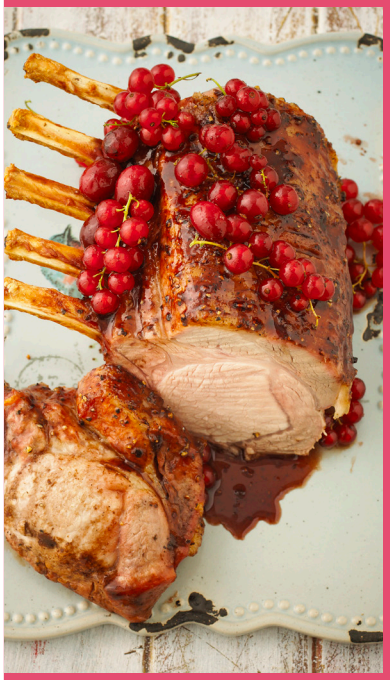
AUSTRALIAN Pork™

An Educational Unit for Secondary Schools

Producing and Marketing Australian Pork



Acknowledgements

This educational resource was produced by Australian Pork Limited (APL) in conjunction with the Primary Industries Education Foundation Australia (PIEFA).

The resource is designed to introduce young people to pork production in Australia. Whilst not an exhaustive educational resource, it is intended to raise the awareness of school-aged students about the sustainable resource management practices in pork production in Australia, supports investigations of the past and present and includes investigating a range of futures for intensive livestock industries, like pig farming.

The materials in this educational resource have been developed by Angela Colliver from Angela Colliver Consulting Services Pty Ltd.

APL would like to acknowledge and sincerely thank the education program reference group for offering comments on the drafts of materials in this educational resource.

‘EDUCATION IS NOT THE FILLING OF A BUCKET BUT THE LIGHTING OF A FIRE.’

(W.B. Yeats)

CONTENTS

Introduction

Rationale

This resource material aims to help teachers and students in secondary schools explore pork production and marketing systems in Australia.

The objectives of the educational resources are to:

- Support APL and its members in expanding awareness about the pork industry in Australia by engaging and informing teachers and students about the role and importance of the industry in the Australian economy, environment and wider community.
- Provide resources which help build leadership skills amongst teachers and students in communicating about pork production and the industry in Australia.
- Develop education resources that can be used across Australia that provide encouragement, information and practical teaching advice that will support efforts to teach about pork production and the pork industry sector.
- Educate school students on ways pigs are raised and pork products are marketed.
- Demonstrate to students that everyone can consider careers in the pork industry and along the chain of supply of pork products.
- Develop engaging learning programs using an inquiry process aligned to the Australian Curriculum.
- Develop in school communities, an integrated pork industry education program that emphasises the relationship between the pork industry, individuals, communities, the environment and our economy.

These educational resources are an effort to provide practical support to teachers and students learning about pork production.

About the approach

Several key principles underpin the theoretical and practical application to this unit. In providing an ***integrated framework for inquiry***, complemented by rich explorations of texts that are, in turn, supported by an emphasis on undertaking a challenge or task, the unit requires students to:

- Search for information using both digital and non-digital means;
- Use research techniques and strategies;
- Use thinking and analysis techniques;
- Present findings to a real audience; and
- Reflect both on the product created and the process undertaken.

Rather than seeing knowledge as something that ***is taught*** the emphasis in this unit is on knowledge and understanding that ***is learned***.

The unit involves students in:

- Working from a basis of their prior knowledge and experience;
- Seeing a real task or purpose for their learning;
- Being directly involved in gathering information firsthand;
- Constructing their knowledge in different ways;
- Presenting their learning to a real audience; and
- Reflecting on their learning.

The approach used, is the ***inquiry approach*** through five phases: Engage, Explore, Explain, Elaborate and Evaluate. The phases of the model are based on the 5Es instructional model (Bybee, 1997). These phases are:

- **Engage:** The 'Engage 'phase begins with lessons that mentally engage students with an activity or question. It captures their interest, provides an opportunity for them to express what they know about the concept or skill being developed, and helps them to make connections between what they know and the new ideas.
- **Explore:** The 'Explore' phase includes activities in which they can explore the concept or skill. They grapple with the problem or phenomenon and describe it in their own words. This phase allows students to acquire a common set of experiences that they can use to help each other make sense of the new concept or skill.
- **Explain:** The 'Explain' phase enables students to develop explanations for the phenomenon they have experienced. The significant aspect of this phase is that explanation follows experience.
- **Elaborate:** The 'Elaborate' phase provides opportunities for students to apply what they have learned to new situations and so develop a deeper understanding of the concept or greater use of the skill. It is important for students to discuss and compare their ideas with each other during this phase.
- **Evaluate:** The 'Evaluate' phase provides an opportunity for students to review and reflect on their own learning and new understanding and skills. It is also when students provide evidence for changes to their understanding, beliefs and skills.

Source - Primary Connections: www.primaryconnections.org.au/about/teaching

Teacher Notes

Resource description

This is a unit with five inquiry teaching sequences about pork production and marketing in Australia.

This unit encourages students to investigate and make judgements about the ethical and sustainable production and marketing of Australian pork.

The unit explores the variety of technologies and methods used by the pork industry to raise and produce pigs.

The unit also explores the techniques involved in conducting campaigns and programs to increase the demand for, and promote pork. Students explore key elements of how pork products are marketed and labelled, analyse these elements and design a labelling system that will be attractive to the consumer and communicates accurate information about how a range of pork products were farmed and where they were produced.

It also explores the challenges and opportunities that exist in pork production in Australia, including the quality assurance systems used by the industry to protect the pigs, the environment and the consumer.

Having investigated these contexts about the pork industry, students then consolidate and present these understandings to an audience following the study.

Year levels: Year 9 and 10

Curriculum focus:

It contains a unit of work in Technologies and Science with a variety of student activities selected as vehicles to help students:

- Explore a range of Australian pig production methods;
- Explore label claims used to describe the origin of pork products;
- Examine production technologies and methods used in the pork industry;
- Examine the challenges in pork production, including the quality assurance systems used by the industry to protect the pigs, the integrity of the product, the environment and the consumer;
- Examine other aspects of pork production and marketing – e.g. traceability in the pork value chain;
- Design a labelling system that communicates accurate information about how a range of pork products are farmed and where they are produced; and
- Reflect and evaluate what they know about the production and marketing of pork.

Teachers will find, as they examine this unit and its student activities that there are some learning areas which are more strongly represented than others. This is a consequence of the subject matter with which students are dealing. Sustainability is the dominant cross curriculum priority, and Technologies and Science learning areas feature strongly in the unit as the topics deal with the ethical and sustainable production and marketing of pork. Literacy and the critical and creative thinking, particularly in design and technologies processes are featured strongly throughout the activities.

Deep understanding takes time; achieving it is a gradual process that evolves throughout the unit and is facilitated by reflection. This unit invites students to think beyond the information and data they gather and the texts they read and view. To step back from their investigations and do some big picture thinking for:

- label claims used to describe the origin of pork products
- the sustainability of Australian pig production and animal welfare
- reducing animal impact on the environment
- reducing energy use
- improving the recovery and recycling of waste products
- reduced piglet mortality on farms
- the pork supply chain as a connected enterprise
- the traceability of Australian Pork

In many activities, it is suggested the teachers 'reflect aloud' and thereby model to students the kinds of questions, language and thinking associated with this task.

Based on Australian Curriculum, Assessment and Reporting Authority (ACARA) materials downloaded from the Australian Curriculum website in March 2015. ACARA does not endorse any changes that have been made to the Australian Curriculum.

Australian Curriculum Content Descriptions

Technologies

Design and Technologies: Knowledge and understanding

Investigate and make judgments on the ethical and sustainable production and marketing of food and fibre ACTDEK044

Science

Science as a Human Endeavour: Use and influence of science

People use scientific understanding and skills in their occupations and these have influenced the development of practices in areas of human activity ACSHE121 ACSHE136.

Scientific knowledge has changed people's understanding of the world and is refined as new evidence becomes available ACSHE119 ACSHE134.

Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations ACSHE120 ACSHE135.

Cross Curriculum Priorities: Sustainability

OI.2: All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.

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

OI.4: World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability.

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

OI.6: The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.

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

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

OI.9: Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), downloaded from the Australian Curriculum website in March 2015.

General capabilities

Literacy, ICT capability, Critical and creative thinking, Personal and social capability

NSW Syllabus Outcomes

Agricultural Technology Stage 5

A student:

5.3.1 investigates and implements responsible production systems for plant and animal enterprises

5.3.4 explains and evaluates the impact of management decisions on animal production enterprises

5.4.2 evaluates management practices in terms of profitability, technology, sustainability, social issues and ethics

5.4.3 implements and justifies the application of animal welfare guidelines to agricultural practices

5.5.1 designs, undertakes, analyses and evaluates experiments and investigates problems in agricultural contexts

Implementing the unit and activities in the classroom

Using the unit

The unit can be used in a number of ways. It will be of most benefit to teachers who wish to implement a sustained sequence of activities following the inquiry stages highlighted in the 'About the Approach' section of this resource in Year 9/10 in Technologies and in Science as stated in the Australian Curriculum. In NSW schools it will benefit teachers who wish to implement a food and fibre focus in the NSW Syllabus for the Australian Curriculum Agricultural Technology Years 9-10 Syllabus.

