From paddock to plate

AUSTRALIAN CURRICULUM CONTENT

Analyse how people in design and technologies occupations consider ethical and sustainability factors to design and produce products, services and environments. (ACTDEK029, AC9TDE8K01)

Analyse how food and fibre are produced in managed environments and how these can become sustainable. (ACTDEK032, AC9TDE8K04)

Analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions. (ACTDEK034, AC9TDE8K06)

Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions. (ACTDEP035, AC9TDE8P01)

Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools. (ACTDEP036, AC9TDE8P02)

Develop project plans to individually and collaboratively manage time, cost and production of designed solutions. (ACTDEP039, AC9TDE8P05)

LESSON OBJECTIVE

Students will learn about the steps in the red meat 'paddock to plate' supply chain and how technologies can target areas within the chain to improve production.

LESSON OVERVIEW

Activity 5.1	Paddock to plate story	10 mins
Activity 5.2	Building the supply chain	25 mins
Activity 5.3	Technologies and the supply chain	30 mins
Activity 5.4	Online learning task: Sustainable packaging in the supply chain	15 mins

CONTENTS

SUPPLEMENTARY MATERIALS

7–10 Paddock to Plate card game
7–10 Paddock to Plate poster

Resources and equipment

ACTIVITY 5.1 – Paddock to plate story

1. Paper.
2. Australian Beef Paddock to Plate Story | 360° video.
3. Australian Lamb Paddock to Plate Story | 360° video.

ACTIVITY 5.2 – Building the supply chain

4. Worksheet 5.2a – *The paddock to plate chain.*
5. Scissors and glue.
6. Butchers paper/A3 paper.

ACTIVITY 5.3 – Technologies and the supply chain

1. Computer/digital device access.
2. The Future of Farming Robots - 13 High Tech Examples (Compilation) (8.32).
3. Worksheet 5.3a – *Technologies and agriculture.*
4. Worksheet 5.3b – *Technologies in the red meat supply chain.*
5. Traceability case study: NLIS Cattle Video (Queensland Government) (1.34).
6. Profitability case study: MLA Grainfed R & D insights BunkBot testing at Mort & Co Pinegrove Feedlot (2.52).
7. Safe work practice case study: Robotic beef processing a reality (3.59).

ACTIVITY 5.4 – Online learning task: Sustainable packaging in the supply chain

1. Computer/digital device access of Lesson 5 Online Learning Task.
2. Red meat joins the war on waste.
3. Cryovac® Darfresh® Colour Change (3.04).

ADDITIONAL READING/RESOURCES

• Australian Butchers' Guild.
• Australian Good Meat.

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Lesson 5

Lesson guide

ACTIVITY 5.1 – Paddock to plate story

a. As a class, view the paddock to plate source/s to observe a visual account of the production process for cattle and/or sheep. Encourage students to take notes (own paper) about the processes they observe, occupations they see, and any technologies associated with the supply chain.

- Australian Beef Paddock to Plate Story | 360⁰ video.

- Australian Lamb Paddock to Plate Story | 360⁰ video.

NB. Some videos contain content of animal carcasses being assessed and processed. Preview footage to determine suitability for own classes.

ACTIVITY 5.2 – Red meat preservation and its relationship to the production chain

a. Allocate students into pairs and provide them with Worksheet 5.2a – *The paddock to plate chain.* Students cut around the elements on their worksheet and attempt to assemble the flowchart in the correct sequence, based on what they have observed in the video clip. After a period of time, provide students with a projected image of the completed sequence. Students use glue to secure their flowcharts to butcher's paper/A3 paper. (Answers page 13)

ACTIVITY 5.3 – Technologies and the supply chain

a. As a class, brainstorm any technologies that students are familiar with that could be associated with each of the steps in the chain. Areas to be discussed may include:

- On-farm technologies that producers use to prepare animals for sale.
- Transport and saleyard technologies.
- Processing and packaging technologies.
- Retail technologies.

