YEARS
7–8

RESPONSIBLE PRODUCTION
IN THE DAIRY INDUSTRY
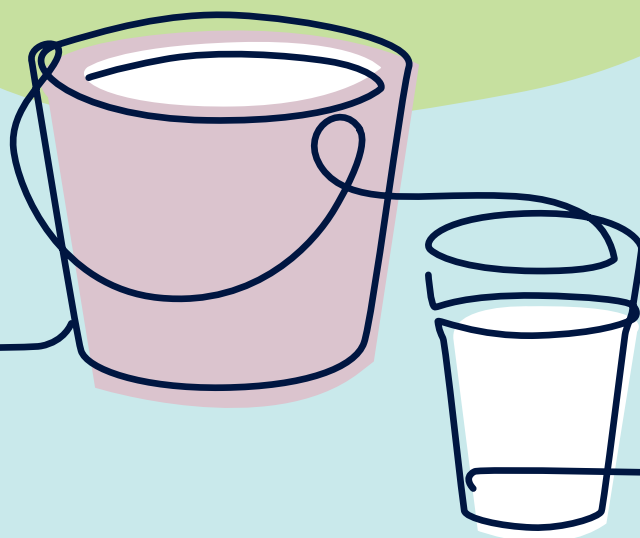
AN EDUCATIONAL
RESOURCE FOR
YEARS 7–8

ACKNOWLEDGEMENTS

While reasonable efforts have been made to ensure that the contents of this educational resource are factually correct, Dairy Australia does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this educational resource.

All links to websites were accessed in June 2019. As content on the websites used in this resource book is updated or moved, hyperlinks may not always function.

CONTENTS

INTRODUCTION

This resource contains a unit of work in Technologies in Design and Technologies for the food and fibre production content of the Australian Curriculum.

The resource material aims to help teachers and students in secondary schools understand how managed environments and systems are used in the dairy industry to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Students learn about the dairy industry, milk production and the range of sustainable practices the industry and supply chain have embraced.

They develop knowledge and understanding about all the things the dairy industry does to raise cows and calves, produce, process and deliver milk, and manage the environment sustainably through researching the industry's practices and understanding how research has identified that the consumer cares more about sustainability now than ever before.

Using design and production skills, students design a solution for consumers and the industry by creating an educational product that can educate them about how the Australian dairy industry has embraced sustainable practices on the farm, in processing, packaging and delivery of dairy products to customers.

Aim

This resource book provides schools with opportunities to:

- Develop understandings about the Australian dairy industry, milk production and the range of sustainable practices the industry and supply chain have embraced;

- Define the managed environments and systems that are used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably;

- Discover ideas and solutions that can tackle the industry's sustainability challenges;

- Discover and envision creative solutions to real-world problems;

- Dream and consider the many possible solutions to deal with challenges;

- Design the steps required to create solutions for the tasks they are set;

- Deliver and debrief solutions;

- Use project based learning (PBL) approaches to investigate and respond to a challenge, task or project, and;

- Apply thinking skills and develop an appreciation of the processes they can apply as they encounter problems, unfamiliar information and new ideas.

EDUCATIONAL APPROACH

The Project Based Learning (PBL) learning sequence used in this book is underpinned by the work of Lee Watanabe-Crockett.

PBL uses the *solution fluency* through six phases: Define, Discover, Dream, Design, Deliver and Debrief. The phases of the model are based on the 21st Century Fluencies created by Crockett et al. (2011).

The Essential Fluencies are outlined extensively in the book *'Mindful Assessment'* (Crockett, L. & Churches, A. (2016) *Mindful Assessment* published by Solution Tree. See also 'Solution Fluency', Global Digital Citizen Foundation website.