Selecting activities

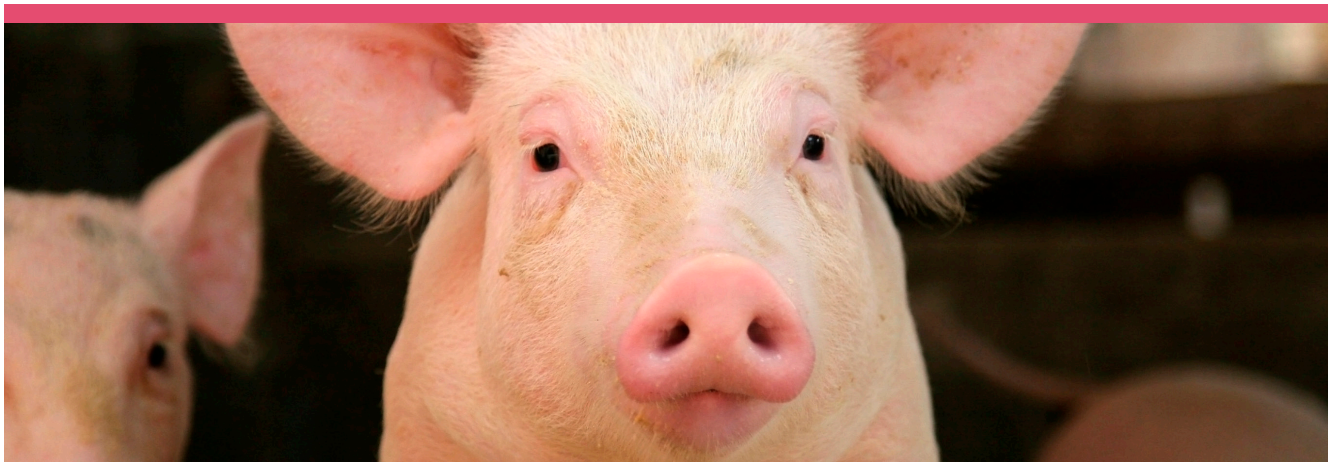
At each stage, several activities are suggested from which you are encouraged to select the most appropriate for your purposes. Not all activities in each stage of the unit need to be used. Alternatively, you may add to or complement the suggested activities with ideas of your own.

It is suggested that teachers create a hyperlinked unit. Organise the digital resources for your class's use on a website or wiki or provide them on your interactive whiteboard.

Resourcing the unit

The resources suggested are on the whole, general rather than specific. Schools and the contexts in which they exist vary widely as does the availability of some resources – particularly in remote areas. There is a strong emphasis in the unit on gathering information and data research and observations feature strongly as these methods develop important skills and ensure that the exploration of the topics are grounded in a relevant context.

Some You Tube and online videos in addition to Internet based resources are suggested in the unit. You will need to investigate what technology is available in your school.



Adapting the unit

The unit is targeted at Year 9 and 10 students. This is a suggested age range only and teachers are encouraged to modify activities to suit the needs of the students with whom they are working.

Many teachers in secondary schools may have one lesson of theory when teaching 'Agriculture'. It may therefore be necessary to choose activities from this inquiry sequence of learning. A trial school suggested they used the following activities before undertaking the assessment task.

- Pig production methods
- Production technologies and methods
- Challenges in pork production
- Pork production and marketing
- Label claims describing pork products
- Designing a labelling system

The unit's topics are based on content descriptions of the Australian Curriculum, on the key perspective of education for sustainability and embrace content that we believe is of relevance and significance to all students. We encourage you to explore ways in which the content can be adjusted to the context in which you are working.

Many of the activities contain the following icons offering a suggestion on how many students should be involved:

Suggested for individuals

Suggested for pairs or small groups

Suggested for larger groups or entire classes

Resource sheets are provided for some activities. Most are for photocopying and distribution to students.

They are identified within units by the following icon: **Resource 1.2**

The resource sheets are designed to assist teachers to facilitate learning without necessarily having access to many other resources.

What about assessment?

Rather than being a task carried out at the end of the unit, assessment is viewed as integral to the entire unit sequence. Each activity should be regarded as a context for assessment of student learning.

When planning and implementing the unit of work, make clear decisions on what you will focus on in assessing learning. The unit provides an opportunity for a range of ***skills*** and ***understandings*** to be observed. We encourage you to devise an assessment plan or assessment rubric that features areas to be assessed over subsequent lessons.

In planning for assessment, student learning in the following areas can be considered:

- Understandings about the topic;
- Development of skills;
- Exploration and clarification of values;
- Use of language in relation to content;
- Ability to use and critically analyse a range of texts;
- Ability to analyse and solve problems;
- Ability to interpret information, perceive its meaning and significance and use it to complete real-world tasks;
- Ability to work cooperatively with others; and
- Approach to learning (independence, confidence, participation and enthusiasm).

For this unit, the following understandings are provided to assist teachers in planning for assessment.

By the end of this unit, students should understand:

- How food (pork) is produced in managed systems and how Australian pork is marketed to consumers, chefs in restaurants, retail supermarkets, butchers and other speciality retailers ACTDEK044
- How people right through the supply chain can use scientific understanding and skills in their occupations and these have influenced the development of practices in areas of human activity ACSHE121 ACSHE136
- How scientific knowledge has changed people's understanding of the world and is refined as new evidence becomes available ACSHE119 ACSHE134
- How solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations ACSHE120 ACSHE135

Assessment strategies

Each stage in the inquiry sequence provides information about student learning. There are however, two stages in the unit that are central to assessment: the **engage** stage and the **evaluate** stage. Work that is undertaken in these stages can assist teachers to monitor growth and see concrete examples of the way student ideas have been refined or changed through the unit sequence. Work samples should be retained for this purpose.

This unit contains a 'Student Task' which is well suited for assessment, as it is the summation of the work undertaken by the students in this unit.

Some questions and possible answers

Should I do all the activities?

At each stage of a unit, a number of activities are listed. You would not be expected to do them all. Instead, the unit is designed so that a selection of activities can be made at each stage. You should select the activities according to the needs and interests of your students and the time, relevance to the existing school curriculum and resources available to you.

While you are encouraged to follow the suggested inquiry sequence for each unit, it is quite possible to pick and choose from the range of activity ideas throughout the unit. It may also be used in conjunction with other programs you use.

How do these units fit into my weekly program?

Although the unit integrates a range of key subject areas, it is not designed to be a total program. It is assumed that regular routines that operate in your classroom will continue to run alongside your unit of work. For example, you may have regular times for use of the library, for maths, physical education etc. These things don't change – although student's writing topics or choice of topics to research in the library or in ICT classes may be may be influenced by this unit.

How long should the unit run?

This will of course depend on your particular circumstances but generally, a few weeks to a term is suggested.

I don't know much about pork production and the marketing of Australian pork myself – will I be able to teach it effectively?

Yes! The unit is designed in such a way that you, as the teacher are a co-learner and you are provided with teacher notes, plus the resources are mainly web-based and are readily available. Most importantly, you will find that you learn with the students and make discoveries with them.

Fact Sheet: Facts and Figures about the Australian Pork Industry

This page gives some basic pig production information that may be helpful when you interact with the school students.

Pigs and the Environment

The Australian pork industry is serious about environmental stewardship. The industry believes it has a duty to ensure that Australian pork is produced and distributed responsibly, while also remaining competitive and sustainable. The Australian pork industry has taken proactive steps to help ensure its producers carefully manage the nation's precious environment and resources. In efforts to reduce the industry's environmental footprint, ongoing industry research and development is focused on the continuous improvement of overall productivity, waste minimisation, pollution prevention and beneficial reuse of wastes.

Environmental issues pose both a challenge and opportunity for the Australian pork industry. The industry has tackled this challenge head-on and is making important progress in addressing these issues—especially in acknowledging and addressing greenhouse gas (GHG) emissions. The industry was the first in Australia to have developed and approved a methodology for the government's Carbon Farming Initiative (CFI). This initiative is now part of the new Emissions Reduction Fund (ERF).

GHG emissions produced by the pork industry are significantly lower than other agricultural sectors such as beef cattle, dairy cattle and sheep. Currently, the industry's emissions and potential mitigation options puts the industry in the position to have a low, if not the lowest, global warming potential for pork production worldwide. The industry is striving to reduce this even further by setting an industry goal of ***1kg CO_2 per kg of pork produced.*** Fortunately, most of the industry's GHG relate to emissions from effluent ponds. This provides pig farmers with a fantastic opportunity for emissions capture, destruction or use. Progressive industry research is developing innovative new technologies and management systems to mitigate and utilise these GHG emissions. Current research shows that a 500 sow piggery has the potential to produce enough energy to power 3.1 million 100 watt globes for one hour, or produce electricity to run 62 houses for one year. And if combusted and destroyed, it would eliminate the equivalent of the fossil fuel GHG emissions from 458 Toyota Corollas travelling 20,000km/per year burning 7 Litres/100km.

