From PADDOCK to PLATE

Technologies

Year 7 | Stage 4

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Curriculum focus

The resources in the Technologies Teacher Manual help teachers and students explore the ethical, sustainable, social and profitable qualities of old and new technologies used in agriculture. Students explore the Virtual Video Excursion/s for one or more industries and use this information to understand the importance of food labelling and maketing in a world where technology is the foundation of consumer awareness.

How to use this Teacher Manual

The Technologies Teacher Manual consists of lesson plans and supplementary activities about several agricultural industries in Australia. There are facts about Australian agriculture for your use on page 3, 5, 16, 23 and 29.

First, start with the Springboard video virtual excursions on page 4.

Then, move on to the products or industries within this manual that match your learning aims or interests.

Themes and topics:

- Animal welfare
- Biodiversity
- Communications
- Community
- Drought & natural disasters
- Economics
- Employment
- Environment
- Ethics
- Food miles
- Food security
- Food waste & recycling
- Innovation
- Marketing
- Nutrition
- Pests & diseases
- Profitability
- Seasonality
- Soil & pasture management
- Sustainability
- Technology
- Traceability
- Waste management
- Water security

Acknowledgements

Founder of From Paddock to Plate, Louise FitzRoy, has produced this national educational resource to be incorporated into the curriculum programs of schools across Australia. Louise would like to sincerely thank passionate farmers, orchardists and producers, for dedicating their valuable time to show her around and answer numerous questions about their industry and livelihood. Louise would also like to acknowledge all the sponsors and supporters of From Paddock to Plate.

Australian Curriculum Links

All Industries | Year 7 | Stage 4

Cross-curriculum priorities

Aboriginal and Torres Strait Islander histories and cultures

Asia and Australia's Engagement with Asia

Sustainability

Lesson 1 Technology Decisions	ACTDEK029	Examine and prioritise competing factors including social, ethical and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures
Lesson 2 Pack It Up	ACTDEK030	Investigate the ways in which products, services and environments evolve locally, regionally and globally through the creativity, innovation and enterprise of individuals and groups
Lesson 3 Researching Packaging	ACTDEP036	Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques
Lesson 3 Researching Packaging	ACTDEP039	Use project management processes when working individually and collaboratively to coordinate production of designed solutions
Lesson 4 Processed Cherries	ACTDEK033	Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating
Lesson 5 Egg Labelling Case Studies	ACTDEK029	Examine and prioritise competing factors including social, ethical and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures
Lesson 5 Egg Labelling Case Studies	ACTDEK030	Investigate the ways in which products, services and environments evolve locally, regionally and globally through the creativity, innovation and enterprise of individuals and groups

Supplementary activity cards relate to these learning outcomes:

Safety First (ACTDEP036 – communicating to an audience)

Facts about the Australian agricultural industry

- The gross value of Australian agriculture increased by $3.7 billion from 2014–15, to $58.1 billion in 2015–16.
  SOURCE: ABARES, Agricultural Commodities – June Quarter 2017.
- TIn Australia, individuals spent on average $4739 for food in 2015–16. This includes eating out and non-alcoholic beverages. This amount has risen by 16% during the past six years.
  SOURCE: ABS, Household Expenditure Survey, Australia: Summary of Results, 2015–16, Catalogue No.6530.0.
- Food imports, particularly for processed food, accounted for only 15 per cent of household food consumption in Australia in 2015–16.
  SOURCE: Hogan, Linsday. (2017) *Food demand in Australia: Trends and food security issues*. ABARES research report 17.7, Canberra.
- Out of the $58.1 billion worth of food and fibre Australian farmers produced in 2015–16, 77 per cent ($44.8 billion) was exported.
  SOURCE: ABARES, Agricultural Commodities – June Quarter 2017
- More than 99% of Australia's agricultural businesses are wholly Australian owned, owning 88% (or 343.3 million hectares) of Australia's agricultural land. Wholly Australian owned businesses also control 87% of Australia's agricultural water entitlements (or 13.3 million megalitres).
  SOURCE: ABS, Agricultural Land and Water Ownership, 2015–16, Catalogue No. 7127.0. 2017
- As of May 2017, 304,200 people were employed in the Australian farm sector — accounting for about 3% of the national workforce.
  SOURCE: Australian Bureau of Statistics, *Labour Force, Australia, Detailed, Quarterly, May 2017 Catalogue No. 6291.0.55.003.*
- Across the supply chain agriculture powers 1.6 million jobs.
  SOURCE: Australia's Farm Dependent Economy: *Analysis of the role of Agriculture in the Australian Economy.*
- 216,100 males and 88,100 females are employed in the Australian farm sector
  SOURCE: Australian Bureau of Statistics, *Labour Force, Australia, Detailed, Quarterly, May 2017 Catalogue No. 6291.0.55.003.*
- Agricultural businesses occupy and manage 48% of Australia's landmass, as such, they are at the frontline in delivering environmental outcomes on behalf of the broader community.
  SOURCE: Australian Bureau of Statistics, *Land Management and Farming in Australia, 2015–2016, Catalogue No. 4627.0.*
- At 30 June 2016 there were 371 million hectares of agricultural land in Australia, a 1.4% increase on the previous year.
  SOURCE: Australian Bureau of Statistics, *Land Management and Farming in Australia, 2015–2016, Catalogue No. 4627.0.*
- Australian primary industries have led the nation in reducing greenhouse gas emissions intensity — a massive 63% reduction between 1996–2016.
  SOURCE: Australian Bureau of Statistics, *Australian Environmental-Economic Accounts, 2017, Catalogue No. 4655*
- Australian water consumption decreased in 2014–15 by 7% from 2013–14. The largest decrease in water consumption was in the agriculture industry.
  SOURCE: Australian Bureau of Statistics, *Water Accounts, 2014, Catalogue No. 4655.*
- Agricultural businesses spend a significant amount on managing pest animals and weeds. An average of $19,620 was spent per agricultural business on undertaking pest animal and weed management activities.
  SOURCE: Stenekes, N, Kancans, R and Binks, B, 2017, Pest animal and Weed Management Survey: National landholder survey results, ABARES research report 17.5, May. CC BY 4.0.
- Australian farmers are among the most self-sufficient in the world, with government support for Australian farms representing just 1% of farming income. By comparison, in Norway it is 62%, Korea 49%, China 21%, European Union 19% and United States 9%.
  SOURCE: OECD (2017), Agricultural Policy Monitoring and Evaluation 2017, OECD Publishing, Paris.

Virtual video excursions

Let's get started

All Industries | Year 7 | Stage 4

If this is your first time teaching with the From Paddock to Plate Schools Program, welcome! When planning your lessons, you may first like to read the Welcome Guide on our website.

www.frompaddocktoplate.com.au/school-programs/

Assessing prior knowledge

Kick off by understanding the level of knowledge your students have of farming in Australia. This will determine your structure of delivery.

