practices are employed on dairy farms. Explain that it is vital for dairy farmers to ensure their herd is healthy, safe, and comfortable in their surroundings, both for ethical reasons and also for quality milk production.
- b Introduce the Five Domains of Animal Welfare as a means of evaluating the welfare of an animal, or group of animals. These domains, first developed in 1994 by Professor David Mellor and Dr Cam Reid, are an internationally recognised standard for optimal animal health and well-being.
 - 1 **Nutrition** – Does the animal have access to sufficient, balanced, varied, and clean food and water?
 - 2 **Environment** – Are factors that enable the comfort of the animal being addressed? Comfort may be impacted by temperature, space, air, odour, noise, and predictability.
 - 3 **Health** – Are factors that enable good health being addressed? This may refer to the absence of disease, injury, and impairment. It also includes the maintenance of good fitness levels.
 - 4 **Behaviour** – Are varied, novel, and engaging environmental challenges being provided? This may include opportunities for exploration, foraging, retreating, and companionship.
 - 5 **Mental state** – Is exposure to negative states such as boredom, fear, frustration, hunger, and pain being reduced? An animal's mental state is determined by addressing their nutritional, environmental, health, and behavioural needs.
- c In order to contextualise this model, ask students to consider how the Five Domains of Animal Welfare are applied in the context of a family pet. Distribute **Worksheet 2a – Five Domains of Animal Welfare: Family Pets**. Students respond to the questions provided, prompting them to consider the various ways that nutrition, environment, health, behaviour, and mental state are addressed by pet owners when caring for their pets (Answers page 9).
- d Individually or as a class, view the video [How Dairy Farmers Care for Their Cows](#) (2:14) and discuss how these five domains of animal welfare relate to dairy cows.
- e Distribute **Worksheet 2b – Five Domains of Animal Welfare: Dairy Cows** and rewatch [How Dairy Farmers Care for Their Cows](#) (2:14), pausing where necessary to allow students to record the various ways that dairy farmers address the Five Domains of Animal Welfare to ensure the health and well-being needs of the dairy cows on their farms are being met (Answers page 9).

Lesson Guide



Activity 3 - Creative Challenge

Students will consider current production methods on Australian dairy farms and identify potential aspects of the industry that could be modified to support animal welfare priorities. They will work in small groups to create design solutions that aim to support and/or improve the welfare of dairy cows.

- a** Based on learnings and discussions from Activity 2, ask students to consider aspects of the dairy industry they believe would benefit from new animal welfare design solutions. Examples may include:
- Milking system design
 - Cow track and yard design
 - Safe and comfortable transportation
 - Protection for cows from the heat/sun
 - Hygiene management.

Facilitate an ideas sharing session, recording student responses and suggestions.

- b** Allocate students into small groups and distribute **Worksheet 3a - Creative Challenge** to each group. Allow time for students to brainstorm ideas, choose a design solution, and conduct research into relevant current industry practices.

- c** Having completed this research, students consider potential improvements that could be made within this area to support animal welfare. They collaborate to design a solution that aligns with the Five Domains of Animal Welfare.

Design briefs should include:

- A concise description of the solution, outlining the design and how it aims to support or improve the welfare of dairy cows
- An overview of how the design solution addresses the Five Domains of Animal Welfare
- Annotated sketches of the proposed solution, identifying the resources required.

- d** Allocate time for students to present their designs to the class.

Answers



Answer

Activity 1 – Introduction to Dairy Processes

- **Do all cows produce milk?**

All cows produce milk once they deliver a calf. Not all cows are used for dairy production, however. Some breeds are better suited to beef production.

- **Are there particular breeds of cows best suited to dairy production?**

Yes. In Australia, there are seven different breeds of dairy cows. They are Holstein, Jersey, Aussie Red, Brown Swiss, Guernsey, Illawarra, and Ayrshire.

- **Which food products are produced by the dairy industry?**

Milk, cheese, butter, cream, custard, ice cream, yoghurt.

- **Which areas of Australia are best suited to dairy production? Why?**

The majority of dairy production occurs on the south-east seaboard in Victoria, New South Wales, and Tasmania. The lush pastures needed for dairy cows grow well in these high-rainfall areas. Note a very small number of Australian dairy cows are kept in freestall barns and fed total mixed rations (TMRs), grain and hay.