As well as GHG emissions, the industry is also proactively addressing many other environmental issues such as nutrient management, by-product reuse, alternative waste management and soil health.

Pigs and Food Safety

The Australian pig herd is free from many serious diseases afflicting other pork producing countries. This is why product integrity continues to be one of the most important aspects of Australian pork production. The industry has quickly responded to growing consumer demand for top quality produce that is safe to eat. The Australian Pork Industry Quality Assurance Program (APIQ✓®) is an on-farm quality assurance program that allows producers to demonstrate good farming practice using the principles of Hazard Analysis and managing Critical Control Points for management, food safety, animal welfare, bio-security and traceability. The uptake of APIQ✓® by producers throughout Australia has reached 91% of the national herd and is increasing.

Australia's pork industry is also leading the world to ensure its pork products are fully traceable from paddock to plate. This has been realised through a traceability system (PigPass National Vendor Declaration - NVD). The PigPass NVD provides key information that can be used to trace pigs or pork back to the property of origin in the event of an emergency, such as an animal disease outbreak or a food safety incident.

Additionally, Australia's pork industry newest traceability system Physi-Trace enables rapid trace-back of pork in the event of a food safety incident. Physi-Trace also offers a compliance verifying pork product label that can identify where nearly every domestic pork product comes from.

These systems help to ensure the integrity of the Australian pork supply chain which makes the Australian pork industry leaders in Australian agriculture.

Looking after our Pigs – We're Leading the World

Australian pig producers have the same concerns as the community when it comes to taking care of their pigs. To demonstrate that pig farmers are listening to consumer sentiment, in November 2010 the industry announced the voluntary phase-out of sow stalls by 2017. Australia's pig farmers are the first in the world to make such a voluntary commitment.

Producers understand more than anyone that providing excellent care results in a contented animal that provides a high quality product—pig producers' livelihoods depend on it. The industry invests millions of dollars each year to research new technologies and practices to improve pig welfare, and provide valuable education and training to industry personnel throughout Australia. Additionally, APL invests over $800 000 annually in research to improve pig welfare alone.

The *Model Code of Practice for the Welfare of Animals (Pigs), third addition*—(the Model Code)—is a guide that has been developed by the Australian government in consultation with all levels of industry, regulators, RSCPA and scientists to detail the acceptable practice for the management of pigs. It outlines all responsibilities involved in caring for pigs—including their housing, food, water and special needs. Standards in the Model Code have been incorporated into APIQ✓® and all APIQ✓® accredited farms are independently audited each year to ensure producers comply with these standards.

How Pigs are Farmed

All pigs grown for meat are housed in different sized groups depending on their age and weight.

A sow raised for breeding will have her first litter when she's about one-year-old. The gestation period (the time from conception to birth) for a sow is 3 months, 3 weeks and 3 days. She can have up to two litters each year and usually has between 10-14 piglets weaned per litter. The piglets feed from their mother for three to four weeks before being weaned and grouped with other pigs the same age in a weaner or grower facility.

Pigs are hand fed on mostly grains and continue to grow until they reach between 24-55kg and are sold as 'porkers'. Pigs that are sold between 55-110kg are known as 'baconers/ finishers' – most pigs are sold between 80–100kg. It usually takes between 18-20 weeks for a pig to reach 100kg.

There are three main types of pig farming methods used in Australia—indoor housing, deep litter housing and outdoor bred/free range systems.

Indoor housing systems are for pigs from birth to sale and for lactating and weaned sows. This system allows pigs of similar ages to be kept together. Group pens and individual pens are often used indoors.

Deep litter housing systems are usually large open-sided sheds or hoop–like structures with deep litter flooring (rice hulls, straw, sawdust). These systems are used extensively for growing pigs and for group housing of dry sows.

Free range systems consist of outdoor paddocks, including rooting areas, wallows and shelter huts. The weaners, grower pigs and sows all have access to paddocks at all times throughout their lives. The paddocks must be rotated with a crop-forage-pasture phase.

Outdoor bred systems are where adult breeding sows live in open spaces with free access to paddocks for their entire adult life. Piglets are born and raised under these conditions until weaning when they are moved to grow out housing. The paddocks must be rotated with a crop-forage-pasture phase.

Gestation stalls: In November 2010, the industry overwhelmingly agreed that Australia would be the first nation in the world to voluntarily phase-out the use of sow stalls by 2017. This means sows and gilts must be kept in loose housing from five days after mating until one week before farrowing.

The reason producers have used sow stalls in the past is because pigs can be extremely aggressive animals- especially during the early stage of pregnancy. The best and safest way to ensure sows get enough food and water and aren't bullied, bitten and injured has been to protect them in individual stalls. Australian producers are now transitioning to a sow stall free status.

Piglet Protection Pens: The average sow weighs between 120–300 kg (equivalent to three standard fridges) and after farrowing, her new piglets are at serious risk of being crushed to death. A piglet protection pen allows a sow to stand up, lie down and stretch out, while keeping her piglets safe and warm in a separate section. The temporary use of a piglet protection pen during the piglets' most vulnerable weeks plays a vital role in their protection. In the wild sows build nests which don't allow the piglet to leave until they are big and strong enough. This protects the piglets in a similar way to piglet protection pens. It's estimated that the use of piglet protection pens save over a million piglets each year.

How to Make Sure You're Buying Australian Pork

All fresh pork sold in Australia is 100% Australian grown. However, 70% of processed pork (ham, bacon and smallgoods products) is made from frozen boneless pork imported from places like Denmark, Canada and the United States.

When buying Australian pork, look for one of three things:

- the packet label states 'Product of Australia'
- the bright pink Australian PorkMark logo
- the green Australian Grown kangaroo logo.

Or visit the Australian pork consumer website: www.pork.com.au and look for a butcher near you that sells Australian grown pork to make ham, bacon and smallgoods products.

Nutrients

Nutrition Information: Trimmed Lean Pork *	Quantity per 200g serving size	% Daily Intake per serving **
Energy (kJ)	930	11%
Protein (g)	46.6	93%
Total fat (g)	3.70	5%
Thiamine (mg)	1.95	178%
Niacin (mg)	18.5	185%
Vitamin B6 (mg)	1.01	63%
Vitamin B12 (µg)	0.69	35%
Zn Zinc (mg)	3.69	31%
Fe Iron (mg)	1.44	12%
Se Selenium (µg)	42.4	61%

DATA SOURCED FROM:

H. Greenfield, J. Arcot, J.A. Barnes, J. Cunningham, P. Adorno, T. Stobaus, R.K. Tume, S.L. Beilken, W.J. Muller. 2009. Nutrient composition of Australian retail pork cuts 2005/2006. Food Chemistry 117, 721–730.

A.J. Sinclair, S. Barone, T. Stobaus, R. Tume, S. Beilken, W. Müller, J. Cunningham, J.A. Barnes, H. Greenfield. 2010. Lipid composition of Australian pork cuts 2005/2006. Food Chemistry 121, 672–681.

* Trimmed Lean Pork is calculated using the numerical average of raw trimmed lean pork cuts (Loin Steak, Fillet, Rump Steak, Round Steak, Topside Steak, Silverside Steak, Diced Pork, Pork Strips, Loin Roast, Round Mini Roast and Loin Chop)

** Percentage Daily Intakes are based on an average adult diet of 8700 kJ. Your daily intakes may be higher or lower depending on your energy needs.

Bringing Home the Bacon

Did you know that pork is the most widely consumed meat in the world?

- Australia produces around 367,000 tonnes of pig meat every year. A little over 10% is exported to countries like Singapore, New Zealand and Hong Kong, and 25% is sold through restaurants and other food service outlets in Australia. (*Figures current as at early 2015*).
- Each year Australians consume around 24.2 kg of pork per person—this is made up of 9.2 kg of fresh pork and 15 kg of processed products such as bacon, ham and smallgoods. (*Figures based on information supplied September 2014*).
- During 2014-15, pork products accounted for just over 10% of Australia's total fresh meat retail consumption and had a gross value of production (GVP) of more than $1137 million. (Source: ABARES, Agricultural Commodities March 2015).
- Australian farmers produce around 4.85 million pigs a year (forecast number of pigs produced to the end of June 2015) from a sow herd of around 267,000 in June 2015.
- The APL PigPass NVD Traceability database in November 2014 had over 2,100 pig producer registrants. However, just over 1,500 producers could claim they derive an income from growing pigs.
- The main source of food for Australian is cereal grains such as wheat, barley and sorghum, resulting in a white fat around the outside of the meat.

Crackling Facts!