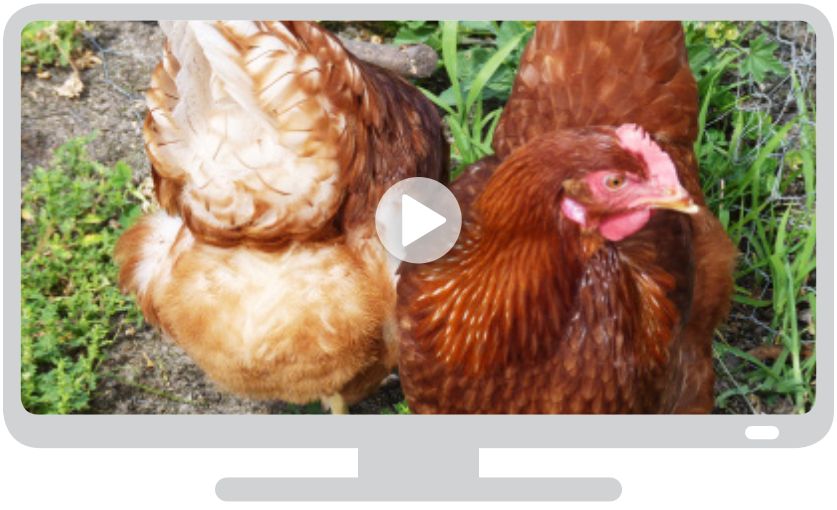
- ASK the students to describe and list what they know about farming in Australia.
- EXPLORE the facts about Australian agriculture (page 3).
- BRAINSTORM and gather ideas, questions and information from the class and use this as a platform to begin this unit. What information do students want to confirm, check, debate or explore?
- DISCUSS any questions that arise.

Now is the time to choose and watch a selection of the **From Paddock to Plate Virtual Excursions.**

You can find them all on the From Paddock to Plate website. Log in and choose your year level, subject or industry of interest:

www.frompaddocktoplate.com.au

Ask students to reflect on what they already know about this industry and what the video showed them that was new, or that changed their thinking.



ALMONDS

Ask students first to reflect on the *From Paddock to Plate* **Almonds Virtual Video Excursion**:

- How do almonds grow?
- What does an orchard look like?
- What can they say about the paddock to plate journey of almonds and almond products?
- What did they learn that they hadn't considered before?
- What would they like to know more about the almonds industry in Australia?

Facts and Vocabulary - Almonds

Facts about the Australian almond industry

- Australian growers produce approximately 10% of the total volume of almonds grown in the world.
- Orchard area planted to almonds increased by 15.8% or 4,904 hectares in 2016 to now total 35,886 hectares
- The number of almond trees now planted in orchards totals more than 10 million.
- Two million virus tested buds were delivered by the ABA to nurseries for grafting to produce healthy trees
- 2016 production of 82,333 tonnes was slightly less than the 2015 harvested crop
- Australia produced 7.7% of the global crop to remain the world's second largest producer behind the USA that grew 80% of world production
- Almonds were 62% of Australia's total tree nut crop that includes macadamias, walnuts, pistachios, hazelnuts and chestnuts (measured as inshell tonnage)
- 97% of almond orchards are efficiently irrigated using drip systems managed by soil moisture monitoring technology
- Annual per capita consumption of almonds in Australia is increasing strongly and exceeded one kilogram for the first time in 2016/17
- Australia ranks 6th in per capita consumption globally
- Domestic sales tonnage increased by 9.9%
- 46.7% of Australian households purchased almonds in the year ending February 2017
- Almond demand by manufacturers was boosted with 274 new products reaching supermarket shelves in 2016
- Australian almonds were exported to 46 countries
- Almond exports earned the nation $464 million
- For every one tonne of almonds sold in Australia, 2.7 tonnes were sold overseas
- India was the single largest destination for exports
- Europe as a region consumed 43.2% of Australia's almond exports with sales of $200.3 million
- East Asia is an emerging market for Australian almonds taking 13.8% of total exports

SOURCE: ABS, Household Expenditure Survey, Australia: Summary of Results, 2015–16, Catalogue No.6530.0.

Useful words and phrases

- Activated almonds
- Almond meal
- Almond milk
- Australian Stock Exchange
- Bacteria
- Belly dumper
- Biomass
- Blanch
- Conveyor belt
- Deciduous
- Drupe
- Export
- Fertigation
- Foliage
- Geographic diversity
- Hi vis clothing
- Hulling process
- Husk
- Irrigation
- Kernel
- Laser sorter
- Microorganisms
- Non-pollinator
- Pasteurisation
- Pollination
- Prune
- Quality assurance
- Renewable energy
- Salmonella
- Self-pollinator
- Shelling
- Stock feed
- Stock pad
- Stockpile
- Weighbridge

Lesson 1

Technology Decisions

Almonds	Year 7	Stage 4

ACTDEK029

Examine and prioritise competing factors including social, ethical and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures

Themes

Sustainability	Ethics	Profitability
Marketing	Social values	Business decision-making

Getting started

DISCUSS and agree a class definition of 'technology'. Technology is:

- the application of scientific knowledge to solve problems; and
- equipment and processes that arise from such application of knowledge.

Watch the *From Paddock to Plate* **Almonds Virtual Video Excursion** with the class.

EXAMINE what technologies Select Harvests uses to grow the almonds in this video.

OBSERVE the tree-shaking and nut-sweeping machines used by Select Harvests. These are examples of equipment technology. DISCUSS how it works and what it does.

Another example is the drone used to get high-angle footage in this video. EXPLORE how drone technology may assist with producing almonds.

Make a list of the technology seen in the video, including processes as well as equipment.

> "So we take specially designed machine that grabs the trunk of the tree and shakes it for up to three seconds and all the nuts fall onto the ground. Once the nut has been sitting on the ground for three days, we get these huge sweeping machines that have big blowers. The blowers push all the almonds into a small pile and they sit there for another two days and then a huge truck turns up and we load them into a semi-trailer and that semi-trailer is then driven to our processing plant."
>
> (5:30 – 5:56)

Ask students, perhaps in pairs or groups, to suggest how the use of these technologies relates to decisions about:

- **Sustainability** – Does Select Harvests use pesticides? What is the long-term impact on the almond industry if bee populations crash in Australia (as they have elsewhere)?
- **Profitability** – How does the technology help them produce uniform, safe, good-looking (saleable) nuts?

Lesson 1: Technology Decisions (continued)

- **Ethics** – Is it right to grow almonds in areas with water restrictions? How can almond farmers conserve water?
- **Social values** - Do consumers know where and how almonds are grown, and how intense the processing of almonds is? Is there a risk of Australian almonds being undercut by cheap imported almonds produced to a lower standard?

Students EXPLORE some of the other technologies featured in the Almonds Virtual Excursion, such as fertigation, the use of the weigh bridge, laser sorters and the process of steam pasteurisation, when required.

Quotes from the video, below, will help them identify and find the various technologies employed in growing and processing almonds.

"In terms of these trees and the tree health, for 12 months of the year we're irrigating with water. Because of the harvesting process where we put nuts onto the ground to do drying, we don't put fertiliser on top of the soil because it can contaminate the nuts. So we put the fertiliser into the irrigation lines and it comes out through these pipes and that's called fertigation. We do this throughout the year to make sure that the trees have the nu trients to grow big and strong for the harvesting process."

(4:30 – 5:00)

"Once it gets to the processing plant, each truck goes through a weigh bridge. At the weigh bridge we look at how much does it weigh, what is the moisture of the nuts, what farm did it come from, what variety is it, what size are they. All that information is entered into a computer and then we can trace all of our product from the farm all the way to the finished product."

(5:57 – 6:16)

"Once it's gone through the weigh bridge, the almonds are then transported to a stock pad, where the truck tips up on its side and unloads all of the almonds onto the stock pad. Those almonds are then pushed up into a pile by a huge loader."