40% OF DAIRY FARMERS HAVE RENEWABLE ENERGY SYSTEMS SUCH AS SOLAR PANELS AND SOLAR HOT WATER.
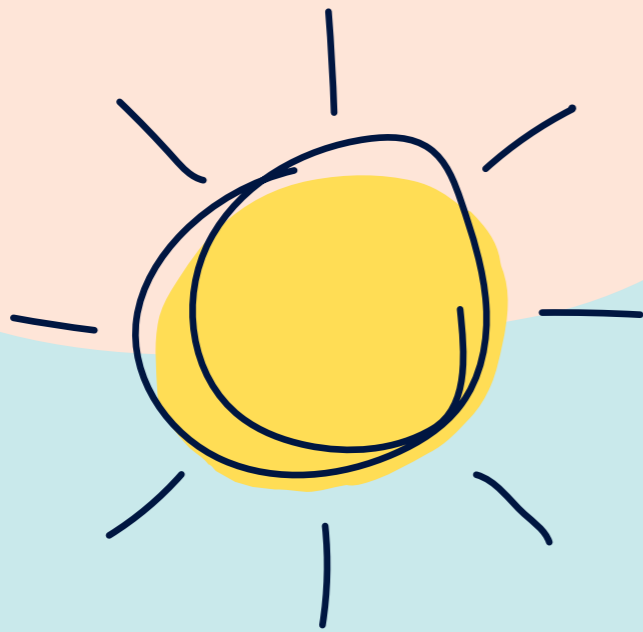
CURRICULUM LINKS

Technologies-Content

The following content descriptions, cross-curriculum priority and general capabilities have been incorporated into the unit.

Design and Technologies Knowledge and Understanding

Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032)

Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)

Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)

### Design and Technologies Process and Production Skills

Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas (ACTDEP035)

Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and technologies, including graphical representation techniques (ACTDEP036)

Select and justify choices of materials, components, tools, equipment and techniques to effectively and safely make designed solutions (ACTDEP037)

Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (ACTDEP038)

Use project management processes when working individually and collaboratively to coordinate production of designed solution (ACTDEP039)
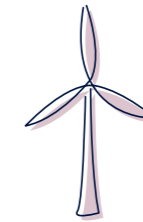
Cross-curriculum priority: Sustainability

OI.3: Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.

OI.5: World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.

OI.7: Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

OI.8: Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments and balanced judgments based on projected future economic, social and environmental impacts.

General capabilities:

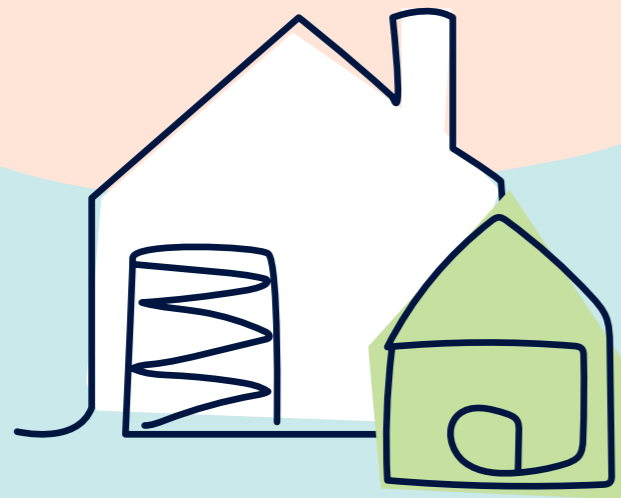Critical and creative thinking

Literacy

Numeracy

Personal and social capability

Information and communication technology capability

FACT

AUSTRALIAN DAIRY IS A $13 BILLION FARM, MANUFACTURING AND EXPORT INDUSTRY, DIRECTLY EMPLOYING 43,000 AUSTRALIANS ON FARMS AND IN DAIRY PROCESSING.

The essential question:

What happens when we understand all the managed environments and systems involved in looking after cows and calves, managing a dairy farm, managing the environment sustainably, producing milk and manufacturing it, and how these can all become more sustainable?

Scenario and design brief:

Australians love their dairy products and research shows consumers are willing to pay more for products that are environmentally friendly, contain all-natural ingredients and carry sustainability claims.

Your challenge is to learn about how the Australian dairy industry produces and processes milk and delivers it to customers.

You need to analyse the managed environments and systems that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Then, help the industry share their sustainable solutions by designing an educational product for consumers about what the industry does to sustainably look after cows and calves, maintain, protect and enhance the local environments, produce, process and bring milk to consumers.

You are also required to make a presentation of the designed product to an audience. You need to demonstrate how your product can fill a need and educate consumers about the managed systems and environments that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Are you up for the challenge?

