

A day in the life of a dairy cow

A Stage 1 unit of work for the Living World strand

Rationale

This unit works towards the Living World strand of the NSW Science and Technology Syllabus and provides opportunities to develop the skills of working scientifically and technologically. Students will consider the needs of plants and animals and how their interactions affect the way a farmer might design a system that meets the needs of plants, animals and people. Students will use this understanding to produce a play about life on the farm.

NSW syllabus outcomes addressed in the unit

Science and Technology:

A student:

- describes ways that different places in the environment provide for the needs of living things ST1-11LW
- describes external features, changes in and growth of living things ST1-10LW
- describes a range of manufactured products in the local environment and how their different purposes influence their design ST1-16P
- identifies ways that people use science in their daily lives to care for the environment and the Earth's resources ST1-9ES
- uses a structured design process, everyday tools, materials, equipment and techniques to produce solutions that respond to identified needs and wants ST1-5WT

History:

A student:

- communicates an understanding of change and continuity in family life using appropriate historical terms HT1-1

- identifies and describes significant people, events, places and sites in the local community over time HT1-2
- describes the effects of changing technology on people's lives over time HT1-3

Geography:

A student:

- describes features of places and the connections people have with places GE1-1
- communicates geographical information and uses geographical tools for inquiry GE1-3

English

A student:

- plans, composes and reviews a small range of simple texts for a variety of purposes on familiar topics for known readers and viewers EN1-2A
- thinks imaginatively and creatively about familiar topics, ideas and texts when responding to and composing texts EN1-10C

Art

A student:

- takes on roles in drama to explore familiar and imagined situations DRAS1.1
- conveys story, depicts events and expresses feelings by using the elements of drama and the expressive skills of movement and voice DRAS1.2
- interacts collaboratively to communicate the action of the drama with others DRAS1.3
- appreciates dramatic work during the making of their own drama and the drama of others DRAS1.4

PDHPE

A student:

- recognises that positive health choices can promote wellbeing. PHS1.12

Unit at a glance

Learning experience	Location	Activities	Resources
1	Classroom	Start a class KWL chart, dairy farm diagram	Learning journals Wall space of space for a chart that can stay up for the duration of the unit of work
2	Classroom	Mapping areas of a farm for different users	Learning journals
3	Classroom	Changes the Macarthurs made to the Belgenny area to suit their needs	Belgenny: Changes in time and space
4	Onsite or online	Learning journal activities	
5	Classroom	Review of learning journals / drawing together the lessons and the site visit	Learning journals and wall chart
6	Classroom	Consider environments for other farm animals	Learning journals
7	Classroom	'A day in the life of a ...' play	

Learning sequence

Learning experience 1: Plants 4 animals 4 plants

Learning experience 1:
Science and
Technology
background

Aim: Students will consider the interrelationship of plants and animals using the example of a dairy cow.

Learning intention

Students will be able to describe the needs of a dairy cow and how they satisfy those needs in a farm environment.



Activate prior knowledge

Start a class KWL chart (What we Know, what we Want to know, and what we Learnt).

Brainstorm with the class (for ‘what we know’) what we would expect to find in a dairy farm environment.



Discuss / Investigate / View

Encourage students to think about a range of elements of a dairy farm by asking them to name some farm animals, where do they live? What jobs do farmers do? Where do they do them? What tools would they need to do this? This discussion may start to raise some questions to add to the ‘what we would like to know’ on the KWL chart. If you have students in your class who live on a dairy farm, let them go for it, this is their time to shine!

Talk to students about how some of the elements rely on each other to survive eg cows eat grass, their manure fertilises grass. Don’t be tempted to give them all the answers now. Later in the unit students will do another drawing/illustration and this will be a chance to reflect on their learning

Leave the KWL chart on the wall so you can refer to it and add to it throughout the course of the unit.



Suggested activities

Ask students to draw their ideas about how the parts of a dairy farm system work together. Label the parts of the farm that they understand meet the needs of the animals and people that live there.

There is a blank space to do this in the learning journals if you are using them.

Take it further

Finish the lesson reading a picture book about life on a farm—*A Year on our Farm* by Penny Matthews is a great example. Talk about the things in the book that are included on the KWL chart, students will return to the chart at the end of the unit to complete the ‘what I have learnt’ section.

Next

In the next lesson students will look at the Belgenny Farm site and discuss the different zones in a farm environment.

Learning experience 2: Geography of Belgenny Farm

Learning
experience 2:
Place

Aim: Students will think about the needs of different inhabitants in an environment and how a farm environment meets the needs of different users.

Learning intention

Students will be able to identify on a map the parts of an environment that provide for the needs of people and those that provide for the needs of animals.