(6:17 – 6:33)

"That product could sit there from three days up to a couple of months and gets called up by the processing plant. When the processing plant wants to take the hull and the shell off the product, it's picked up by a huge loader and put into a belly dumper. That belly dumper is then driven up to our pre-cleaning area."

(6:34 – 6:53)

Lesson 1: Technology Decisions (continued)

"The pre-cleaning area is there to take the sticks, stones and rubbish that might have been on the farm floor, we take all that rubbish out. Once that's been completed, the cleaner product then goes through out hulling process."

(6:54 – 7:07)

"The hulling process is a number of big grinders that take the hull off."

(7:08 – 7:13)

"In terms of hull storage which is by-product or a waste product from the almonds, we put them in these huge storage piles. They're transported from the factory to these piles by these giant screws, or these augers, as they are called."

(7:14 – 7:28)

"You can imagine all these nuts coming through. We take the hull off, so what's left is the kernel with the shell on it. We take them through a number of sheer rollers, to take the shell off. So from the product that came in, we took the hull off, we took the shell of and that leaves us with the kernel."

(7:41 – 7:57)

"All that kernel is then cleaned and sorted by size. So we'll have the smaller nuts in one bin, we'll have the larger nuts in another bin. Each of those bins has a full QA done, so that's quality assurance where we test the moisture, we look for defects like scratches, insect damage or mouldy nuts and all of that information is also entered into the computer and then each bin is taken and stored in the warehouse."

(7:57 – 8:26)

"From the warehouse as a customer might require some nuts, we'll take whatever the customer's specifications are, we'll pick a bin out of the warehouse. That bin is then tipped upside down onto these conveyors where again the nuts are sorted for more stones and any other foreign material that might be in there."

(8:27 – 8:46)

"The almonds then go through a number of laser sorters. Laser sorters are looking for any type of defect. What we're trying to do is have the perfect looking nut and taking little white spots out or any other defects in the nuts."

(8:47 – 8:58)

"Once the nuts have gone through all of the sorters, you'll have a perfect product. That product is either packed in plastic or packed in a carton or packed in a bag and then that process goes through a metal detector. It is then palletised using a robot system and that robot system then automatically shrink wraps it sitting on a pallet."

(8:59 – 9:20)

"If pasteurising is required, which is a kill step for microorganisms like salmonella, we'll put it into a huge chamber. It will sit there for about eight hours. It's a steam process that basically cooks the nuts to make sure all of the nasties are killed."

(9:22 – 9:36)

"Our biggest initiative over the next 12 months is to put a biomass recycling plant in place, which will take our waste product which is hull and shell and burn it to create electricity and steam and provide enough power to run our own plant, but also provide power for the local neighbourhood."

(10:31 – 10:49)

"The factory was commissioned in 2008. It was about $40 million worth. We've got state-of-the-art equipment. You'll see that there are huge vibrators, so it's huge scale. Not many people need to operate it. It's fully automatic. It runs 10 tonnes an hour and we run the factory for about six months of the year."

(10:53 – 11:11)

"Most of our equipment actually comes from overseas, so our processing equipment comes from the US and some of our other equipment may come from Europe."

(13:31 – 13:38)

Decisions about technology

List all the technologies students find in the video. In groups, they use the same four categories to unpack the decision-making each farmer would go through when deciding whether to use this technology or not:

- **Sustainability** – is this sustainable for the environment?
- **Profitability** – will the cost outweigh the benefit?
- **Ethics** – will this help solve an issue or create new ethical concerns?
- **Social values** – does the investment in this technology match or exceed consumers' perceived value of the product and its benefits?

Students rank each type of technology according to the four categories and DECIDE whether or not they would use it. They WRITE or PRESENT a short paragraph explaining their assessment and decision (Why did you decide to use / not to use this technology?) They should refer to the four categories (sustainability, profitability, ethics, social value) in their response.

Recommended source material:

> 'The use or abuse of technology can create social differences, disagreements and ethical conflicts, e.g. genetically modified foods, in-vitro fertilisation technology. While designing, developing and using technology is linked to the evolution of our species, our future existence will be influenced greatly by technologies currently being, or yet to be, designed and created. Consequently, responsible and democratic decision-making, taking into account cultural, societal and environmental factors, is an important aspect of Technology and Design.'
>
> — NT Curriculum Framework

Designing for the future

Students DESIGN a new technology that Bruce could use in the almond orchard to increase productivity and/or decrease the level of manual labour involved in pruning the almond trees and maintaining the almond canopy and orchard floor.

"Hi I'm Bruce van Twest, General Manager at Select Harvests, an Australian-owned and run company. At Select Harvests, basically we have farmers, we have growers, we have marketing people, and we have accountants. We have everybody. We have engineers."

(0:58 – 1:12)

"Each of these nuts needs sun to grow from a flower into a final nut and then to dry so that it can be harvested. So each of these trees are pruned [by hand] to capture as much light as possible."

(2:35 – 2:47)

"In terms of these trees, these trees are approximately 12 years old. The trees themselves, will start producing nuts after about two years, but really become productive at about seven years of age and stay productive for about another 10 years. Once they start getting too old, they start producing less nuts and so at certain points in time, like after about 20 years, we'll actually pull the trees out and put young ones back in."

(3:03 – 3:26)

Traditional and contemporary tech

Students EXPERIMENT with traditional and contemporary technologies when developing a design, considering the advantages and disadvantages of each approach.

They may use the Paddock to Plate app to FIND and VISIT a local farmer's property to INVESTIGATE technologies being used on this farm to assist productivity and environmental sustainability.

App Store: https://itunes.apple.com/us/app/paddock-to-plate/id1012377466?mt=8

Google Play: https://play.google.com/store/apps/details?id=com.mavinapps.produce

Remind students to INVESTIGATE emerging technologies and their potential impact on design decisions, for example digital technologies and robotics.

Students EXAMINE a variety of suitable materials, components, tools and equipment to determine their suitability for particular uses related to durability.

After sufficient time for research and design development, students PRODUCE annotated concept sketches and drawings, using technical terms, scale, symbols, pictorial and aerial views. They develop a digital portfolio with images and text, which clearly communicates each step of a design process.

Here are some great inventions for inspiration!

Recommended source material:

Wired Ag

[Mr Rogers'] farm is wired up like a lab rat. Or, to be more accurate, it is wirelessed up. Moisture sensors planted throughout the nut groves keep track of what is going on in the soil. They send their results to a computer in the cloud (the network of servers that does an increasing amount of the world's heavy-duty computing) to be crunched.

The results are passed back to the farm's irrigation system—a grid of drip tapes (hoses with holes punched in them) that are filled by pumps. The system resembles the hydroponics used to grow vegetables in greenhouses. Every half-hour a carefully calibrated pulse of water based on the cloud's calculations, and mixed with an appropriate dose of fertiliser if scheduled, is pushed through the tapes, delivering a precise sprinkling to each tree. The pulses alternate between one side of the tree trunk and the other, which experience has shown encourages water uptake. Before this system was in place, Mr Rogers would have irrigated his farm about once a week. With the new little-but-often technique, he uses 20% less water than he used to. That both saves money and brings kudos, for California has suffered a four-year-long drought and there is social and political, as well l as financial, pressure to conserve water...'

Lesson 1: Technology Decisions (continued)

Recommended source material (continued):

'...Mr Rogers's farm, and similar ones that grow other high-value but thirsty crops like pistachios, walnuts and grapes, are at the leading edge of this type of precision agriculture, known as "smart farming".