72% OF DAIRY FARMS HAVE FENCED OFF SOME OR ALL WATERWAYS TO PROTECT RIVER HEALTH.
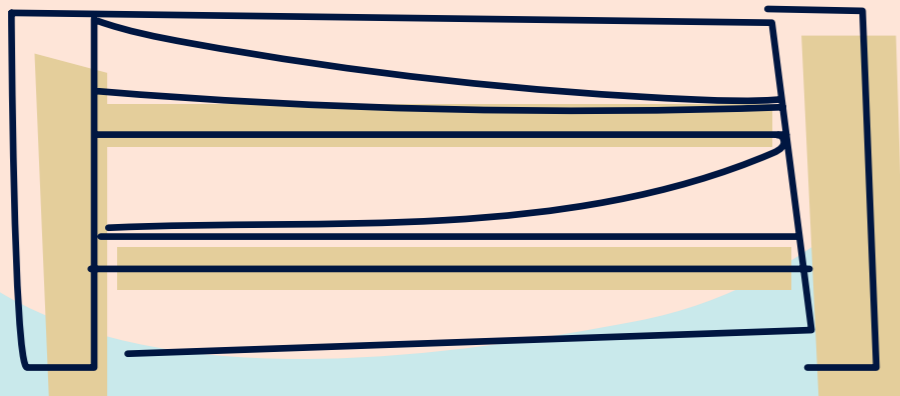
STEP 1: DEFINE

Objective:
Have students illustrate their understanding of the challenges set out in the scenario by providing an oral definition of the task.

Share the scenario and design brief

Share the scenario and design brief with the class and talk about the tasks that need to be addressed. Ask students to define the task they have been set. See Resource 1.1 in the Student Design Folio.

Highlight key terms in the design brief and record these terms on a whiteboard.

Talk about the consumers who are seeking eco-friendly, sustainable and environmentally conscious products in retail outlets. Read the Nielsen research, discuss the data, findings and talk about the need for food producers to communicate how their industry embraces sustainable practices on farm, in processing, packaging and in the delivery of food to customers.

Discuss with the students how the design brief requires them to design a solution for the real-world problem that is highlighted in the Nielsen study on sustainability.

Establish evaluation criteria and what is already known

As a class, establish evaluation criteria through brainstorming and then create an assessment rubric with the class. Ask students to highlight the evaluation criteria on the class-made assessment rubric.

Talk with students about their knowledge of the Australian dairy industry, the way cows are sustainably and ethically cared for, the ways dairy farms are sustainably managed, the many stages involved in producing and processing milk and the many products produced from milk.

Recall the task

Invite students to recall the focus of the task that they have been asked to undertake. See Resource 1.2 in the Student Design Folio.

Ask students what they might need to know more about, in order to undertake the challenge. Might they need to know something about how cows and calves are looked after, and how milk is produced and processed in managed environments? Might they need to know about the sustainability considerations the industry incorporates into their work?

Ask students how they might evaluate their educational product in terms of what the industry produces and the sustainable processes used to look after cows and calves, manage a dairy farm, produce milk and manufacture it.

Remind students that they are also required to make a presentation of the designed product to an audience.

Revisit the assessment rubric for the unit with the students ensuring all aspects of the task are understood.

Prerequisite for progression:
Ask students to articulate their understanding of the task/challenge through oral conversation and if appropriate a written (scribed) statement.

Note: *The Prerequisite for Progression are the checkpoints that occur at the end of each stage of the learning sequence. This is the time at which formative feedback is given to the students about what they have accomplished in that stage. It describes what the students must complete before they move onto the next phase of the unit. (Crockett, et, al)*

STEP 2: DISCOVER

Objective:
Have students research and analyse ideas about the managed systems and environments that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably. Have students explore a range of educational products that educate others about food production.

The industry and how cows make milk

Ask students to consider the question 'How might we discover more about the managed systems and environments that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably?' See Resource 1.3 in the Student Design Folio.

Introduce the term "farm to plate", "paddock to plate", "grass to glass" or "from farmer to consumer" and as a class, share ideas about how milk gets from the cow to us.