Review

Review student's farm diagrams, and recall the needs of animals and plants in a farming system.

Discuss / Investigate / View

View an aerial view of Belgenny Farm (available on Google Maps) or on our website ([link](#)). This will provide students with information about the site including where the river is and shows some of the farming land that still surrounds the site ([link](#)). Note the nearby river and consider that before colonisation most of the area was covered in open forest.

As a class think about which areas on the site are where people live (or have lived) and which areas are homes for animals. You might also be able to decide where their food comes from and why they are located where they are. For example, there is a dovecote (images also available on our website) built beside Belgenny Cottage, the 'home' part of the structure is built up high to keep the pigeons safe from predators, it is small because they are small animals, the Macarthurs kept pigeons to eat spilt grain as it may otherwise attract rats and mice. Or, the pigsty is located at the back of the creamery—pigs were fed the skim milk left over when the cream was extracted so it was not far to cart it.

The Belgenny Farm app (available for free on Apple App Store or Google Play Store) provides information on most of the buildings shown on the map—a transcript is also available online ([link](#)) for you to read with students. The information will assist students to decide what purpose the buildings fulfil.

Suggested activities

In student's learning journal there is a map of the Belgenny Farm complex. Students can add details to the map.

Take it further

The audio file Belgenny Farm Introduction ([link](#)) gives students an introduction to the area before and after European settlement. It will give them a different perspective.

Next

In the next lesson you will be looking at how the Macarthurs changed the Belgenny Farm site to suit their changing needs over time.

Learning experience 3: The people of Belgenny

Learning
experience 3:
People

Aim: To introduce students to the Macarthurs of Belgenny and to discuss how they arranged the environment to meet their needs.

Learning intention

Students will be able to describe two changes the Macarthurs made to the environment when setting up their farm and why they did that.

Review

Review the idea that people and animals have different needs and they meet those needs in different ways.

Discuss / Investigate / View

Compare two images of Camden—one historical landscape and one current—available on our website ([link](#)). Discuss with the class the differences they see. Major changes will include that there are less trees, more houses and roads. Note these images show Camden Aerodrome established in 1938 by Edward Macarthur Onslow.

Discuss what coming to an area like the Cowpastures and setting up a farm might have been like. What are the things that you would like to find or establish quickly? Consider what their needs would have been and how they could meet them e.g. they would need to find water, food sources and shelter for themselves and/or their livestock. Think back to the discussion about the farm environment, which of those elements do students think the Macarthurs would have needed to establish quickly when they arrived in the area? For example clearing land, fencing, water and shelter for themselves and/or their stock?

Some students will be able to sequence the process and decide what they would have done first when they arrived at the Cowpastures to start farming.