But it is not only fruit and nut farmers who benefit from being precise. So-called row crops—the maize and soybeans that cover much of America's Midwest—are being 'teched up', too. Sowing, watering, fertilising and harvesting are all computer-controlled. Even the soil they grow in is monitored to within an inch of its life. Farms, then, are becoming more like factories: tightly controlled operations for turning out reliable products, immune as far as possible from the vagaries of nature.

Thanks to better understanding of DNA, the plants and animals raised on a farm are also tightly controlled. Precise genetic manipulation, known as "genome editing", makes it possible to change a crop or stock animal's genome down to the level of a single genetic "letter". This technology, it is hoped, will be more acceptable to consumers than the shifting of whole genes between species that underpinned early genetic engineering, because it simply imitates the process of mutation on which crop breeding has always depended, but in a far more controllable way.

Understanding a crop's DNA sequence also means that breeding itself can be made more precise. You do not need to grow a plant to maturity to find out whether it will have the characteristics you want. A quick look at its genome beforehand will tell you. Such technological changes, in hardware, software and "liveware", are reaching beyond field, orchard and byre. Fish farming will also get a boost from them. And indoor horticulture, already the most controlled and precise type of agriculture, is about to become yet more so.

In the short run, these improvements will boost farmers' profits, by cutting costs and increasing yields, and should also benefit consumers (meaning everyone who eats food) in the form of lower prices. In the longer run, though, they may help provide the answer to an increasingly urgent question: how can the world be fed in future without putting irreparable strain on the Earth's soils and oceans? Between now and 2050 the planet's population is likely to rise to 9.7 billion, from 7.3 billion now. Those people will not only need to eat, they will want to eat better than people do now, because by then most are likely to have middling incomes, and many will be well off.

– The Economist, 11 June 2016:
www.economist.com/technology-quarterly/2016-06-09/factory-fresh

Recommended source material (continued):

Toowoomba trials

[In a shed near Toowoomba, researchers at the University of Southern Queensland are developing the tools and techniques they think will dominate farming practice by 2025.

Mechatronic engineer Dr Cheryl McCarthy is researching the use of drones to automatically detect hot spots in crops, and will soon be one of the few people in Australia licensed to operate unmanned aerial vehicles commercially.

Agricultural engineer and biosecurity expert Paul Kamel traps moths in a device that allows him to photograph them under a microscope and upload the image, to help spot incursions early.

Crown rot is a disease caused by fungus, which survives in the stubble of its host plant, limits water movement from the soil and causes browning of the stem. It can be a major headache for the grains industry, causing significant yield losses, particularly in wheat crops. Plant pathologist Dr Cassy Percy is investigating better ways of using phenotyping to learn more about resistance to the disease.

Food expert Lindsay Brown has been investigating the potential of recycling food waste. He has begun clinical trials to look at how the waste products of foods such as wine can be utilised, and made into functional foods which could improve health. "For example, when we make red wine most of the stuff gets thrown out [and] gets used as compost," Mr Brown said.

Precision agriculture expert Troy Jensen has been developing technology which can measure and quantify the spatial capacity of farms in terms of things like fertiliser use. However, to do so requires advanced technology such as auto-steer tractors, which Mr Jensen said already existed. But farm equipment could be even more advanced in the future. "The idea behind fully autonomous, driverless tractors is a possibility," Mr Jensen said.

– *Drones as common as tractors? Farm technology in 2025* by Robin McConchie, Craig Zonca and Arlie Felton-Taylor, ABC Rural, 27 October 2015: www.abc.net.au/news/2015-10-27/drones-driverless-tractor-farming-in-2025/6888352

Lesson 1: Technology Decisions (continued)

Recommended source material (continued):

Paddock packer

The Low Impact Harvester is a mobile, harvesting machine which is structured like a mobile production line and mini packing shed. It allows the vegetable grower to pick, wash and pack the vegetables ready for transportation, in the field where they are grown.

– The New Inventors, ABC TV: www.abc.net.au/tv/newinventors/txt/s1404842.htm

BEEF

Ask students first to reflect on the ***From Paddock to Plate*** **Beef Virtual Video Excursion**:

- What does a cattle farm look like?
- What can they say about the paddock to plate journey of beef?
- What are three technologies students saw in the video?
- What did they learn that they hadn't considered before?
- What would they like to know more about the beef industry in Australia?

Facts and Vocabulary - Beef

Facts about the Australian beef industry

- In total, Australian beef cattle farmers produce 2.5 million tonnes of beef and veal each year
  SOURCE: ABARE, *Australian Commodity Statistics*, 2016.
- The beef industry accounts for 55% of all farms with agricultural activity.
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- The gross value of Australian cattle and calf production (including live cattle exports) in 2015–16 was $12.7 billion
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- Australians eat an average 26kg of beef per person, per year. Remarkably, this has remained relatively constant for the past 15 years
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- In 2015–16, Australians spent $8.5 billion on beef. In terms of volume, beef is the third most popular fresh meat consumed through the food service industry after chicken and seafood
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- Australians remain the second-largest consumers of meat per capita, and the sixth-largest consumers of beef in the world, averaging 26 kg per person in 2016
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- Australia exported 962,983 tonnes of beef in 2016–17, worth $8.5 billion. The major export markets for beef are Japan (29%), the United States (21.7%) and Korea (16.8%).
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- Australian live cattle exports are worth $1.2 billion in 2016–17 – predominantly exported to Indonesia (58.7%), Vietnam (17.7%) and China (8.2%).
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*
- Australia produces 3% of the world's beef, and was the third largest beef exporter during 2016-17.
  SOURCE: Meat & Livestock Australia, *Fast Facts 2017: Australia's Beef Industry.*

Useful words and phrases

- Abattoir
- Arbitrage
- Australian Certified Organic
- Barley
- Bear market
- Boning room
- Bovine
- Bovine spongiform encephalopathy (also known as 'mad cow disease')
- Bull
- Bull market
- Butcher
- By-product
- Carcase weight
- Chorizo
- Dressed weight
- Eastern Young Cattle Indicator (EYCI)
- Export market
- Fat score
- Feedlot
- Grain-fed
- Grass-fed
- Heifer
- Holistic
- Livestock agent
- Marbling
- Meat Standards Australia
- Muscle score
- National Livestock Identification System
- Omega-3
- Organic
- Pastrami
- Premium
- Restocker
- Rotational grazing
- Rump steak
- Sold to the trade
- Steer
- Stocking density
- Store sale
- Trade buyers
- Vealer
- Yearling
- Wagyu

Lesson 2

Pack It Up

Beef	Year 7	Stage 4

ACTDEK030

Investigate the ways in which products, services and environments evolve locally, regionally and globally through the creativity, innovation and enterprise of individuals and groups

Themes

Health	Packaging	Design	Recycling
Food waste	Innovation		

Getting started

EXPLORE how the packaging of beef has changed over time by looking at images and examples of butchers' shops and meat packaging or marketing.

- An excellent resource for finding meat marketing examples from the past is Trove: https://trove.nla.gov.au/
- This link takes you to results for a search on Trove on 'meat advertising' limited to images, Australia only: https://trove.nla.gov.au/picture/result?q=meat+advertising&l-availability=y

As a class or in groups, LIST traditional food packaging materials and methods (e.g. wrapping meat in leaves, drying meat for storage) and modern materials and methods (e.g. canning, freezing, cryovac, modified air packaging). Keep the list for students to refer to.