Explain to the class that cattle breeds have been specifically bred for milk production.

Talk about how cows first produce milk after giving birth to a calf. View a video with additional information.

View another video and ask students to analyse it for information about what cows eat so that they stay healthy and produce good quality milk.

Ask students to learn more about the 'internal features' of dairy cows. Talk about the fact that they have four stomachs, each of which performs a special function. Demonstrate this and play the animation 'How do dairy cows make milk?'

Share information about dairy farming in Australia and view a video about the industry.

Managed environments

Introduce the concept of 'managed environments on dairy farms' and explain to the class that there are different types of dairy farms located across Australia. Talk about how some are large commercial farms with automated and robotic systems, while others aren't.

If possible, visit a dairy farm and investigate how managed environments and systems responsibly manage the environment, look after cows and calves, and produce quality milk for consumers.

Talk about how dairy farmers usually graze their animals in environments with high-quality pastures that are found in high rainfall areas or regions where they have access to water supplies so they can irrigate their pastures.

Explain that dairy farmers also house their animals in environments with specialised sheds for some stages of their life. For example, calves are raised in small yards with shelter where they are generally fed milk twice a day, and where they can access clean water and food.

Go further and talk about how Australian dairy farmers care for their cows, ensuring they are kept happy and relaxed to help them produce milk. They also ensure the dairy cows have clean water, quality food, adequate shelter and very clean, hygienic environments when being milked. Explain how milkers wear gloves and cow's teats are sprayed after milking with disinfectant to prevent udder infections or mastitis. Farmers work hard to keep their cows healthy, however, when cows do get sick, it is important that they receive the appropriate veterinary treatment, which may require antibiotics. The milk from the treated cows is then discarded until the antibiotics have cleared from their system, and the cow is healthy again.

Go further about the variety of food types that are fed to dairy cows. In Australia, most cows have a diet that is made up of grass, which is either grazed or supplied as hay or silage, with a small amount of grain and mineral supplements to fill any nutritional gaps.

View a video to explore what is involved in running a dairy farm. Talk about some of the managed systems and environments that the dairy industry has designed to raise cows and calves, produce, process milk, and manage their environments sustainably.

View a video that explains how and why dairy farmers milk cows once, twice or sometimes three times a day in environments like milking sheds that are specially designed and electronically controlled. Highlight how milking stalls in these sheds can be set out in a 'herringbone' pattern or on a continuously rotating platform called a rotary that allows the cows to easily and efficiently move through the dairy with minimal handling. Explain how in most dairy sheds, cows are fed grain and mineral supplements while being milked, which supports their health and ensures they receive the nutrients needed to produce high-quality milk. Talk about how some farmers use fans and/or sprinklers in hot weather to cool the cows in the milking shed.

Talk more about milking sheds having a concrete base and how they are hosed down after each milking to remove effluent which goes into an effluent pond.

Talk with students about some of the technologies used to manage cows on farm. Introduce students to the sensors and tracking devices being used by some dairy farmers that give them the ability to track a cow's activity levels, health, and other key behaviours like reproduction activity.

Explain how dairy farmers also manage their natural environment in and around the farm. View a video that shares some of the best environmental management practices undertaken on farm. Ask students to record ten or more ways dairy farmers manage their environment and systems like water, waste and energy, sustainably.

Explain to the class that the goal of everyone in the dairy industry is to be viable, profitable and sustainable. Introduce students to the commitments made by the industry to sustainability. Introduce the industry's sustainability framework and 2030 goals.

Talk about the word 'sustainability'. As a class, consider the differences between 'environmental sustainability', 'economic sustainability', 'social sustainability' and 'political sustainability'.

Discuss how sustainability includes the way farmers care for their animals. Animal welfare is linked with ethical, political, economic, environmental and social issues. Investigate how the Australian dairy industry is working towards ensuring the highest quality animal care and has enforced practices such as disbudding with pain relief (cow horn removal) and is phasing out routine calving induction and tail removal.

Ask students to develop a concept map describing what they know about the sustainable practices in the dairy industry.