b. View the video clip The Future of Farming Robots - 13 High Tech Examples (Compilation) (8.32) to provide students with a glimpse into some areas of advancing innovations in technology and agriculture.

c. Distribute Worksheet 5.3a – *Technologies and agriculture* and read and highlight the information about the use, advantages and disadvantages of using technologies in agriculture.

d. Provide students with computer/digital device access and Worksheet 5.3b – *Technologies in the red meat supply chain.* Students view the source material focused on three aspects of the supply chain, and record a description of the technology (what it does) and a summary of the advantages of the technology to the red meat industry. (Answers page 14)

NB. Videos contain content of animal carcasses being assessed and processed. Preview footage to determine suitability for own classes.

Lesson guide continued next page

Lesson guide *continued*

- Traceability focus: National Livestock Identification System (NLIS). Source: NLIS Cattle Video (Queensland Government) (1.34).

- Profitability focus: Bunkbot. Source: MLA Grainfed R & D insights BunkBot testing at Mort & Co Pinegrove Feedlot (2.52).

- Safe work practice focus: Robotic beef processing. Source: Robotic beef processing a reality (3.59).

e. After viewing the video clips, students reconvene in their pairs from Activity 5.2 and discuss where in the supply chain the three technologies are used, and where they offer advantages to the stakeholders. (Answers page 14)

ACTIVITY 5.4 – Online learning task: Sustainable packaging in the supply chain

a. Students access Online learning task 5 and complete the provided activities focused on MLA's support of innovation of sustainable packaging of red meat. (Answers page 15)

Student resources

ACTIVITY 5.1 – Paddock to plate story

N/A

ACTIVITY 5.2 – Building the supply chain

Worksheet 5.2a	The paddock to plate chain

ACTIVITY 5.3 – Technologies and the supply chain

Worksheet 5.3a	Technologies and agriculture
Worksheet 5.3b	Technologies in the red meat supply chain

ACTIVITY 5.4 – Online learning task: Sustainable packaging in the supply chain

Lesson 5 Online learning task	Sustainable packaging in the supply chain

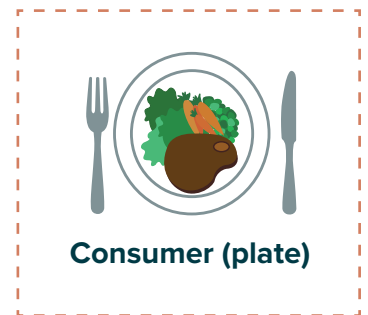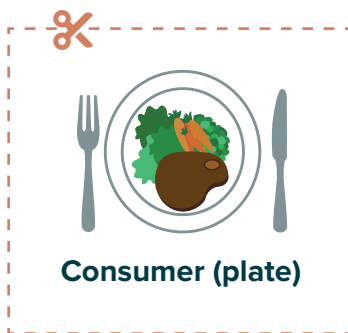Australian Good Meat
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7–8 | WORKSHEETS

Worksheet 5.2a

PLEASE NOTE: This activity requires single-sided printing

The paddock to plate chain

Instructions:

a. Cut around the elements of the supply chain.

b. Using the information from the video clip, assemble the elements to create a paddock to plate supply chain.

**c.** Check your answers and then secure your flowchart to paper.

Consumer (plate)

Saleyard

Consumer (plate)