Recommended source material:

> 'One of the defining moments in the development of the Australian beef export sector since World War Two was the utilisation of vacuum packaging technology, together with the introduction of containerised sea-freight to put chilled boneless beef primals into the Japanese market.'
>
> – *How Australia got chilled beef to Japan* by Stephen Martyn
> ABC News, 7 March 2016

Exploring packaging

WATCH the butcher cut and put Warren's beef into cryovac packaging.

(0:30)

DISCUSS how beef packaging has changed in response to the need for more sustainable patterns of living as well as to new inventions in materials, processes and technologies such as refrigerated transport.

Lesson 2: Pack It Up (continued)

LIST other considerations such as reduced time to market (faster transport) and the need to reduce wasted materials or food waste and their associated financial and environmental costs.

Students RESEARCH AND ANALYSE how developments in materials, tools and equipment have influenced food packaging designed solutions. (E.g. When was plastic developed? In what year or decade did cryovac become common for food packaging? When did containerised shipping develop into a cost-effective option?

Recommended source material:

Packaging protects meat during processing, storage and distribution from:

- contamination by dirt (contact with surfaces and hands)
- contamination by micro-organisms (bacteria, moulds, yeasts)
- contamination by parasites (mainly insects)
- contamination by toxic substances (chemicals)
- influences affecting colour, smell and taste (off-odour, light, oxygen)
- loss or uptake of moisture (evaporation or water absorption).

Packaging films must be:

- flexible
- strong
- light weight
- odourless
- hygienic (clean and toxicologically harmless)
- easy to recycle / sustainable
- resistant to hot and cold temperatures
- resistant to oils and fats
- a good barrier against gasses
- sealable
- low-cost.

'Australia may be following a trend first seen in Europe where increasing attention has focused on environmental credentials behind food packaging. As identified briefly in a Beef Central article last week, Coles supermarkets is the first major Australian retailer to move into bio-degradable 'green' tray packs in some of its fresh beef items, including mince.'

– *'Eco-friendly' trays hit retail mainstream* by Jon Condon
Beef Central, 7 June 2012

Lesson 2: Pack It Up (continued)

Recommended source material (continued):

> 'American-based Sealed Air Corporation has created multi-layer coextruded bags, designed to improve food safety in the fresh red meat and smoked and processed meat industry. The Cryovac OptiDure bags claim to combine mechanical abuse resistance with reduced thickness, while reducing the negative impact it would have on the environment. Pleats and overlap closing ensure the packaging is efficiently sealed. This reduces the risk of leakage, which subsequently lessens the likelihood of contamination.'
>
> – *Meat industry benefits from new packaging innovation* by Aaron McDonald
> Global Meat News, 24 August 2015

Looking forward

Students use what they have seen to PREDICT what beef packaging will be like in 50 years' time. They refer to the list of the qualities of meat packaging (text box above). They CONSIDER traditional and contemporary design and technologies and provide a poster, presentation or short report with their thoughts and predictions.

Teacher resources:

- Beef Central: www.beefcentral.com/news/packaging-eco-friendly-trays-hit-retail-mainstream/
- Beef Central: www.beefcentral.com/processing/improved-packaging-to-enhance-shelf-life-performance/
- Global Meat News: www.globalmeatnews.com/Safety-Legislation/Meat-industry-benefits-from-new-packaging-innovation

Lesson 3

Researching packaging

Beef	Year 7	Stage 4

ACTDEP036

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

ACTDEP039

Use project management processes when working individually and collaboratively to coordinate production of designed solutions

Themes

Innovation | Design | Marketing | Packaging

Supermarket excursion

As a class, VISIT your local supermarket to DISCUSS different types of red meat packaging.

Students take notes, photos or drawings to document what they see.

If a real-life excursion is not feasible, students examine packaging on supermarket websites.

Students EXAMINE typical meat packs and make notes on their usability, convenience and aesthetics.

Developing prototypes

LOOK at the Blackwood Valley Beef logo on the packaging of Warren's small goods range.

(5:01)

Working individually, students will DESIGN their own red meat packaging using a variety of CRITICAL and CREATIVE thinking strategies such as brainstorming, sketching, 3-D modelling and experimenting to generate innovative design ideas.

Students DEVELOP models, prototypes or samples using a range of materials, tools and equipment to test the functionality of their ideas.

They IDENTIFY factors that may hinder or enhance project development.

When they have had suitable time to develop one idea, students PRESENT their packaging prototype to the class. Their presentation should cover materials, processes and design of their proposed packaging.

Lesson 3: Researching Packaging (continued)

Activity card:

Safety First

DISCUSS and EXPLORE the different resources that beef producer, Warren, uses on the farm.

DRAW a storyboard and PRODUCE a safety information video for employees on the Blackwood Valley Organic Beef farm.

DETAIL risk management practices for using the equipment and machinery that you can see in the video.

ACTDEK034 Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment

CHERRIES

Ask students first to reflect on the *From Paddock to Plate* **Cherries Virtual Video Excursion**:

- How do cherries grow?
- What role does technology play in cherry growing, processing and packing?
- What can they say about the paddock to plate journey of Australian cherries?
- What did they learn that they hadn't considered before?
- What would they like to know more about the fruit growing / orcharding industry in Australia?

Facts and Vocabulary - Cherries

Facts about the Australian cherry industry

- Cherries are a small, plump stone fruit and a member of the Rosacea (rose) family that also includes almonds, peaches, apricots and plums.
- The top four cherry producing countries (Turkey, USA, Iran and Italy) account for approximately 50% of the world's cherry production.
- Australia is a relatively small cherry producer by world standards, only producing approximately 0.5% of the world's total cherry production.
- Currently up to 15,000 tonnes of Australian cherries are produced every year with 30% exported. This number is expected to rise to 20,000 tonnes and 50% exported by 2020.
- The Australian industry is spread over six states with around 2,845 hectares under production and 485 grower enterprises currently operating.
- New South Wales and Victoria are the two largest producers of cherries. Tasmania has had a rapid expansion in plantings and is currently the third highest producer. It has a strong export focus, enhanced by its relative pest and disease freedom. South Australia is the fourth largest producer with a significant proportion of its production sold interstate and a small percentage also exported. Both Western Australia and Queensland are relatively small producers primarily focusing on their domestic markets.
- Australian cherries are available from mid/late October to late February, depending on the state and seasonal calendar due to climatic variation, varieties and growing season.
- There are two main cherry species:
- Sweet cherries (Prunus avium L.) are often sold as just generic fresh cherries.
- Sour cherries (Prunus cerasus L.) are mostly used in processed products such as freezing, canning and juices or typically preserved and used in cooking or for making cherry brandy.
- Today there are over 50 varieties grown and many more are being developed in Australia.
- Sour cherries are more commonly grown in Europe but some plantations exist in Victoria South Australia and Tasmania.
- The most well known sour cherry is the Morello.
- A study published in the American Journal of Clinical Nutrition found that sour cherries ranked 14 in the top 50 foods for highest antioxidant content per serve – and are among well-known 'superfoods' such as red wine, berries and dark chocolate.

SOURCE: Cherry Growers Australia Inc.