Design task

Remind students that their task is to start their own research and record information about the Australian dairy industry. Investigate what the industry does to look after cows and calves, maintain, protect and enhance the local environments, produce, process and bring milk to consumers. Introduce students to the Dairy Matters and AgriFutures Dairy web pages.

Ask students to use their Design Folios to document their design project's research development and to:
- Play the 'Farm to Plate' digital interactive and find out how milk gets from the cow to us, is processed in a plant and then used to produce other dairy products.
- Use the "Dairy Matters" platform to find additional information about how dairy cows are farmed, raised and produced in managed environments on Australian dairy farms, and how milk is processed in a plant and then used to produce other dairy products.
- Investigate the Australian Dairy Industry using the AgriFutures Dairy page.
- Discover how cows make milk.
- Explore milking time and research the different types of milking systems used on Australian dairy farms. Analyse the design features of the different types of milking systems. Record information about what's positive, negative or interesting about them.
- Locate and search for information about rotational grazing systems, pasture management and animal management.
- Research and record information about the industry's sustainability framework and 2030 goals and sustainability initiatives.
- Delve deeper into the Australian dairy industry and explore how it has developed its own Sustainability Framework that aligns itself with the United Nation's Sustainable Development Goals (SDGs). View a website and explore the SDGs it is delivering on.

- View a range of producer stories about dairy production. Record information about their production processes and note any sustainable designs used within their systems.
- Research information about how milk is made.
- Read and take notes about manufacturers who make dairy products in Australia and the systems they use to process dairy products responsibly and sustainably.
- View a video, read about the milking process and record information about how milk is processed (pasteurised and homogenised).
- Go further and watch a video to investigate how other dairy products are made.

Remind students to record information from each source in their Design Folio. See Resource 1.3 in the Student Design Folio.

Ask students to complete a flow chart diagram in their Design Folio about the managed environments and systems that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Ask students to draw conclusions about what has been learned and develop concept maps in the Design Folio. From the concept maps, encourage students to come up with statements about the managed environments and systems used to raise cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Thinking skill activity

Use the Edward de Bono's Six Thinking Hat technique to explore the managed environments and systems used in dairy farming and milk production in more depth. Students, in groups, each with a different hat, discuss and document their ideas according to their given perspectives and come together at the end to share their ideas. See Resource 1.3.

Educational products

As a class, brainstorm a range of educational products that could be used to teach about dairy farming and where food and fibre products come from.

Introduce Dairy Australia's Picasso Cows program in which students use a blank fibreglass cow to create an artwork about the farmers who produce milk, and how this commodity is being produced sustainably.

View a video about the Lego Farmer and learn about how this educational tool helps others learn about the agriculture industry.

Talk about the variety of educational tools and products that could be used to educate consumers about what the Australian Dairy Industry does. For example podcasts, blogs, consumer fact sheets etc.

Re-focus students' attention on the Design Task.

Ask the students to share their understandings with others.

Ask each student to share what their research has told them and what they still have to accomplish within the task with their peers, the teacher and family.

Prerequisite for progression:

Students have worked as a class, and individually and collected information about what Australian dairy farmers do to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably. Websites, videos and texts are used to contextualise understanding.

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STEP 3: DREAM

Objective:

Have students imagine how they are going to design and produce an educational product for consumers and help the industry share what it does to raise cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Visualise

Ask students to visualise their design ideas and sketch them in their Design Folio. See Resource 1.4 in the Student Design Folio.

Imagine solutions and draft ideas

Ask students to pose questions about the possible ways of designing and creating their educational product for consumers. Questions include:
- Will the product be a digital or hard copy product?
- Will the product be spoken, use multi-media or written text and graphics?
- Focus student's attention on the following prompts:
- What might you have to do to make your design idea possible?
- What might it include?
- How might it be created?
- What are the different ways it could be created?

Ask students to record and make decisions about what's practical, possible and preferable about their draft ideas. See Resource 1.4 in the Student Design Folio.

Invite students to generate their draft design ideas in an annotated concept sketch. See Resource 1.4 in the Student Design Folio.

Materials, tools, equipment and evaluation

Challenge students to think about the materials, tools, and equipment they will need to design and create the educational product. Will they use digital or non-digital equipment and tools? How might they work safely and co-operatively? How might they appropriately source their images and information that is used to create the educational product?