- The Australian pork industry has taken a world-leading position by voluntarily committing to phase out the use of sow stalls, meaning that sows will not be confined in sow stalls from five days after they are last mated until one week before farrowing, when they are moved into farrowing (birthing) accommodation. At the beginning of 2015, 69% of Australia's sow herd is now housed in this manner.
- Pork accounts for approximately 0.4% of the national greenhouse gas emissions – significantly lower than other agricultural sectors, including beef at 11.2% and sheep at 3.4%. (Source: Garnaut, R 2008, The Garnaut climate change review – final report, available at: www.garnautreview.org.au/index.htm)
- Whether housed indoors or outdoors, a pig spends more time resting than any other domestic animal.
- Pig producers use the manure and effluent of their farms as a fertiliser to improve crops and pasture, or to capture methane gases to convert to energy.
- Numerous pig producers are now using their manure to generate electricity to power their whole farm.
- Australia's pig herd health is one of the best in the world, free from many diseases found in most other pig producing countries.
- The feed component (mainly grains such as wheat, barley and sorghum) makes up about 60% of the total cost of producing pork.
- On average, a sow will produce 10–14 piglets per litter.
- The average growth rate of Australian pigs is around 600–650 grams a day from birth to sale.
- Grower pigs eat the equivalent of about 3% of their body weight and drink about 10% of their body weight, daily.
- Pigs are considered to be smarter than dogs and are easy to train. This characteristic helps producers develop safe handling routines.
- Pigs are unable to perspire and they lose heat through their mouths. The ideal growing temperature for older pigs is 20–22°C.
- Pigs have colour vision but they can't focus both eyes on the same spot. Pigs have a very wide angle of vision (310 degrees).
- A female pig which has nursed a litter is called a sow; a female pig which has not nursed a litter is called a gilt.
- Pig heart valves have similarities to human heart valves and have been transplanted into humans for many years. Don't worry- the valves are treated to preserve the tissue and prevent immunological reactions.

Step 1: Engage with the topic

Getting started

Purpose

To provide students with opportunities to:

- Share information about the pork products they eat
- Gather information about student's prior knowledge about pork products, labelling on pork products and the production of Australian pork
- Share ideas about marketing campaigns
- Build an interest about pork production and the labelling used on these products
- Explore information about pigs and pig farming
- Develop skills in making connections between ideas
- Help set directions for an investigation.

Diets containing pork

Each day we behave in particular ways and eat particular foods. Pork has many important health benefits. Lean trimmed pork is a source of protein, thiamine, niacin, B6, B12, selenium, riboflavin, zinc and Omega-3.

The scientific evidence shows benefit from the consumption of Omega 3 fatty acids for cardiovascular, brain and eye health.

Talk with students about the particular pork products they eat, the number of times per week that pork is eaten; ways pork is prepared for eating and their favourite pork meals.

Buying pork

Capture student interest and find out what they know about farms where the pork people consume originates from.

Present a scenario.

This week you may have eaten a ham sandwich, a pulled pork bun, quiche containing ham or bacon, a serve of pork spare-ribs, bacon and eggs, a piece of roast pork, some tinned spam, a piece of pork loin or some pork dumplings.

The local butcher shop only sources fresh pork cuts from Australian sources.

The local shop might source processed pork products such as pre-packaged bacon from Canada and pre-packaged ham from the United States of America; or pre-packaged smoked ham sausages such as Bratwurst from Germany; Salami from Italy and pre-packaged Chorizo sausage from Spain. The shop might also stock other pork produce from overseas, such as Denmark, the Netherlands, and Belgium.

The local Coles supermarket meat cabinet might contain packaged pork cuts such as pork fillets, sirloin steaks, mince, and easy carve leg roasts from Western Australia labelled as 'Australian Free Range Pork'. Its refrigerated shelves might also contain imported processed pork products produced and packaged in the Netherlands, the United States, Belgium, Canada and Spain.

The local Woolworths, ALDI or IGA supermarket refrigerated meat cabinets might contain fresh pork cuts that are Product of Australia, and their deli's and refrigerated shelves might contain pork products that are Made in Australia and contain some imported product.

Talk about how fresh pork cuts are produced in Australia and how many processed pork products are imported from other countries.

Ask students to consider and discuss whether they think 'country of origin' labelling or labelling that describes how the pork was produced is important? Why? Or why not? Does it matter? Is it adequate and clear?

Ask students whether they actually look at food labels and discuss their importance in knowing where our food comes from.

Note: Australia has an Australian Pork Labelling Mark, which clearly indicates which pork products contain exclusively Australian pork. The marking was designed to ensure consumer confidence in the pork products they purchase. Inappropriate labelling has implications for both food safety and sustainability.

Labelling used on pork products

Share the following labelling standards and discuss whether they have been referred to when purchasing pork products.

Introduce the pink Australian PorkMark. Ask students if they have ever seen this label before. If so, where have they seen it and in what context?

Introduce the four label claims used to describe the origin of pork products. These can include:

- Product of Australia; which is Australian grown;
- Made in Australia; which can be possibly be grown and processed in Australia but can also contain imported pork; and
- Made in Australia from Local and Imported Ingredients; which means that over 50% of the core ingredient is Australian.
- Made in Australia from Imported and Local Ingredients; which is, in all likelihood, predominately imported pork.

Invite students to visit their local supermarket to verify where the pork sold there comes from, and to report back on the pork products found and the labelling used.

Collate students' ideas and display for future reference.

Marketing

Australian industries spend millions of dollars each year promoting their products. Often campaigns and programs are conducted in the belief that raising awareness of products, providing information about them and educating people to make informed decisions about their preferred choices, will lead to increasing the demand for that product.

Invite students to share a recent marketing campaign used to promote the consumption of a food produced in Australia. The campaign might have been shared on Facebook, Twitter, Instagram, television, the cinema, radio etc. Talk about what it was about the marketing campaign that they recall.

For example:

- How was it marketed and made to look irresistible?
- What type of language was used to engage you in considering buying the product?
- What made it distinctive?
- Was it simple or complicated?
- Was its packaging important? Why or why not?
- Did it mention any nutritional value, and was this important?
- Did it include any mention of any environmental credentials, and was this important?
- Did it make you feel something?
- Did it create an emotional connection?

Ask students to identify and record what facts they 'read' from the marketing campaign, and what 'wider messages' the campaigns might have conveyed.

Talk with the students about whether they have joined any conversations on Facebook, Twitter or Instagram that keep them up to date with the latest news from any food sectors. Discuss the food sectors that students have connections with and whether they ask questions about where that particular food comes from and how it is produced.

Record and display these ideas in the classroom.

Pig farming

People farm pigs for many different reasons–food, lifestyle, work and income.

Pig farming and production occurs in approximately 2,800 farms spread across all states of Australia, with the highest proportion of producers located around the grain, sorghum or maize growing regions.

Using Resource 1.1 at the rear of this unit, find places where pigs are farmed in Australia.

Brainstorm what is known about pig farming and production. Consider questions like:

- 'What do we understand about pig farming and production?'
- 'Is pig farming a primary industry?'
- 'What have we heard about pig farming in the media or from scientists, friends or family members?'

Display the brainstorm lists around the classroom. If questions emerge from this activity, record these and display them for reference throughout the unit.

Source: Changing conditions in the pig industry: An Educational Unit for Junior Secondary Schools, page 19.

Students understanding of pigs

Talk about how the Australian pork industry grows a number of breeds of pigs. The white breeds include: Large White, Yorkshire and Landrace pigs. The coloured breeds include: Berkshire, Duroc, Large Black and Hampshire pigs.

Find out what is known about pigs. For example, do the students know that:

- Pigs have a very wide angle of vision (310 degrees) and can therefore be easily distracted.
- On average, a sow will produce 10–14 piglets per litter.
- The average growth rate of Australian pigs is around 600–650 grams a day from birth to sale.
- Pigs have colour vision but they can't focus both eyes on the same spot.
- Pigs are considered to be smarter than dogs and are easy to train. This characteristic helps producers develop safe handling routines.
- Grower pigs eat the equivalent of about 3% of their body weight and drink about 10% of their body weight, daily.
- Pigs are unable to perspire and they lose heat through their mouths. The ideal temperature for older pigs is 20–22°C.
- A female pig which has nursed a litter is called a sow; a female pig which has not nursed a litter is called a gilt.

- Whether housed indoors or outdoors, a pig spends more time resting than any other domestic animal.

For more information see: www.aussiepigfarmers.com.au and note the 'Industry Terms' included at the end of this resource.

Setting the task

Note: This is a suggested assessment task.

Explain to the class that working either individually, in pairs or groups, their task is to investigate the pork industry and to research and record information about the ethical and sustainable technologies and methods used by the industry to raise pigs for pork.

Explain that students will also investigate the marketing practices and the labelling used to demonstrate where the pork products come from and how they are produced. The students are required to develop and design a labelling system that will be attractive to the consumer and communicates accurate information about how a range of pork products were farmed and where they were produced.