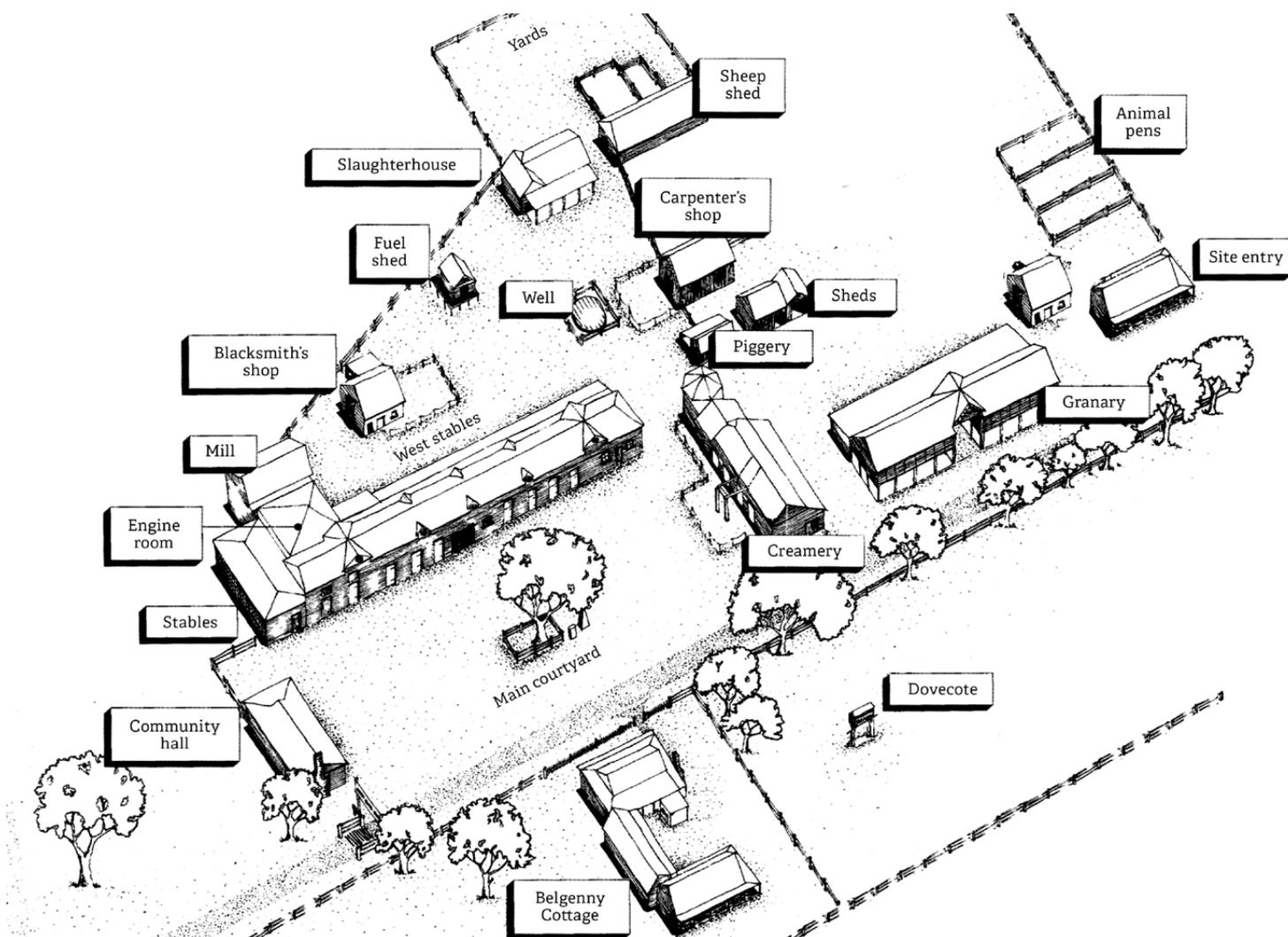
Suggested activities

If you are using the learning journal, students can illustrate the process—there is a line for students who are able to prepare a timeline of the changes or it can be used as a blank space to illustrate their understanding of the changes.

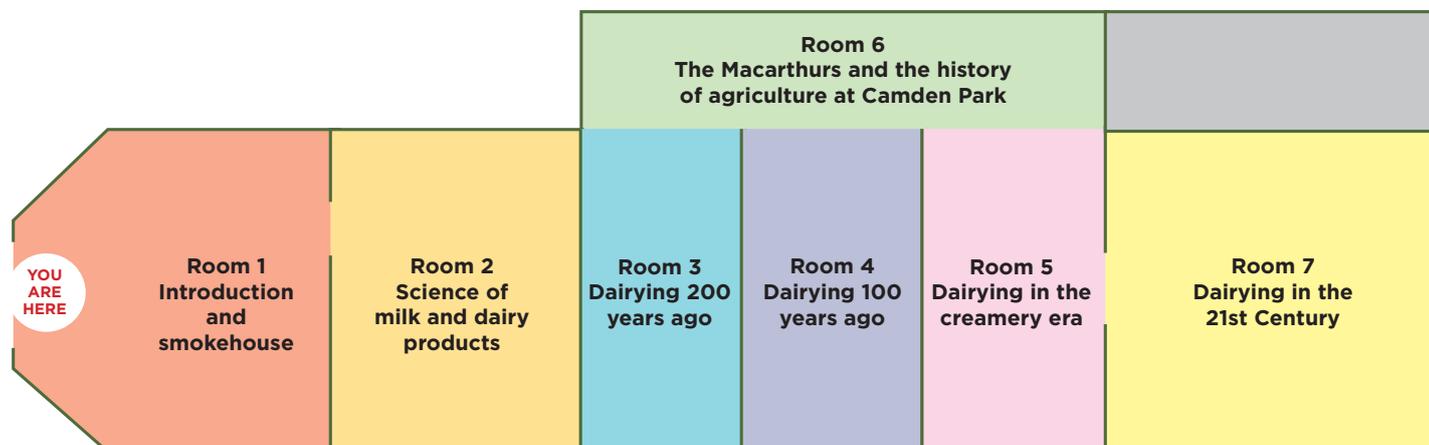
Next

The next learning experience will be the site visit where students will look at the ways people's and animal's needs have been met at Belgenny Farm.