Ask students how they might evaluate whether their educational product and accompanying presentation meets the original criteria of their task? Might they create a matrix of success criteria?

Prerequisite for progression:

The class has envisioned design ideas and begun designing their educational product for consumers to help the Australian dairy industry share what it does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

STEP 4: DESIGN

Objective:

Have students explain, prepare and action how they are going to design and produce their educational product for consumers and help the industry share what it does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Project planning

Ask students to explain, prepare and action how they are going to document their design ideas. See Resource 1.5 in the Student Design Folio.

Ask students to draft a storyboard with the messaging being used in the accompanying presentation they are going to design.

Invite students to develop a project plan outlining the planning and production steps required to their educational product and accompanying presentation.

What?	How?	When?	Who?	Completed (Y/N)

Ask students to start actioning the steps involved in making their chosen digital or non-digital work samples.

Designing the solutions

Ask students to gather the materials, tools, and equipment needed and then plan each step involved in creating the educational product and accompanying presentation.

Invite students to start creating their educational product for consumers and help the industry share what it does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably. See Resource 1.5 in the Student Design Folio.

Talk with students about how they might share and present their educational product to an audience? Invite students to finalise their presentation narrative. See Resource 1.5 in the Student Design Folio.

Ask students to finalise and create their work samples to share them with another peer in the class and seek feedback on their ideas.

Prerequisite for progression:

Students are able to document in oral or written/digital forms how this project is to occur. The understanding is demonstrated by the students explaining their design and production thinking to a peer in the class.

STEP 5: DELIVER

Objective:

Have students deliver their educational product for consumers and help the industry share what it does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Produce, publish and present

Ask students to finalise their educational product and accompanying presentation.

Ask students to photograph their designed solution for consumers and the dairy industry and insert it in Resource 1.6 in the Student Design Folio.

Students present their designed products.

Prerequisite for progression:

Each student has published and delivered the upcycled recipes they have created, the 'Loved Not Wasted Recipe Cards', the Information Cards, the Design Folio and their 'Pitch' part of a food tech and sustainability 'Pitch' competition.

STEP 6: DEBRIEF

Objective:

Assess the results of the designed educational product and accompanying five minute presentation about what the Australian dairy industry does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Reflections

Ask students to reflect on their learning. Ask students to:

- Explain how the designed educational product educates consumers about how milk is produced and processed in managed environments.
- Explain how the designed educational product educates consumers about what the Australian dairy industry does to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.
- Explain how their product fills a need.

Evaluate the solutions

Ask students to evaluate their educational product for consumers and accompanying presentation and write about whether their work matched the definition of the task in the design brief.

Write about the quality of their planning, their research, the processes they used to design their educational product and presentation and whether they enjoyed the tasks. See Resource 1.7 in the Student Design Folio.

Challenge students to re-design their product and presentation where needed. See Resource 1.8 in the Student Design Folio.
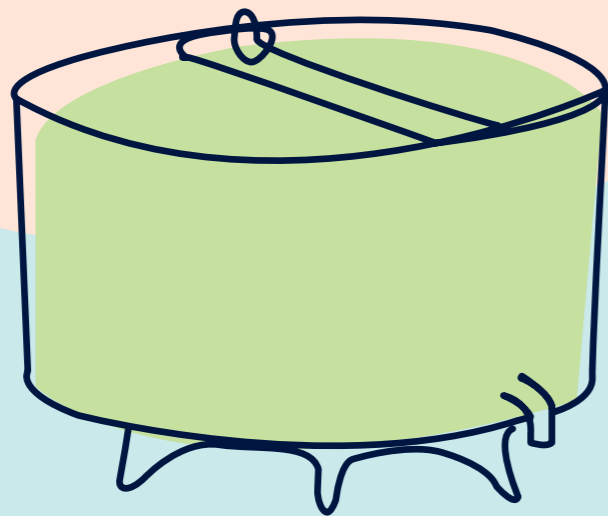
In addition, students might also like to assess other student's work samples and presentations too.