The following aspects need to be taken into account when developing your labels:

- The words 'Australian Pork' must appear as part of the design of the labels
- The visual aspect of the label must be inclusive of Australian pig breeds that are sourced from farms in Australia
- The words 'Accredited by the Australian Pork Industry Quality Assurance Program (APIQ✓®) must appear as part of the labels.

Each student, pair or group will make a presentation communicating the marketing benefits of their new labels for a range of pork products to an audience.

APIQ✓®
AUSTRALIAN PORK INDUSTRY
QUALITY ASSURANCE PROGRAM

Step 2: Explore the topic

Explore production and marketing

Purpose

To provide students with opportunities to develop their understanding of:

- Ethical and sustainable management practices that are used in pork production
- The Australian pork supply chain
- Marketing campaigns that are used to promote pork
- Country-of-origin labelling
- A focus for the forthcoming experiences in the 'Explain' stage of the inquiry.

Ethical and sustainable practices

Revisit the student task and talk with students about the importance of understanding the many facets involved in producing pork as part of their research

Talk about the task, also involving the students, in considering ethical and sustainable practices that are used in pork production

Talk about the word 'ethical'. How might the students describe an ethical way to raise and farm pigs? What might pigs need to be raised ethically? For example: space, room to move, a clean environment, access to food, water and shelter...

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

For example: When a pork producer thinks of being economically sustainable, they might ask themselves a question like 'Are we sustainably profitable?'

When a pork producer thinks of being socially sustainable, they might ask themselves a question like 'Are we behaving in a way that the community supports us into the future?'

When a pork producer thinks of being environmentally sustainable, they might ask themselves a question like 'Are we maintaining our farms and their natural assets for future generations?'

Expand the topic and talk about ethical and sustainable production. Consider possibilities like small scale, large scale and commercial scale pork production. What might ethical and sustainable production look like, sound like and feel like?

Think about issues such as the farm's environmental footprint, sustainable management systems to conserve soils, limit chemical usage, improve water use efficiency, reduce and re-use waste, recycle effluent and minimise energy usage.

Ask students to develop criteria explaining the standards they feel describe 'ethical and sustainable' production. Share these as a class.

As a class, build understanding by sharing ideas and record things that the class would like to know more about how a pork producer might address ethical and sustainable production on their farm and in their business.

Encourage students to find examples of what actual pork producers are doing to address ethical and sustainable production and bring their findings back to class. Share these to build a bigger picture of what is happening in the industry.

Use the following activities to provide insights into pork production and the pork industry who supply us with pork products.

The pork industry

Brainstorm what is known about the pork industry and the ethical and sustainable methods used by Australian farmers to produce pork. Collate ideas using Wordle, a tool to create word clouds.

See: www.wordle.net

Talk about how the Australian pork industry consists of a number of producers, some of whom are large commercial producers and others who are family owned and smaller in size.

Share ideas about the ethical and sustainable production practices the class has learned about that are used by the Australian pork industry to produce pork.

Visit a piggery

Where possible organise an excursion to a piggery and processor to gain a first-hand understanding about how pigs are farmed and processed for pork products. Contact Australian Pork Limited for possible locations of pig farms to visit.

Email: apl@australianpork.com.au or alternatively phone: (02) 6285 2200 or 1800 789 099.

Pork production

Ask students to develop a concept map explaining what they now know about pork production, what it is, what it comprises of, who produces pork and why.

After sharing students' ideas talk about all aspects of pork production including production; processing; distribution; retail; marketing; and consumption.

Introduce the system, 'the food supply chain' and explore the many steps and processes within it. See Table 1.1.

Table 1.1 The Food Supply Chain

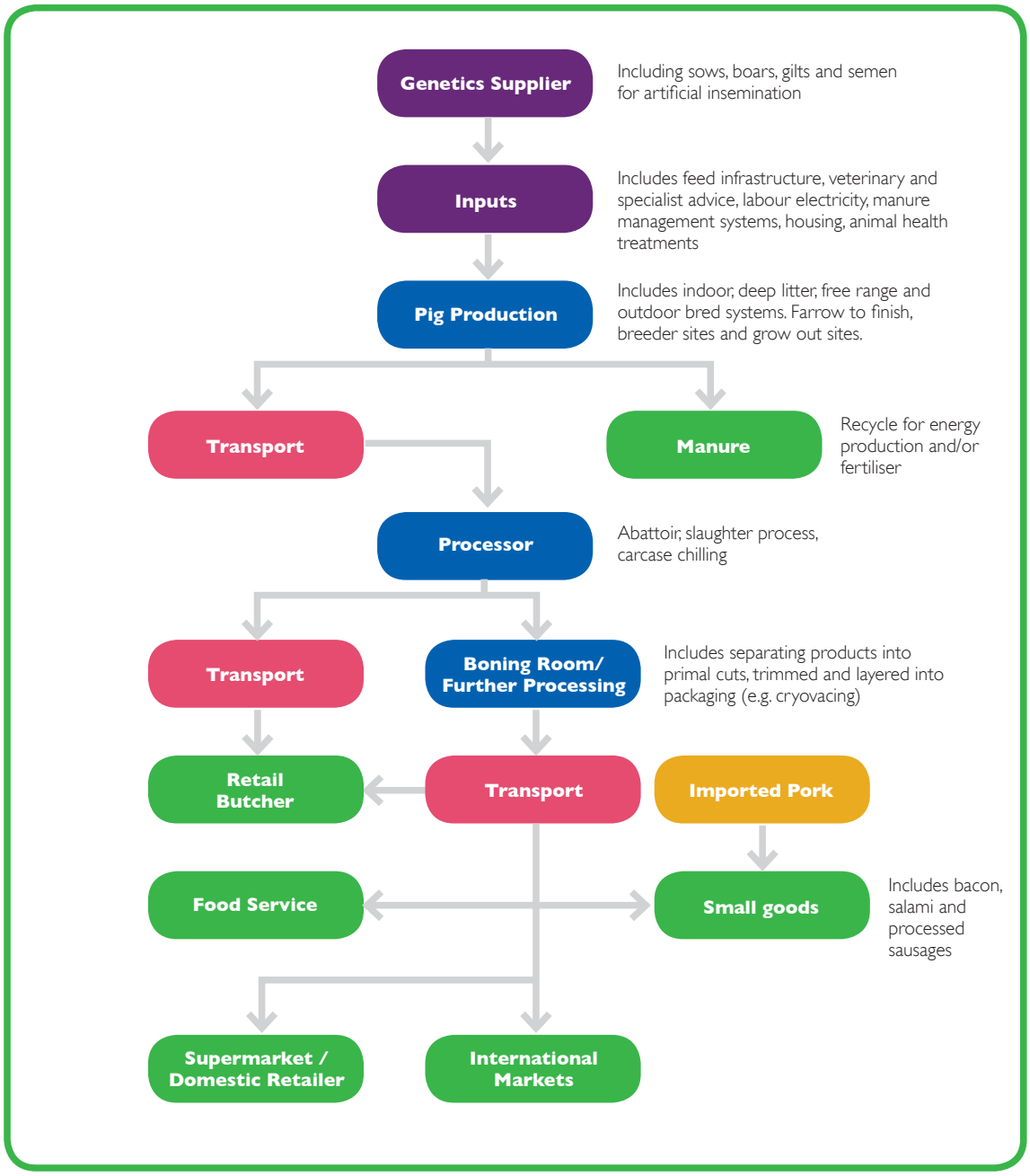
1.	Agricultural inputs e.g. fertilisers, seeds, pesticides, veterinary products, artificial insemination, genetic technologies, animal housing, feed systems, feed additives
2.	Primary production e.g. pig farmers
3.	Primary food processing e.g. on farm piggeries, abattoirs, grain mills, boning and packaging facilities
4.	Secondary food processing e.g. packaging, preserving, canning, freezing, drying
5.	Food distribution e.g. regional/national/international, import/export
6.	Food retailing e.g. supermarkets, butchers, general shops
7.	Food catering e.g. schools, restaurants, hospitals, cafes, conference centres
8.	Domestic food e.g. at home
9.	Recycling, reclaiming or disposing of the product.

Source: Adapted from Lang and Heasman, Food Wars.

Talk about pork production on a farm that raises pigs in more detail. Discuss the many aspects involved in producing the animal. For example: raising the animal – providing it with food, water and shelter – looking after any health needs – managing breeding cycles – managing nutrition – managing housing – managing water access – managing pests and diseases – reducing any biosecurity risks – maintaining healthy ground surfaces – minimising run off and greenhouse gas emissions – maintaining the farm and its natural assets and managing the business.

Go further and talk about the 'pork supply chain', beginning with pig producers who breed pigs to produce offspring, some with the help of genetics, right through to after the pig is fully grown and ready to be processed as a product for consumers.

Figure 1.1 Pork Supply Chain



For example:

Introduce a commercial pig farm in Australia called 'Rivalea Australia' that has a genetics program, farms pigs, processes pork and distributes pork products across Australia.