Learning experience 4: Map of site



Guide to Creamery



Learning experience 4: The site visit

Learning experience 4: Site visit

Room 1 - Smokehouse

This room is the smokehouse, it was built in the 1830s or 40s and was not originally connected to the buildings next to it. In the days before refrigeration smoking was used to keep meat from going off. The Macarthurs used this room to smoke pork and beef to preserve it. When an animal was killed it was cut up and salted, the second step is to smoke it. The meat was hung in the roof of this room and a slow fire burnt on the floor for one or two weeks until the meat was dried and smoked. It could be kept in this room for up to two years and safely eaten.

Optional learning journal activity

In your learning journal there is a diagram of how the meat was smoked but there is something missing, can you see what is missing?

Room 2 - Science of milk

Milk is a natural product produced by mammals to feed their young. Humans use milk from animals including cows to meet our nutritional needs, and from that milk we also get cream, cheese, butter, yoghurt and a lot of other products. Milk is a really important and useful product for people. To make sure that the milk that people consume is clean, healthy and readily available, dairy farmers need to take good care of their cows.

Have a look at the poster of dairy production, part of it shows a farm food web. The farmer's job is to make sure that all the parts of the food web are healthy so that cows produce the best milk that they can.

Optional learning journal activity

Can you add the arrows to the diagram in your learning journal?

Room 3 - Dairying 200 years ago

Two hundred years ago farmers needed to provide their own milk and vegetables and they also consumed meat from the property. All of the farmer's jobs focussed on making sure they could meet their own needs of food, water and shelter. Any extra produce they made, they could sell. Which of these foods do you think the Macarthurs produced on the farm 200 years ago? The posters in this room and the next will give you some hints.

Optional learning journal activity

Circle the foods that you think the Macarthurs produced on the farm 200 years ago.

Room 4 - Dairying 100 years ago

One hundred years ago dairy farmers started to get better access to machines to help them do their work. In the late 1800s a mechanical cream separator was installed here at Belgenny and in the 1900s farmers got access to milking machines. At this time there were also developments in transport that meant that farmers produce could be sent to markets faster. These technological developments meant that fewer people needed to keep cows as dairy farms were able to milk more cows each day. This room is all about the improvements and technological advancements that meant that farmers could produce more and get it to people faster. It is also the room where the engine that ran the separator was located.

 **Optional learning journal activity**

In your learning journal there are some pictures of foods that are produced on farms—circle the foods that the Macarthurs made from cream produced at Belgenny Creamery.

Room 5 - Dairying in the creamery era

This whole end of the building was constructed in the 1820s as a coach house for horse-drawn vehicles. This section was converted into a creamery in 1898 by adding the upper storey and an elevated water tank.

At the creamery, milk was separated into cream and skim milk. Cans of milk were hauled to the top floor from carts parked directly underneath. The milk was tipped into a vat and flowed into a machine called a 'separator'. The cream was taken to Menangle Central Creamery to be sold or made into butter. The skim milk was fed to pigs on Camden Park which could be eaten by the people living here or sold.

 **Optional learning journal activity**

In your learning journal look at the diagram that shows how the pigs fitted into the dairy system, can you add the arrows?

Room 6 - The Macarthurs

These are all members of the Macarthur family, the first ones that lived here are John and Elizabeth Macarthur with their children. The Macarthurs still live in a house nearby and lots of the Macarthurs between then and now have worked and lived on the farm. Each of the Macarthur family who are shown here made a special contribution to the development of Belgenny Farm, in terms of what they grew and sold from the farm and what the buildings were used for.

 **Optional learning journal activity**

See if you can match their photos in your learning journal to the development that they were part of.

Room 7 - Dairying in the 21st century

The Macarthurs have often tried new farming technology, often in the early stages of development. There is a model of the rotolactor in this room. It was one of only three in the world and was the start of rotary dairying that many modern dairies use now. Edward Macarthur Onslow, who was responsible for building the rotolactor here in the 1950s, would probably never have believed that one day robots would milk cows, but they do in some dairies. At one stage there was also a robotic dairy on Camden Park. Robotic dairies are a gentle way of milking cows as the computer that operates the milking machines can tell (by reading the cows identification tag) which cow is in the stall, how long she needs to be milked and how much feed she needs. The computer can also tell if she is getting sick by testing the milk, which is then diverted from the milk tanker for disposal. If a cow is getting sick the farmer can arrange for the vet to come and treat her so she gets well again soon.

 **Optional learning journal activity**

In your learning journal there are pictures of new and old styles of dairying, draw a star over the most technologically advanced pictures in each set. Remember though, even though these are the most modern methods, there are still some house cows that are milked by hand although most are milked in manual mechanical sheds.

Learning experience 5

Learning experience 5:
Reinforce science and technology outcome

Aim: This lesson brings together information from previous lessons to encourage students to consider what dairy cows do, what they need and where they do it.