Useful words and phrases

- Bird damage
- Blossom
- Certified organic
- Cherry season
- Cherry variety
- Commercially available
- Cool store
- Cross compatibility
- Cultivar
- Domestic market
- Earwigs
- Export
- Fertigation
- Fertiliser
- Flowering
- Frost
- Fruit maturity
- Fruit set
- Grading equipment
- Gross value
- Growing season climatic conditions
- Global cherry production
- Hail netting
- Hand picked
- Harvest
- Irrigation
- Microclimate
- Morello
- Orchardists
- Packing shed
- Pollenisers
- Providence
- Pruning
- Rootstock
- Seasonality
- Shelf life
- Sour cherries
- Sweet cherries
- Sweetheart
- Thinning
- Topography
- Tree vigour
- Verticillium wilt fungus

Lesson 4

Processed Cherries

Cherries	Year 7	Stage 4

ACTDEK033

Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating

Themes

Food safety | Nutrition | Food preparation | Health | Preservation

Technology | Processed foods

Taste it

Students TOUCH, SMELL and TASTE fresh cherries picked straight from a tree.

DISCUSS the difference between fresh cherries and foods made out of cherries.

Students IDENTIFY the health differences between fresh, stewed, roasted, dried, pickled, juiced and glacé cherries.

"I have, I've eaten too many cherries. Every cherry season I tend to eat too many first up and then don't touch them again until the end of the cherry season. Yes, it's very hard not to eat a lot of cherries. We allow our pickers to eat of course. Once again they'll usually eat for the first half hour of harvest and then they won't touch another cherry."

(6:19 – 6:43)

Cook it

Students EXAMINE the relationship between cooking and processing foods and the impact on nutrient value and aesthetics.

For example: if you were to cook cherries by the methods listed below, how would the flavor, aroma, texture and appearance of a fresh cherry be affected?

Methods:

- Boiling
- Canning
- Dehydrating
- Freezing
- Frying
- Pickling
- Roasting
- Sautéing
- Steaming

Lesson 4: Processed Cherries (continued)

Would you prefer to eat cherries fresh or stewed? Fried or dried? Covered in chocolate or frozen in yoghurt?

DISCUSS whether fresh fruit (and vegetables) has more nutrients than products containing dried, cooked or otherwise processed fruit. Read the resource below with the class.

Recommended source material:

'A study commissioned by the Victorian Cherry Association has conclusively concluded that "fresh cherries are indeed very beneficial in maintaining good health".

- Cherries have only 224 kilojoules (54 calories) per 100 grams and virtually no fat.
- Vitamins E and C and the flavonoids found in cherries and other fruits may slow ageing and they may slow or even reverse the symptoms of neurological diseases such as Alzheimer's and Parkinson's.
- Sweet cherries contain 16 antioxidants, plus a suite of other compounds with beneficial health benefits. Cherries may benefit people suffering from chronic inflammatory conditions such as gout, pancreatitis, or prostitis, as well as allergic conditions includingasthma, hay fever, eczema and hives because they contain the compounds cyanidin and quercetin.'

— The Cherry Growers Association of South Australia: www.cherriessa.com.au/cherries-your-health/

In pairs or groups, students INVESTIGATE how a recipe can be modified to enhance health benefits. JUSTIFY decisions. Which cooking method would provide greater nutritional value? Or should you keep the fruit as fresh as possible?

What does ripeness of fresh fruit (like cherries), have to do with flavour?

"We just walk along and taste them and have a look at the colour, the size and have a bit of a taste. If they're ready to go, they are nice and sweet."

(6:08 – 6:18)

Researching cherry products

Students conduct online research (perhaps using supermarket websites) into processed foods using cherries (cherry ice cream, cherry chocolate, muesli with dried cherries, cherry fruit leather, eetc.)

They EXPLORE how the food industry creates a new fruit product for market:

- BBC Food Programme (podcast) – Ice Cream factory: https://www.bbc.co.uk/programmes/b00tnjsz

Lesson 4: Processed Cherries (continued)

In pairs, they discuss and prepare a shared statement about these considerations in developing a new product:

- Food safety
- Product shelf-life (preservation)
- Ease of production (preparation)
- Appearance (presentation)
- Flavour and sensory perceptions

In the kitchen, students EXPERIMENT with food preservation methods such as pickling, bottling, drying and freezing cherries to determine changes to food structure and how these impact on designing healthy food solutions.

Ensure students explore the causes of food decay and some of the ways it occurs in daily life, for example:

- Developing a comprehensive checklist of considerations for safe and hygienic food storage and preparation including danger zone temperatures for a food service.
- Storing vegetables in the fridge rather than leaving out on the bench at room temperature to spoil.

Recommended source material:

> 'The natural course of things is decay. Our olfactory and visual senses will tell us when something is past its natural deadline. But rotting food is economically unviable in today's commercially driven marketplace, and food scientists are always looking for more cost-effective ways of prolonging shelf life. In theory, it's a win-win situation: the food industry maximises profits and we the consumers don't have to constantly shop for fresh food. Of course, food preservation is not a new science. Before the days of refrigeration, meat and fish would either be slaughtered and cooked immediately, or preserved by salting. Preservation was essential to the peasant family when food was scarce over the winter months: meat and fish were salted and wild plants, peas and beans were dried. Rightly or wrongly, with the help of preservation techniques you can now buy seasonally produced food all year round. But don't expect your food to taste the same, and preserved food is never as good as the fresh original. Whereas refrigeration slows the process of spoilage, deep freezing at –18°C virtually halts all spoilage by rendering the water in food unavailable to micro-organisms to grow. They do, however, remain alive and resume activity once defrosted. Nutrient loss is generally small. The quality of frozen food depends largely on how soon it is frozen after harvesting. Frozen fruit and vegetables may actually contain more vitamins than their "fresh" counterparts which have been left to languish for days on end on shop shelves. However, some produce, such as strawberries, cannot retain their shape well when frozen, and frozen fruit and vegetables rarely taste as good as the fresh variety.'
>
> – *Frozen, tinned and dried food – even the most health-conscious of us keep a supply to fall back on* by Maria Davies, Institution for Optimum Nutrition, 2006

Lesson 4: Processed Cherries (continued)

As a class, CONDUCT sensory assessment testing of a range of foods to determine how characteristics might be used in food product development.

Try:

- eating a spoonful of fresh cherries and then a spoonful of dried cherries;
- eating a dried cherry on top of a sliver of goat's cheese;
- drying cherries completely and grinding them to a powder before tasting them;
- chopping pitted fresh cherries, mixing with a few ripped fresh mint leaves and a pinch of sea salt;
- freezing dried cherries and tasting some dried cherries frozen, some unfrozen;
- cutting cherries in half and frying them. Try a touch of butter or coconut oil in the pan; and
- freezing fresh pitted cherries in liquids of your choice, e.g. orange juice, milk, sweet tea.

EGGS

Ask students first to reflect on the *From Paddock to Plate* **Eggs Virtual Video Excursion**:

- What sort of environment do farmers build to keep their chickens happy and healthy?
- What did they see that indicated changing technologies in the Australian eggs industry?
- What can they say about the paddock to plate journey of Australian eggs?
- What did they learn that they hadn't considered before?
- What would they like to know more about the egg farming industry in Australia?

Facts and Vocabulary - Eggs

Facts about the Australian egg industry

- Australians consume an average of 213 eggs per person per year.

  SOURCE: Agrifutures Australia
- With the ability to manage larger flocks and the advent of mechanisation, the number of egg farms in Australia has decreased since the late 1970s from 3,200 in 1979 to 337 today.

  SOURCE: Agrifutures Australia
- There are 19 millions hens in farms across the country.

  SOURCE: Egg Farmers of Australia
- Approximately 15 million eggs are produced daily to meet domestic consumption.