See: www.rivalea.com.au/Home.aspx

Share information about a medium producer's story at Young in NSW. View and read information about Blantyre Farms at http://blantyrefarms.com.au

View videos

Explain to the students that their task is to start researching. Invite students to initiate their research and view seven videos explaining how pig farmers produce pigs and the systems they use.

See **Resource 1.2** to support student investigations.

Note: It may be useful to re-introduce students to terminology used in the pork industry.

Ask students to view the following videos and record information about the ethical and sustainable production practices used.

Video 1

Title: Aussie Farmers – Types of Farming- Indoor Intensive Housing

This is a video explaining how one family produces pigs indoors in a dynamic and environmentally conscious system. It includes sections on pig production; effluent management and the health and welfare of the animals and staff working to produce high quality products.

Link: www.youtube.com/watch?time_continue=2&v=2KXOnPvszTQ

Video 2

Title: Housing pigs...different approaches

This is a video about how pig production and the housing of pigs. It describes existing methods and technologies used on an Australian pig farm. It includes information about indoor eco housing that uses straw based systems with technologies to keep pigs well fed and protected in all kinds of weather

Link: www.youtube.com/watch?v=D9DdEiIdTWg

Video 3

Title: Aussie Pig Farmers: Environmental Stewardship

This is a video explaining how one Australian pork farmer is demonstrating their environmental responsibility and stewardship by using pig manure or biogas to create electricity. It includes sections on how the decomposing manure creates methane; how the methane is captured, transported and used to generate electricity at the farm to provide thermal comfort and appropriate conditions for baby piglets. It also highlights how food and packaging waste from other sources is recycled and reused as food for the pigs.

Link: www.youtube.com/watch?time_continue=2&v=KLvSGvw279k

Expand on the task and explore marketing

Explain to the students that their task in this unit is to also investigate the marketing practices used by the industry and the labelling used to inform consumers where the pork comes from and how it was farmed.

Ask students to find out more about how the industry markets and promotes pork products.

Talk with the students about the variety of audiences that Australian pork is marketed to. Discuss marketing campaigns that engage with consumers, chefs, butchers and the industry.

Check out:

- Australian Pork Limited's Marketing page http://australianpork.com.au/industry-focus/marketing
- Australian Pork Limited's Marketing Activities http://australianpork.com.au/industry-focus/marketing/activities
- PorkStar Campaign www.porkstar.com.au

Review articles written in the 'Australian Pork Newspaper' that feature media campaigns.

See: Page 1 of the November 2014 edition that promotes a new 'Free range pork brand'. See http://porknews.com.au/documents/pasteditions/APN1114.pdf

Review an article on page 1 of the February 2015 edition that features a well-known chef marketing Australian pork products. See: www.porknews.com.au/

Ask students to identify key elements of each campaign and the messages shared in them using **Resource 1.2.**

Consider marketing techniques, the use of persuasive language and enabling messages that are used in marketing campaigns.

Consider how TED Talks, Twitter and Facebook are used to communicate and share information.

Talk about how powerful ideas can create change and how people communicate those ideas.

Talk about 'credibility' and what makes a commercial, a story or a media report credible.

Ask students to explore how credibility is established in the marketing campaign, and talk about the evidence that marketing campaigns include making their stories believable.

Ask students to look closely at the sources of information, the people who are included in the marketing campaign. Are they credible? What makes them so?

Food labelling

Note: This is a suggested assessment task.

Remind students that they are required to develop and design a labelling system that will be attractive to the consumer and communicates accurate information about how a range of pork products were farmed and where they were produced.

Read a range of farmer opinions on Australian country-of-origin food labelling.

See: www.abc.net.au/news/2015-03-02/australian-farmers-on-food-labelling-laws/6268810

Go further

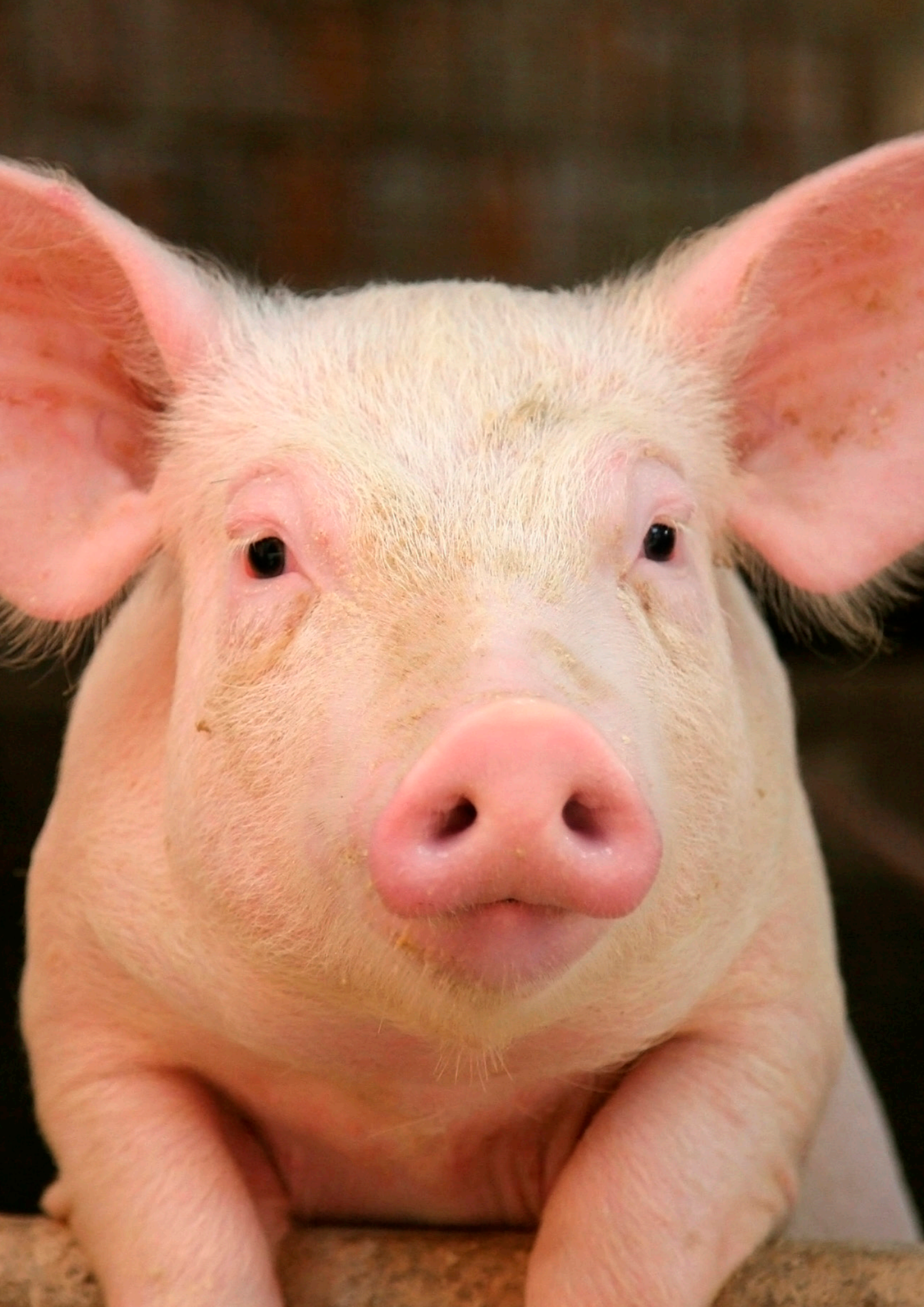
Talk with the class about the following questions:

- Why is knowing about how pork is produced and marketed important?
- How is what we know about pork production and marketing changing?
- What did the pork industry most recently report on in regards to their production methods?

At the end of the activities make a class list of students' comments and questions about pork production and marketing using a table like the one below:

What we know	What we're not sure about	What we want to know

Remind students, to record and collate the information communicated in the websites they have viewed about how the pork industry produces and markets pork.



Step 3: Explain understandings

Purpose

To provide students with opportunities to:

- Explain ethical and sustainable management practices that are used in pork production
- Explain practices used to market pork products
- Listen critically to others' explanations
- Refer to previous activities
- Be introduced to new initiatives and programs to improve on-farm traceability and product integrity
- Construct a draft presentation about a labelling system for a range of pork products.

Explaining concepts

Invite students to brainstorm concepts and terms that will be useful in explaining how Australian pork is produced and marketed.

Encourage discussions to generate explanations, compare ideas and to relate evidence to their explanations.

After comparing explanations by students, use the students' explanations as a basis for explaining terms, definitions or labels where needed.

Going further

Talk with the class about how producing pigs and consuming the pork produced, is important to sustain a growing population - but we need effective policies, investment in science and education to maintain high production, efficient and sustainable production systems, healthy pigs and reduced environmental impacts.

Ask students what they think are the most important things we need to know, if we are going to:

- ensure we have ethically and sustainably raised healthy pigs for food and for export opportunities;
- maintain cultural eating habits; and
- sustain the farms and their natural assets for future generations?