STUDENT DESIGN FOLIO

RESPONSIBLE PRODUCTION IN THE DAIRY INDUSTRY
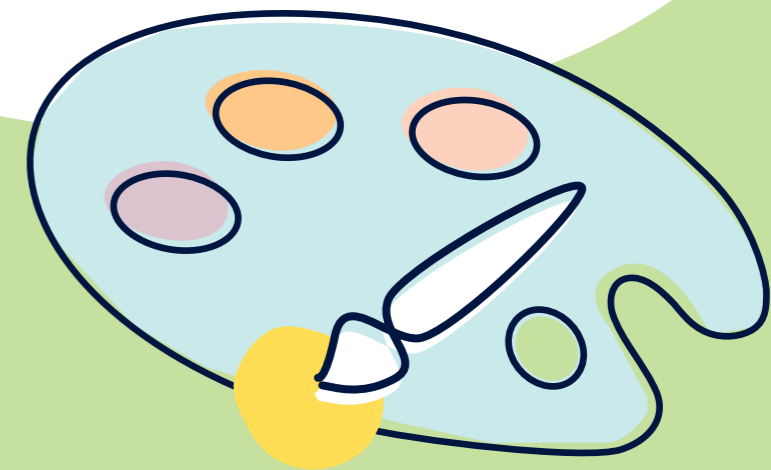
FACT

47% OF DAIRY FARMS HAVE SOME LEVEL OF IRRIGATION AUTOMATION FOR MORE EFFICIENT WATER USE.

THE DESIGN FOLIO

Your Design Folio is a vital communication tool for your design project.

It should document your design project's development.

Start by recording your understanding of the design brief through to the final evaluation of your designed solution.

Use concept maps, word clouds, annotated concept sketches, photographs, flow charts, labelled drawings and information to communicate your ideas.

The essential question:

What happens when we understand all the managed environments and systems involved in looking after cows and calves, managing a dairy farm, managing the environment sustainably, producing milk and manufacturing it, and how these can all become more sustainable?

Scenario and design brief:

Australians love their dairy products and research shows consumers are willing to pay more for products that are environmentally friendly, contain all-natural ingredients and carry sustainability claims. Reference: https://www.nielsen.com/au/en/insights/article/2019/finding-success-through-sustainability-aus/

Your challenge is to learn about how the Australian dairy industry produces and processes milk and delivers it to customers.

You need to analyse the managed environments and systems that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Then, help the industry share their sustainable solutions by designing an educational product for consumers about what the industry does to sustainably look after cows and calves, maintain, protect and enhance the local environments, produce, process and bring milk to consumers.

You are also required to make a presentation of the designed product to an audience. You need to demonstrate how your product can fill a need and educate consumers about the managed systems and environments that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Are you up for the challenge?

What is your challenge?

Read your design brief carefully.

Write a definition of the tasks and challenges you need to undertake.

Consider the questions 'Why is the Australian dairy industry important to Australia?'; 'What is involved in milk production?'; 'What might dairy farmers do?'; 'How might I discover more about the managed systems and environments that the dairy industry has designed to raise cows and calves, produce, process and deliver milk, and manage their environments sustainably?'

What do you know about these topics?

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Let the research begin. Identify what you need to know and what you need to be able to do.

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Here are some links to use for your research.