COLD STORE

Packing and cold store

CAFE   SUPERMARKET

Export retail and food services

ABATTOIR

Holding yards and abattoir

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Worksheet 5.2a continued

Worksheet 5.2a

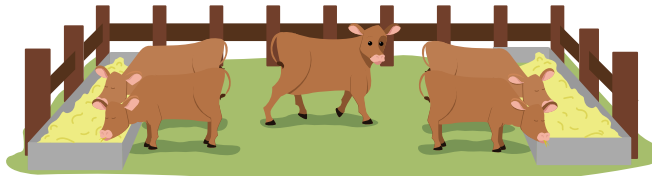PLEASE NOTE: This activity requires single-sided printing
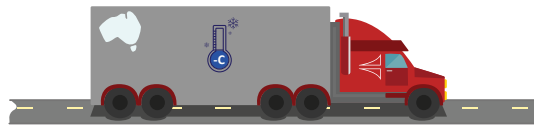
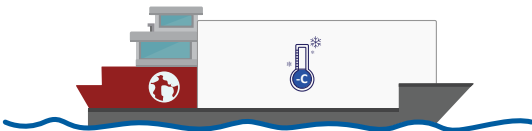**Domestic market**

Consumer (plate)
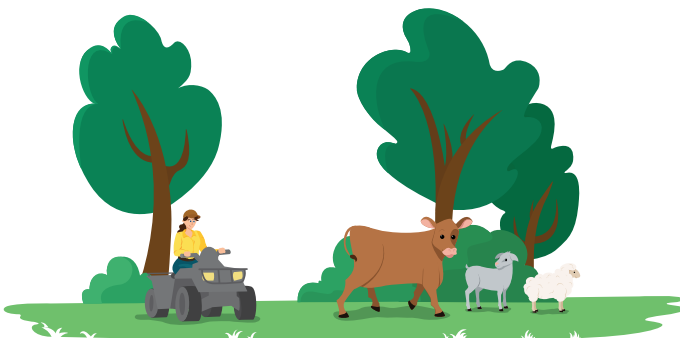
Live export retail and food services
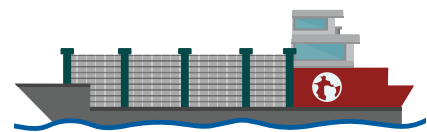
Feedlot

Export market

Domestic retail and food services

Farm (paddock)

Live export market

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Worksheet 5.3a

Technologies and agriculture

Technology in agriculture allows the industry to increase profitability and productivity, make production more sustainable, and make workplaces safer.

Technology also helps meet the challenges of arising problems within the industry.

To sustainably increase production and provide food security that meets future demands, is a difficult task. This, combined with issues in changing climatic conditions, such as decreased water availability and increasing temperatures, means farmers must be supported by technologies and innovations that can assist them in meeting future targets in both quality and quantity of plant and animal production.

Advances in technology focus on all areas of agricultural supply chains, from paddock to plate, and field to fibre. Emerging technologies include:

- Robotic feeding, management, handling and processing of animals - decreasing human labour and improving efficiency, human safety and increasing profitability from waste reduction.

- Precision wireless/sensor technology - improving efficiencies in water and chemical application and providing improvements in data collection.

- Sustainable packaging - improving sustainable outcomes in production and marketing, whilst maintaining appeal and product quality for consumers.
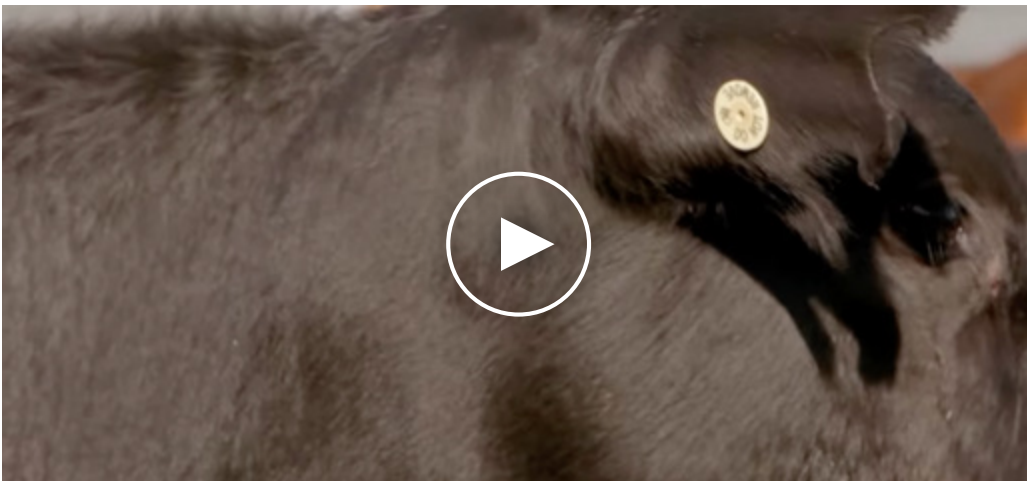
Technologies in the red meat supply chain