Discuss the need for producers to raise pigs and use resources in ethical and sustainable ways.

Discuss how the land supports important pork industries, the number of people these industries employ and the earnings that are made from farming pigs and producing pork products.

Consider our increasing appetite for pork and how this might affect the natural environment. How can impact be managed?

Share examples and devise flow charts to describe these. For example:

- Adapting industry practices to our food demands
- Sustainable farming methods
- Consumer demands for more pork

Introduce the advances in science and emerging technologies

Explain to students how the industry invests in policies, research programs, science and education to maintain high production, efficient production systems, healthy pigs and reduced environmental impacts.

Talk about the role of Australian Pork Limited (APL), universities and Cooperative Research Centres (CRCs) in these areas.

See: http://porkcrc.com.au and www.australianpork.com.au

Explain more to the class about the pork industry and its role in addressing environmental issues, product integrity, food safety, animal welfare, and the labelling of pork products. Share **Resource 1.3** with the class.

Clarify new terms including:

- Livestock traceability
- Product traceability
- Food safety
- Biosecurity
- Product differentiation

Talk more about 'livestock traceability' and 'PigPass' which is a national livestock traceability system that provides rapid livestock traceability and identification to minimise the spread and facilitate the rapid confinement of pig diseases.

Talk about the Australian Pork Industry Quality Assurance Program (APIQ✓®) that provides the framework and standards on-farm by which Australian pig producers use safe and sustainable farming practices.

Introduce a recent advance called 'Physi-Trace' which enables the rapid trace-back of pork in the event of a food safety incident. Additionally, Physi-Trace offers a compliance tool for verifying pork label claims relating to the origin and source of pork products.

Explain how Australia also has a 'Pork – Australian Export Meat Inspection System' that ensures the safety, suitability and integrity of Australian meat and meat products.

Encourage students to ask questions and undertake extra research about these programs and initiatives.

Decide on what to present and how to do so

Note: This is a suggested assessment task.

Re-state the purposes of the task and ask students to consider how they are going to bring their information together in a presentation about a labelling system that will be attractive to the consumer and communicates accurate information about how a range of pork products were farmed and where they were produced.

Step 4: Elaborate on concepts and ideas

Presentation planning

Purpose

To provide students with opportunities to:

- Explore how science and research have informed welfare standards and production systems
- Apply and extend their understandings about new technologies that enables rapid trace-back of pork products
- Apply what they have learned and communicate the design principles of a labelling system for pork products
- Plan their presentation about their chosen labelling system
- Critically and creatively think about ways the pig industry ethically and sustainably produce and market their products
- Share investigation findings.

Changing farming practices and methods due to increases in scientific knowledge and developments in technology

Animal welfare, environmental stewardship and quality assurance have influenced improvements in pig farmers current production systems and designs of housing for their pigs.

Ask students to reflect on the researchers or scientists featured in the video below that features these topics, and reflect on how increases in scientific knowledge and developments in technology have changed farming methods (i.e. sow housing) and informed quality assurance programs (i.e. Pig Pass and APIQ✓®).

Talk more about 'Physi-Trace', the technology that allows the industry to determine farm of origin and Property Identification Code (if it is Australian pork) as well as to determine country of origin if the pork is imported. See **Resource 1.4.**

Talk about the Physi-Trace technology and how it might have relevance and implications for the students' labelling systems for pork products.

Discuss whether it might be useful for consumers to know more about.

Going further with the planning of the presentation

Invite students to confirm the idea planned for their presentation.

Discuss the possible ways to present the big idea in an interesting and engaging format.

Ask students to create a final plan for completing the presentation. Students may need to document their key messages, create an image bank and collate references and acknowledgements for their work sample. Invite them to summarise these and the learning achieved in a journal log or reflection.

Review and submit

Note: This is a suggested assessment task.

Invite students to revise and fine-tune their presentation of the labelling system for consumers about how a range of pork products were farmed and where they were produced.

Consider hosting a 'Food Standards Forum' to showcase the students' work to the school community and beyond.

Share investigations

Note: This is a suggested assessment task.

Encourage students to share their labelling designs with other classes and to submit them to Australian Pork Limited.

Email: apl@australianpork.com.au

Step 5: Evaluating

Think back and evaluate

Purpose

To provide students with opportunities to:

- Reflect on their own learning
- Provide a source of data for assessment.

To provide teachers with:

- Insights into students' understandings and attitudes, as well as their perceptions of their own strengths and weaknesses.

Refection

Note: This is a suggested assessment task.

Begin by modelling reflective writing through a whole class learning log. Alternatively, you could model your own entry 'thinking aloud' as you write.

Provide students with a set of focus questions for their writing:

- Write about something new you have learnt in this unit about the ethical and sustainable production and marketing of pork.
- What is one thing you have learnt about when it comes to producing pork?
- Describe what you now know about the similarities and differences between production practices of free range, outdoor bred and pigs which are housed indoors.
- How might you help others know more about how Australian farmers produce pork?
- What have you learned about the marketing and labelling techniques used by the industry?
- What have you learned about with regard to the quality assurance policies and programs used in the industry?
- What would you still like to find out about the ethical and sustainable production of pork?
- How well did you participate in any group/team learning activities?
- What questions do you have about the topic at the moment?
- What piece of work are you most satisfied with?

References

Australian Pork Limited (2014) Changing conditions in the pig industry: An Educational Unit for Junior Secondary Schools, Canberra, Australian Capital Territory.

Australian Pork Limited. (2014) Physi-Trace Factsheet. Canberra, Australian Capital Territory.

Australian Academy of Science. (2005) Primary Connections, Canberra, Australian Capital Territory.

Cecil, N. (1995) The Art of Inquiry: questioning strategies for K-6 classrooms, Peguis, Canada.

Gardner, H. (1985) Frames of Mind: the theory of multiple intelligences, Basic Books, New York.

Hamston, J. and Murdock, K. (1996) Integrating Socially: units of work for social education, Eleanor Curtain, Melbourne.

Hill, S. And Hill, T. (1990) The Collaborative Classroom, Eleanor Curtin, Melbourne.

Lang, T & Heasman, M. (2004) Food Wars. The Global Battle for Mouths, Minds and Markets. Earthsac, London.

Wilks, S. (1992) Critical and Creative Thinking: strategies for classroom inquiry, Eleanor Curtin, Melbourne.

Websites (viewed June 2018)

This is a list of websites used in this unit for teacher use. As content of websites used in this unit is updated or moved, hyperlinks may not always function.