Learning intention

Students will be able to describe a day in the life of a dairy cow and how they are looked after.

Review

Review the site visit, if you didn't have the learning journals with you the online version of the site will help you to review the Creamery and complete the activities in the journal.

Discuss / Investigate / View

Watch some videos of milking cows, available on our website ([link](#)). This will give students more information to consider how and where dairy cows are cared for and what their needs are.

Brainstorm the areas of the farm that dairy cows visit each day. What are their needs? Food, water, sleep, milking. Where do they do each of these activities?

Try sequencing the cows daily activities into a timeline on the board for all students to contribute to and to use for their independent work.

Suggested activities

In learning journals students draw, write about or sequence 'a day in the life of a dairy cow'. For each activity in the day ask students to indicate what the cows are doing, where they are doing it and why. The line on the page in the learning journal can be used as a timeline or just a starter for a drawing.

Next

In the next learning experience students will consider where some other animals are found on the farm and how their needs are met.

Learning experience 6



Aim: Students are given the opportunity to apply their knowledge of the needs of dairy cows to plan appropriate places for other animals to live and how those places might meet the animal’s needs.

Learning intention

Students will be able to describe where different farm animals are found in different parts of a farm environment.

Review

The discussions you have had about the needs of animals and people and how they satisfy their needs.

Discuss / Investigate / View

Discuss the range of animals often found on farms.

Draw a new farm diagram—this time students will have a broader understanding of the way that plants and animals interact and so their diagrams will probably be more detailed. We are looking for more/different animals and more labels about where their needs are met.

As a class complete the ‘what we have learnt’ section of the KWL chart. This can be used as inspiration for the play in learning experience 7.

Suggested activities

In learning journals there are images of some other farm animals as well as some living environments. Students can use the images as inspiration for their new farm diagrams.

Take it further

On completion of their diagram students can look back to their original drawing and reflect on what they have learnt from the unit.

Next

A class play about life on a farm.

Learning experience 7

Learning experience 7:
Application of learning to a creative endeavour

Aim: Students apply their knowledge of the needs of animals to the production of a short play about life on the dairy farm.

Learning intention

Students will make suggestions about a complication that could result in someone's needs not being met.

Review

Review the animals that you have discussed in the unit, what their needs are and how they meet them.

Discuss / Investigate / View

As a class or small groups plan a short play. A basic process will assist students to plan the play:

- 1.1. Choose an animal that students have become familiar with for the main character.
- 1.2. Students make suggestions for the personality and name of the character—this will determine how the character responds to the complication.
- 1.3. Suggestions are taken for other characters/inhabitants of the farm.
- 1.4. A setting and possible complications that the play is to deal with eg not enough water, a storm destroys all or some of the homes, the road is cut and feed trucks can't get in with grain for the cows.
- 1.5. How do the animals or farmers respond to the complication?
- 1.6. What is the resolution?

Suggested activities

Record the play to share with family and friends.

Take it further

Ensure students have an opportunity to perform their play in front of an audience so they have a chance to demonstrate their learning.

Survey

Thank you for bringing our resources to your classroom, we hope they were beneficial and that you found them enjoyable to deliver. In order for us to be able to continue our work we need to be able to show that we are having a positive impact in schools. To do this we have put together a two minute survey to help us to demonstrate the value of ongoing development of resources such as this.

If you have time to complete a survey the questions will be:

- Do you believe this unit has improved your student's understanding of the dairy industry?
- Did the unit give you a better understanding of the dairy industry in Australia?
- Do you believe units like these are important in Australian schools?
- Did the unit help you do your job?
- Feel free to provide more feedback...

Link: <https://www.surveymonkey.com/r/S3SKVV5>

Appendix 1

Australian Curriculum outcomes

Science:

Living things live in different places where their needs are met. (ACSSU211)

Working cooperatively and individually when participating in different types of guided investigations to explore and answer questions, such as manipulating materials, testing ideas, and accessing information sources, surveys and fieldwork (ACSIS025, ACSIS038)

English

Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features for familiar and some less familiar audiences, selecting print and multimodal elements appropriate to the audience and purpose (ACELY1661, ACELY1671)

Recreate texts imaginatively using drawing, writing, performance and digital forms of communication (ACELT1586)

Geography

Investigate connections that people, including Aboriginal and Torres Strait Islander Peoples, have to local and global places, for example: (ACHGK010, ACHGK011, ACHGK012)

History

The history of a significant person, building, site or part of the natural environment in the local community and what it reveals about the past (ACHHK044)

The impact of changing technology on people's lives (ACHHK046)