Worksheet 1a – Glossary: Important Dairy Vocabulary

Holstein – The most popular breed of dairy cow in Australia, making up nearly 1.4 million of Australia's 1.65 million dairy cows. They are mainly black and white and can produce 10,000 litres of milk in a year.

Ruminant – An even-toed, hooved mammal that has more than one stomach compartment. They are herbivorous, grazing animals that can bring up food from their stomach and chew it again, sometimes referred to as 'chewing the cud'.

Jersey – The second most common breed of dairy cow in Australia. They are the smallest of all dairy cows and produce particularly creamy milk, making it ideal for making butter.

Udder – The mammary gland of a female dairy animal. It is the part of the body that produces milk and hangs under the body, between the animal's hind legs. The four teats are squeezed to release milk.

Milking – The act of drawing milk from a cow (or other animal). This can be done by hand or mechanically. On a dairy farm, it generally occurs twice each day in specialised buildings called milking sheds.

Calcium – A mineral needed by our bodies to carry out many important functions. It is particularly important for building and maintaining strong, healthy bones and teeth. Dairy products are one of the best sources of this mineral.

Pasteurisation – A sterilisation process that milk goes through once it has been taken to the processing plant. It is designed to kill any harmful bacteria in order to ensure it is safe for consumption.

Tanker – A hygienic, insulated truck with a large tank. It collects the milk from farms and takes it to the closest milk processing plant.

Homogenisation – The process of forcing milk through very fine nozzles to evenly distribute the fat globules throughout the milk so that the fat or cream doesn't float to the surface. This gives milk a smooth, consistent, creamy texture.

Heifer – The name given to young female cattle. They are the 'teenagers' of the herd and haven't had a calf or have had one calf only. Feeding and nutrition play a critical role in the development of cattle during this stage.

Answers



Answer

Worksheet 1b – Introduction to Dairy Processes

- 1 d) All of the above
- 2 a) True
- 3 b) Twice a day
- 4 c) 25–40 litres
- 5 b) 4 degrees Celsius
- 6 A rotary allows the cows to easily, efficiently, and calmly move through the milking shed with minimal handling.
- 7 The milk is sucked out in gentle pulses.

Activity 2 – Animal Welfare on Dairy Farms

Worksheet 2a – Five Domains of Animal Welfare: Family Pets

Student answers may vary. Suggested answers include:

Nutrition – Daily provision of food specifically designed for the pet’s nutritional needs (e.g. dog food); provision of clean water.

Environment – Provision of appropriate bedding area; provision of shade in summer; ensuring bedding/living space is regularly cleaned.

Health – Opportunities for exercise are provided (e.g. daily walks); provision of vaccinations and medications when required; veterinary treatment provided for injury or illness.

Behaviour – Opportunities for safe exploration are provided (e.g. roaming in backyards); quiet spaces for pets to retreat are provided; regular interactions with people/other pets are provided.

Mental state – Mental state is addressed by ensuring the nutritional, environmental, health, and behavioural needs of the pets are being met.

Worksheet 2b – Five Domains of Animal Welfare: Dairy Cows

Nutrition – Daily provision of food specifically designed for the cow’s nutritional needs; cows able to feed on grazing pastures; provision of large amounts of clean, fresh water.

Environment – Ensuring shade and shelter are available in paddocks; ensuring a clean, hygienic environment is maintained in milking sheds; cows teats washed before and after milking.

Health – Detailed records kept on each cow (identified by ID tags); provision of regular health checks and preventative treatments by veterinarians (e.g. drenching to prevent worms, vaccinations against diseases); post-calving inspections to check for complete recovery from giving birth; twice-daily health observations during milking.

Behaviour – Predictable, calm handling procedures implemented during milking; opportunities for exploration and foraging provided in paddocks; companionship with other cows provided while grazing.

Mental state – Mental state is addressed by ensuring the nutritional, environmental, health, and behavioural needs of the cows are being met.

Activity 3 – Creative Challenge

Worksheet 3a – Creative Challenge

Student responses will vary depending on chosen designs.

References

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