  SOURCE: Egg Farmers of Australia
- The egg industry contributes 1.6 billion dollars to the Australian economy.

  SOURCE: Egg Farmers of Australia
- About half of all eggs are bought by consumers in supermarkets and grocery stores, the rest go to food manufacturers, restaurants, cafes and other food outlets.

  SOURCE: Egg Farmers of Australia
- The 12 (dozen) packs of eggs are most popular, with 83% of all grocery eggs sold in this pack size at 79% value.

  SOURCE: Australian Egg Corporation Limited (AECL)
- Hens are kept in two main types of production systems; cage and cage-free, which includes barn and free range systems. Many producers run more than one type of production system and in some cases more than one production system is operated on the same farm. These farms vary in size from less than 1,000 hens to over 500,000 hens. Farms with flocks of 20,000 - 60,000 are most common.

  SOURCE: NSW Department of Primary Industries
- Approximately 55% of hens are kept in cage production systems with the remaining in cage-free systems.

  SOURCE: NSW Department of Primary Industries
- Most aspects of egg farm operations are the same across all production systems – ie shed design, bird genetics, nutrition, routine husbandry, and egg collection and handling.

  SOURCE: NSW Department of Primary Industries
- The most common egg production system world-wide is cage, with approximately 80% of all eggs produced in this way.

  SOURCE: NSW Department of Primary Industries

Useful words and phrases

- Air cell
- Albumen
- Artificial insemination
- Avian
- Barn laid
- Battery cages
- Beak-trimming
- Best practice
- Biosecurity
- Blastoderm
- Blastodisc
- Bloom
- Breed
- Brooding
- Buffer distances
- By-product
- Calcium
- Candling
- Chicks
- Closed flock
- Clutch
- Coop
- Embryo
- Feed hopper
- Flock
- Free range
- Hatchery
- Hen welfare
- Layer
- Manure
- Omega-3 fatty acids
- Omnivorous
- Organic
- Pathogen pressure
- Poultry
- Pullet
- Roost
- Scotophase
- Scratch feed
- Shell membrane
- Stocking density
- UV steriliser
- Yolk

Lesson 5

Egg Labelling Case Studies

Eggs	Year 7	Stage 4

ACTDEK029

Examine and prioritise competing factors including social, ethical and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures

ACTDEK030

Investigate the ways in which products, services and environments evolve locally, regionally and globally through the creativity, innovation and enterprise of individuals and groups

Themes

Packaging | Marketing | Consumer rights | Standards | Processes

Examining egg cartons

As a class, LOOK at the packaging from Margaret River Free Range Eggs in the video (11:00) and on Jan's website:

- Margaret River Free Range Eggs: www.margaretriverreggs.com.au/products/

DISCUSS how egg cartons have changed in response to the need for more sustainable patterns of living. You may find old images of egg promotions on Trove:

- National Library of Australia – Trove

Search for 'Egg Marketing' and limit the search to 'Available online' and 'Australian content'.

You should find photos and advertising posters like this one from 1940:

- Demand Quality Guaranteed Board Eggs: https://nla.gov.au/nla.obj-136982820/view

Recommended source material:

> [Today] 'There's no official national standard for free-range eggs, and the label on your carton can have any number of meanings depending on the producer. Consumers' desire to back better animal welfare and support free-range egg producers has contributed to free range being the fastest growing egg sector, with growth expected at eight times that of caged eggs. But the system is broken. With no national standard for free-range eggs, we are being sold eggs under the free-range label that do not meet our expectations.'
>
> – *Do you shell out for free-range eggs?* By Rachel Clemons & Katinka Day, Choice magazine, 7 August 2014: www.choice.com.au/food-and-drink/meat-fish-and-eggs/eggs/articles/free-range-eggs

Research Assignment

Students research the history of national standards for Australian eggs. They CONSIDER arguments for and against egg labelling laws in Australia.

Working in pairs, students search for definitions of the terms free-range, barn, and cage eggs.

- Did everyone find the same definition?
- What does that make them consider?

Students DESCRIBE the influence that these problems are having on the egg packaging industry. They write an answer to the question:

- **Is a national standard the answer to confusion over what the terms free-range, barn, and cage eggs mean?**

Resources below and the **three case studies** can be used, with other authoritative material, to provide evidence to support their argument.

Their argument should consider whether egg packaging should communicate the processes and environments in which hens are raised. Do we need accurate and specific definitions of the managed environments each of these three labels refers to?

Recommended source material:

'The ACCC has today released guidance for egg producers on its approach to enforcing the new National Information Standard on free range eggs, which comes into effect on 26 April 2018. Under the new Standard, egg producers cannot use the words 'free range' on their egg cartons unless the eggs were laid by hens that:

- had meaningful and regular access to an outdoor range during the daylight hours of the laying cycle
- were able to roam and forage on the outdoor range
- were subject to a stocking density of 10 000 hens or less per hectare, and that outdoor stocking density is prominently displayed on the packaging or signage.

"Shoppers are willing to pay a premium for free range eggs, but only if the chickens genuinely have regular access to an outdoor range. From April 26, free range must only be used by compliant egg producers so consumers can have confidence in the products they are buying," ACCC Chairman Rod Sims said.'

– *ACCC releases guidance on free range egg standard*, Australian Competition & Consumer Commission, 6 February 2018: https://www.accc.gov.au/media-release/accc-releases-guidance-on-free-range-egg-standard

Lesson 5: Egg Labelling Case Studies (continued)

Recommended source material (continued):

'One of Australia's biggest egg producers has continued to defend its farming practices after coming under scrutiny in the Federal Court yesterday as the Australian Competition & Consumer Commission sought to prove that the West Australian family-owned company misled customers over its free-range eggs. The ACCC has alleged Snowdale Holdings, which runs Swan Valley Egg Farms and owns Coles and Woolworths-stocked brands including Free Range Eggs by Ellah, misled customers in its use of the label "free range". Snowdale Holdings director Barry Cocking told the court that, at times, between 2011-13, he had exceeded the West Australian Code of Practice for Poultry's recommended free-range stock density of 1500 hens per hectare because it was voluntary and "it's not fast, firm rules — it's a guide". Gail Archer SC, for the ACCC, said Snowdale Holdings's stock density was at times six hens per square metre compared with the code's requirement of one. Mr Cocking yesterday said he had refused to settle the proceedings out of court because he was fighting for a national standard for free-range eggs. "I'll fight the ACCC on what I believe is a free-range egg," he said. I'm the only one in Australia pushing for a standard out there." That seems not to be the case as the Australian egg industry is working with state and territory consumer affairs ministers and federal Small Business Minister Bruce Billson to draft a national code of conduct by mid-June. It is expected that a national code would take into account the animal welfare code of practice now under review, and work through a variety of certification and labelling standards. Ahead of national talks, major egg producers have baulked at moves by the South Australian government to certify free-range egg labels for farmers who stock a maximum of 1500 birds a hectare.'

– *ACCC court action brings to the boil free-range egg debate* by Sonia Kolbacher & Meredith Booth, The Australian, 16 April 2015: https://www.theaustralian.com.au/nation/politics/accc-court-action-brings-to-the-boil-freerange-egg-debate/news-story/c4b22587cfbb33264bb0b9093011cfc0

The Australian Competition and Consumer Commission has released a guide to assist egg producers better understand their Australian Consumer Law (ACL) rights and obligations when promoting their products as free range. READ the full report here (PDF):

- ACCC enforcement guidance – Free range hen egg claims: https://accc.gov.au/system/files/1029_Free%20range%20Eggs%20guidelines_FA.pdf

'After a consultation process that saw strong support from egg producers and the community, the Government has announced the implementation of a voluntary industry code that provides standards for production of free range eggs in South Australia. A key feature of the code is the stocking density of just 1,500 hens per hectare. In contrast Queensland's stocking density is 10,000 hens per hectare. The code will support those producers who adopt the code with an logo to indicate that they have achieved South Australian Free Range accreditation...'