a. Access the source/QR code below and view the video clip of the National Livestock Identification system (NLIS) used in the red meat supply chain.

b. Provide a description of the technology and a summary of the advantages of the technology in the provided spaces.

National Livestock Identification System

NLIS Cattle Video (Queensland Government) (1.34)

Description of the technology	Identify the advantages of the technology

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7–8 | WORKSHEETS

Worksheet 5.3b continued

Worksheet **5.3b**

BunkBot

MLA Grainfed R & D insights BunkBot testing at Mort & Co Pinegrove Feedlot (2.52)

Description of the technology	Identify the advantages of the technology

Worksheet 5.3b continued

Worksheet 5.3b

Robotic beef processing

Robotic beef processing a reality
(3.59)

Description of the technology	Identify the advantages of the technology

Building the supply chain

Worksheet 5.2a –
The paddock to plate chain

Farm (paddock)

Live export market

MARKET

Live export retail
and food services

Consumer (plate)

Feedlot

Saleyard

ABATTOIR

Holding yards and abattoir

COLD STORE

Packing and cold store

Export market

Domestic market

CAFE SUPERMARKET

Export retail and food services

Consumer (plate)

CAFE SUPERMARKET

Domestic retail and food services

Consumer (plate)
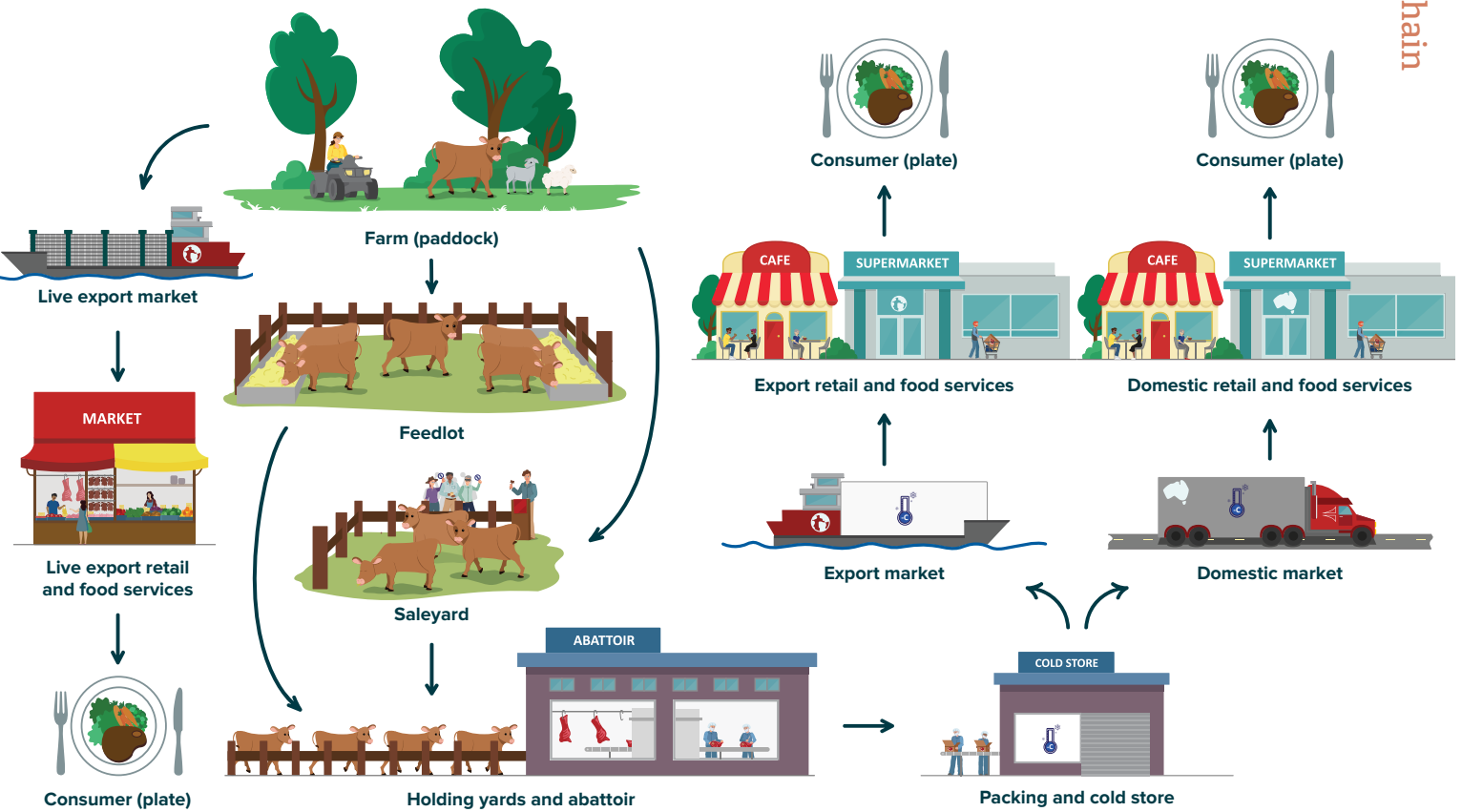
Activity 5.3

Technologies and the supply chain

Worksheet 5.3b – Technologies in the red meat supply chain

National Livestock Identification System	**BunkBot**	**Robotic beef processing**
Description of the technology	**Description of the technology**	**Description of the technology**
Individual identification system for cattle that allows whole of life traceability for an animal. The system requires a tag/bolus, PIC and a database.	An automatic bunk scanning system to help predict feed remaining in commercial feedlots. Uses satellite positioning and perception technology.	Automation of processing and objective measurement of rib cutting process. Provides the exact coordinates for the 2 rib cuts needed.