The industry and milk production

- Play the 'Farm to Plate' digital interactive and find out how milk gets from the cow to us, is processed in a plant and then used to produce other dairy products. See: https://www.dairy.edu.au/discover-dairy-farm-to-plate
- Use Dairy Australia's resources on the "Dairy Matters" platform to find additional information about how dairy cows are cared for on Australian dairy farms, and how milk is processed in a plant and then used to produce other dairy products. See: https://www.dairy.com.au/dairy-matters
- Investigate the Australian dairy industry using the AgriFutures Dairy page.
  See: https://www.agrifutures.com.au/farm-diversity/dairy-cows/
- Discover how cows make milk.
  See: https://www.dairy.edu.au/resources/video-resource/how-cows-make-milk--chapter-5
- Explore milking time and research the different types of milking systems used on Australian dairy farms. Analyse the design features of the different types of milking systems. Record information about what's positive, negative or interesting about them.
  See: https://www.dairy.edu.au/resources/video-resource/milking-time-on-the-farm-chapter-10
- Locate and search for information about rotational grazing systems, pasture management and animal management.
- Research and record information about the industry's sustainability framework and 2030 goals and sustainability initiatives. See: https://www.sustainabledairyoz.com.au/ and https://www.dairyingfortomorrow.com.au/
- Delve deeper into the Australian dairy industry and explore how it has developed its own Sustainability Framework that aligns itself with the SDGs. View a website and explore the SDGs it is delivering on.
  See: https://sdgs.org.au/project/sustainable-development-in-the-australian-dairy-industry/
- View a range of producer stories about dairy production. Record information about their production processes and note any designs used within their systems. See: https://www.dairy.com.au/our-industry-and-people/our-people
- Read information about how milk is made. See https://www.dairy.com.au/products/milk/how-milk-is-made
- Read and take notes about manufacturers who make dairy products in Australia and the systems they use to process dairy products responsibly and sustainably.
  See https://www.dairy.com.au/our-industry-and-people/our-manufacturers
- View a video, read about the milking process and record information about how milk is processed (pasteurised and homogenised). See: https://www.dairy.edu.au/resources/video-resource/discover-how-milk-is-made-chapter-11
  and https://www.dairy.com.au/products/milk/how-milk-is-made
- Go further and watch a video to investigate how other dairy products are made.
  See: https://www.dairy.edu.au/resources/video-resource/discover-how-other-dairy-products-are-made-chapter-14

Use the space below to record your notes about the importance of the Australian dairy industry, and how milk is produced and processed in managed environments that the dairy industry has designed to raise cows and calves, produce, process and deliver milk, and manage their environments sustainably.

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Use the space below to draw your **flow chart** that explains the managed environments and systems that the dairy industry has designed to raise cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Use the space below to draw your **concept map** that details how milk is produced and processed in managed environments and systems that the dairy industry has designed to look after cows and calves, produce, process and deliver milk, and manage their environments sustainably.

Use the space below to explain the managed environments and systems used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Use some "Thinking Skills"

Use the Edward de Bono's Six Thinking Hat technique to explore the managed systems used in milk production in more depth.

White Hat = Information

List the facts you know about environments, present technology and best management practices being used to raise cows and calves, produce, process and deliver milk, and manage the environment sustainably.

Blue Hat = What thinking is needed?

What has happened so far in the industry? What could happen next? What questions should be considered?

Green Hat = New ideas

How could any problems and opportunities related to the managed environments and systems used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably be solved?

Black Hat = Weaknesses

What might some of the negative aspects and outcomes related to the managed environments and systems used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably be?

Yellow Hat = Strengths

What might some of the positive aspects and outcomes related to the managed environments and systems used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably be?

Red Hat = Feelings

What are the emotions and feelings associated with the managed environments and systems used to look after cows and calves, produce, process and deliver milk, and manage the environment sustainably? How do you feel?

Use the space below record your notes.

What does the solution look like in your mind?

Visualise a creative and appropriate design solution.

Sketch annotated concept sketches below of what the educational product might look like and contain.

Using the table below record what is practical, possible and preferable about your draft ideas.

Product Ideas	Practical (Y/N)	Possible (Y/N)	Preferable (Y/N)	Identify your decision

Using your ideas in the table above, which design ideas are the most practical and have the greatest potential to meet the design brief?

Prepare a project plan and outline what needs to be done, who is responsible, when things will be done and write it down as a suggested order of the work.

What do I need to do?	How will I create my educational product and presentation?	When will I do this?	How can my products and processes be improved?	Other notes and ideas

Design your educational product for consumers

Sketch and describe in detail your designed solution.

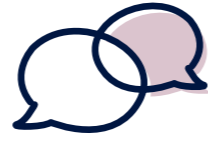## Design your presentation

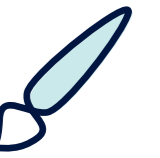Write the introduction:

Write the body:

Write the conclusion:

Make your solution(s) and place photos of them here.

Were you successful? Why or why not?

How would you improve your designs and the information they incorporated?

BIBLIOGRAPHY