Lesson 5: Egg Labelling Case Studies (continued)

Recommended source material (continued):

> '... This will provide consumers with greater certainty as to the production of the eggs they are purchasing, make it easier to identify South Australian produce and help to establish South Australian free range eggs as coming from real free range properties with no more than 1,500 hens per hectare. The code will operate on a voluntary basis so as to not restrict other growers (who may comply with other accreditations) from labelling their product as "Free Range" eggs. However, only those growers who comply with the voluntary code can label their product with the logo so as to indicate compliance.'
>
> – Attorney-General's Department, Government of South Australia

Teacher resource:

- ABC News - Defining the indefinable: ACCC releases free range egg guidelines as Australia scrambles for meaning: www.abc.net.au/news/2015-10-07/eggs-free-range-chickens-accc-policy/6834518

Case study one

'The Federal Court has declared that RL Adams Pty Ltd, trading as Darling Downs Fresh Eggs, engaged in misleading conduct and made misleading representations in its labelling and promotion of eggs as 'free range', in proceedings brought by the Australian Competition and Consumer Commission. The Court ordered that Darling Downs Fresh Eggs pay a pecuniary penalty of $250,000. The ACCC alleged, and Darling Downs Fresh Eggs admitted, that from 31 December 2013 to 6 October 2014, Darling Downs Fresh Eggs supplied eggs marketed and labelled as 'free range' when in fact the laying hens had been continuously confined to barns and had never had access to the outdoors. The Court found that by labelling and promoting eggs as 'free range', Darling Downs Fresh Eggs represented to consumers that the eggs were produced by hens which were able to move about freely on an open range each day, and that most of the hens did in fact do so on most days. In fact, as Darling Downs Fresh Eggs admitted, the doors to its barns were kept shut at all times so that none of the laying hens were able to access or use the outdoor range. "The issue of free range is very important to many consumers and the Australian Consumer Law requires egg producers to make truthful, and not misleading, claims," ACCC Chairman Rod Sims said. "It's clearly misleading to claim your eggs are free range when the hens that laid the eggs didn't roam freely outdoors. People are willing to pay a premium for free range eggs which they believe meet ethical or welfare standards. Businesses should not be benefitting financially from misleading claims about farming practices," Mr Sims said.'.

– Australian Competition & Consumer Commission (Australia's competition regulator and national consumer watchdog)

Lesson 5: Egg Labelling Case Studies (continued)

Case study two

'The Federal Court has declared by consent that Pirovic Enterprises Pty Ltd (Pirovic) engaged in misleading conduct and made misleading representations in its labelling and promotion of eggs as 'free range', in proceedings brought by the Australian Competition and Consumer Commission. The Court ordered that Pirovic pay a pecuniary penalty of $300,000 and contribute to the ACCC's costs. From January 2012 until January 2014, Pirovic used egg cartons which included the words 'Free Range' and images of hens on open pasture. The Court found that by labelling and promoting the eggs as 'free range', Pirovic represented to consumers that the eggs were produced by hens which were able to move about freely on an open range each day, and that most of the hens did in fact do so on most days. In fact, as Pirovic admitted, most of its hens did not move about freely on an open range on most days. "Credence claims such as free range claims are powerful tools for businesses to distinguish their products. However, if they are false or misleading, they serve to mislead consumers, who may pay a premium to purchase such products," ACCC Chairman Rod Sims said. The Court found that the eggs supplied by Pirovic were produced by hens, most of which did not move about on an open range because of a combination of the following factors:

- the stocking densities inside the barns where the hens were housed;
- the flock sizes inside those barns; and
- the number, size and placement and operation of the physical openings to the open range.

"This decision provides very clear guidance that any free range egg claim must be backed by farming conditions and practices implemented by suppliers under which hens actually move about on an open range each day," Mr Sims said.'

– Australian Competition & Consumer Commission (Australia's competition regulator and national consumer watchdog)

Case study three

'The Federal Court has ordered Ms Rosemary Bruhn to pay a civil pecuniary penalty of $50,000 for conduct involving substituting cage eggs for free range eggs, following Australian Competition and Consumer Commission action. The ACCC had alleged that from March 2007 to October 2010, Ms Bruhn trading as Rosie's Free Range Eggs represented that eggs she supplied to 109 business customers in South Australia including retail outlets, bakeries, cafes and restaurants, were free range when a substantial proportion of the eggs were, in fact, cage eggs. The penalty imposed by the Court was in relation to Ms Bruhn's conduct during the period from 15 April 2010 to October 2010. During that period Ms Bruhn acquired 55,790 dozen cage eggs which she supplied to those business customers as free range eggs. "The ACCC takes action in cases such as this to protect consumers and also to protect other egg suppliers who accurately label and supply eggs," ACCC Commissioner Sarah Court said. "The Court's decision should serve as a reminder that the ACCC will take action against suppliers who act unlawfully and represent that eggs are free range when they are not...."

Lesson 5: Egg Labelling Case Studies (continued)

Case study three (continued)

'...The Court has declared that Ms Bruhn's conduct was liable to mislead the public and breached section 55 of the Trade Practices Act 1974 (now known as the Competition and Consumer Act 2010). Ms Bruhn's unlawful conduct comprised supplying eggs to those business customers:

- in cartons which stated "Rosie's Direct from the chook to you", 'Free Range Eggs" and "produced and packed at Rosie's Free Range Eggs" and featured an image of Ms Bruhn outdoors surrounded by chickens;
- in boxes containing cartons or trays of eggs which, from early 2009, had "Rosie's Free Range Eggs" prominently printed on them;
- under her business name without any qualification as to the method of production; and
- issuing invoices to those customers which also stated "Rosie's Free Range Eggs" and "Direct from the chook to you" and included the image of Ms Bruhn surrounded by chickens.'

– Australian Competition & Consumer Commission (Australia's competition regulator and national consumer watchdog)

Teacher note

The cases above form part of a wider investigation by the ACCC into free-range claims made by hen egg producers. The ACCC understands that there are a number of farming conditions that impact on whether hens are able to, and do, move freely on an open range each day. The conditions (and their impact) vary between producers and no single condition of itself is conclusive. The relevant conditions include:

- the internal stocking density of sheds;
- the conditions of the internal areas the hens are housed in;
- the number, size and location of any openings to an outdoor area;
- the time of the day and how regularly the openings are opened;
- the size and condition of the outdoor area, including any shaded areas, the presence of food, water and different vegetation and ground conditions;
- the stocking density of any outdoor area; and
- whether the hens have been trained or conditioned to remain indoors.

Extension project (optional)

Students WRITE a letter to certification body, The Australian Egg Corporation Ltd (the group which represents most egg producers in Australia), requesting a list of their standards on what 'free range' is.

They also CONTACT the Egg Labelling Integrity Panel, an advisory service on egg carton labelling to DISCUSS its criteria for reviewing labelling artwork and how it provides feedback based on labelling law, regulation, standards and industry guidelines: https://elip.com.au