Identify the advantages of the technology	**Identify the advantages of the technology**	**Identify the advantages of the technology**
In the event of a disease or contaminant, the system helps with tracing and containing the spread and impacts of the problem. It also allows an animal to be traced to its origin, providing a reputation of food safety.	The technology is more accurate and precise than relying on human systems. The technology will provide improved feed utilisation, improved knowledge of feed intake, and frees up a human resource. It has the potential to improve feedlot awareness and observation 24-7.	Automation allows the industry to remain competitive, with increased efficiency and decreasing labour costs. Technology has improved safety by removing human interaction with a hand circular saw and improved the consistency of cutting through scanning and x-ray technology.

e. **NLIS** is placed on the animals while on-farm and is an advantage at every step in the chain with respect to traceability.

BunkBot is used in the feedlot when animals are being fattened (finished) prior to processing and is an advantage to feedlot producers.

Robotic processing is used in the processing/abattoir step. It is an advantage to employers and employees (safety) and also to retail and consumers as there is consistency in the cuts of meat they purchase.

Online learning task:
Sustainable packaging in the supply chain

2. The Darfresh® 'on board' packaging uses a board made from paper pulp. The meat sits directly on the board and is vacuum-sealed with plastic to seal in freshness and extend shelf life.

   • Technology uses 70% less plastic than standard trays.

   • Instils consumer confidence when selecting meat, as the clear film offers a front and side view of the meat.

   • Consumers can easily inspect the thickness, fat content, marbling and colour before purchase.

4. Answers will depend on student choice of packaging.

5. Answers will depend on student choice of packaging.