ABC Rural Roundup

www.abc.net.au/news/2015-03-02/australian-farmers-on-food-labelling-laws/6268810

Aussie Pig Farmers

www.aussiepigfarmers.com.au

www.youtube.com/watch?time_continue=2&v=KLvSGvw279k

Australian Curriculum, Assessment and Reporting Authority

www.australiancurriculum.edu.au

Australian Pork Limited

www.australianpork.com.au

Australian Pork Newspaper

http://www.porknews.com.au/

http://porknews.com.au/documents/pasteditions/APN1114.pdf

Blantyre Farms

http://blantyrefarms.com.au

Commonwealth of Australia Global Education Website

www.globaleducation.edu.au/verve/_resources/bibliography_frame.pdf

Pork Cooperative Research Centre

http://porkcrc.com.au

PorkStar Campaign

www.porkstar.com.au

Primary Connections

www.primaryconnectins.org.au/about/teaching

Rivalea Australia

www.rivalea.com.au/Home.aspx

The Garnaut Climate Change Review

www.garnautreview.org.au/index.htm

Wordle

www.wordle.net

YouTube

Primary Industries Education Foundation Channel

Farm Diaries

www.youtube.com/watch?v=d_2M01LVWpE

Housing pigs...different approaches

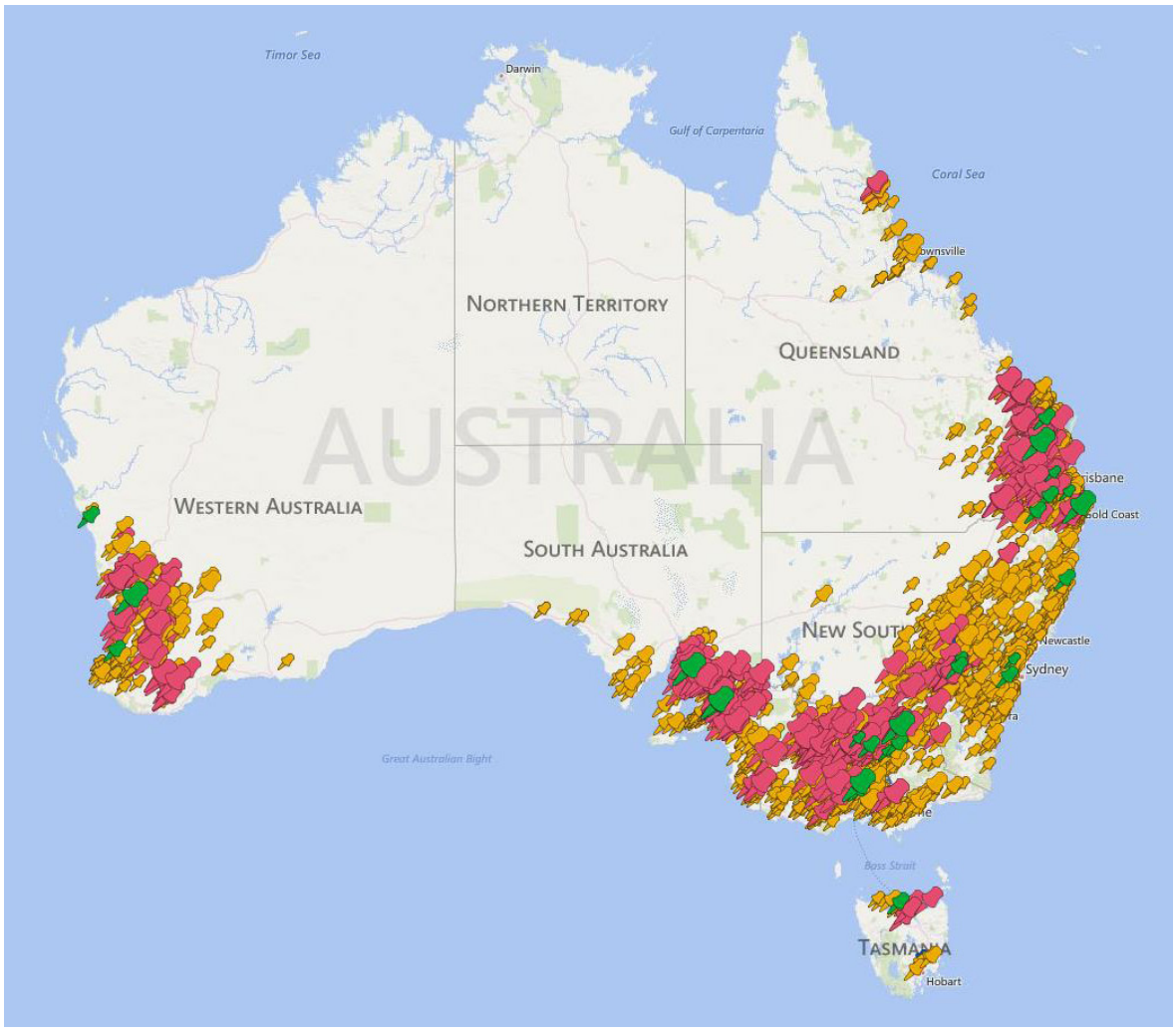
www.youtube.com/watch?v=D9DdEildTWg

Resource pages

Resource 1.1

Pig Production

Pig production occurs in approximately 2,800 farms spread across all States of Australia.



Note: The bigger the pin on the map, the bigger the piggery! The pink pins are APIQ✓® accredited piggeries, the yellow pins are non APIQ✓® accredited piggeries and the green pins are abattoirs.

Resource 1.2

Task Sheet

Your task, is to investigate the pork industry and to research and record information about it including technologies and methods used by the industry to ethically and sustainably produce pigs for pork.

You will also investigate the marketing practices and the labelling used to demonstrate where the pork products come from and how they are produced.

Objectives:

On conclusion of this research task, you should have demonstrated:

- An understanding of how pigs are produced in managed systems and how Australian pork is marketed to consumers, restaurants and butchers
- An understanding of the ethical and sustainable farm management practices used
- An understanding of industry investments in policies, research programs, science and education to maintain high production, efficient production systems, healthy pigs and reduced environmental impacts
- Research skills that require finding, recording, selecting, presenting, analysing, evaluating and reporting secondary data on pig production and marketing issues
- An understanding of the intrinsic value of healthy pigs, farmed in ethically appropriate ways and the value of the farm environment and the appropriate actions and strategies to sustain it in changing times.

Overview:

Using a range of websites as a basis of your study, record and collect information about the pig farms, and types of farm management practices farmers use to produce pork ethically and sustainably.

See: www.youtube.com/watch?time_continue=2&v=KLvSGvw279k
www.youtube.com/watch?v=D9DdEildTWg
www.youtube.com/watch?time_continue=2&v=2KXOnPvszTQ
https://aussiepigfarmers.com.au/people/our-stories/vox-pop-video-1
https://aussiepigfarmers.com.au

Part 1: How pigs are raised and produced

Using the sites as the basis of your study, report on how the pigs are ethically raised and sustainably produced.

Consider questions like:

- How does the producer farm their pigs?
- What different housing designs and systems are used to produce the pigs?
- What technologies are used on the farms?
- How the physical conditions of the farm environment and farm practices used impact on the production of the pigs?

How useful is the production system used by the pig farmers in terms of:

- Efficiency (ecological and economic)
- Its contribution to productivity
- Its contribution to providing a quality product
- How sustainable the system is
- How ethical the system is or whether it is animal welfare 'friendly'?

Site 1 www.youtube.com/watch?time_continue=2&v=KLvSGvw279k

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Site 2 www.youtube.com/watch?v=D9DdEildTWg

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Site 3 www.youtube.com/watch?time_continue=2&v=2KXOnPvszTQ

Site 4 https://aussiepigfarmers.com.au/people/our-stories/vox-pop-video-1

Site 5 https://aussiepigfarmers.com.au

Part 2: Farm Management Practices

Collect information about the ethical and sustainable farm management practices implemented at sites to produce pigs. Describe the ethical and sustainable farm management practices that have contributed to healthy pigs and healthy farms.

Consider questions such as those cited below to explore the ethical and sustainable practices being used in the production of the animals and investigate any scientific and technological advances that have been applied to assist and enhance the producers' ethical and sustainable production practices.

For example:

- What do you think, feel, hope or believe in relation to the production processes?
- What might others who are involved in the industry think, feel and say about the production processes?
- How have these production processes come about?
- What is the vision of the producer being researched?
- What values does the producer use to guide their choices of production options?
- What are the courses of action that they take? Why?
- How have science and any technological advances informed the sector's production processes?

Site 1

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Part 3: Marketing Australian Pork

Your task in this unit is to also investigate the marketing practices used by the industry and the labelling used to inform where the pork comes from and how it was farmed.

Find out more about how the industry markets and promotes pork products to consumers, butchers, chefs and the industry. Check out:

- Australian Pork Limited's Marketing page http://australianpork.com.au/industry-focus/marketing
- Australian Pork Limited's Marketing Activities http://australianpork.com.au/industry-focus/marketing/activities
- PorkStar Campaign www.porkstar.com.au

Consider the messages shared in these sources and collect information about the key elements in these marketing campaigns. Consider the messages shared in these campaigns. Think about the language used and the stories being shared.

Think about how powerful ideas can create change and how people communicate those ideas.

Think about 'credibility' and what makes a commercial, a story or a media report credible.

Explore how credibility is established in the marketing campaigns cited above. Is there any evidence included in marketing campaigns to make the stories believable? Look closely at the sources of information, the people who are included in the video clips. Are they credible? What makes them so?

Resource 1.3

Environmental stewardship – the challenges and opportunities

The Australian pork industry is serious about environmental stewardship. The industry believes it has a duty to ensure that Australian pork is produced and distributed responsibly, while also remaining competitive and sustainable. The Australian pork industry has taken proactive steps to help ensure its producers carefully manage the nation's precious environment and resources. In efforts to reduce the industry's environmental footprint, ongoing industry research and development is focused on the continuous improvement of overall productivity, waste minimisation, pollution prevention and beneficial reuse of wastes.

Environmental issues pose both a challenge and opportunity for the Australian pork industry. The industry has tackled this challenge head-on and is making important progress in addressing these issues—especially in acknowledging and addressing greenhouse gas (GHG) emissions. The industry was the first in Australia to have developed and approved a methodology for the government's Carbon Farming Initiative (CFI). This initiative is now part of the new Emissions Reduction Fund (ERF).

GHG emissions produced by the pork industry are significantly lower than other agricultural sectors such as beef cattle, dairy cattle and sheep. Currently, the industry's emissions and potential mitigation options puts the industry in the position to have a low, if not the lowest, global warming potential for pork production worldwide. The industry is striving to reduce this even further by setting an industry goal of ***1kg CO_2 per kg of pork produced.*** Fortunately, most of the industry's GHG relate to emissions from effluent ponds. This provides pig farmers with a fantastic opportunity for emissions capture, destruction or use. Progressive industry research is developing innovative new technologies and management systems to mitigate and utilise these GHG emissions. Current research shows that a 500 sow piggery has the potential to produce enough energy to power 3.1 million 100 watt globes for one hour, or produce electricity to run 62 houses for one year. And if combusted and destroyed, it would eliminate the equivalent of the fossil fuel GHG emissions from 458 Toyota Corollas travelling 20,000km/per year burning 7 Litres/100km.

As well as GHG emissions, the industry is also proactively addressing many other environmental issues such as nutrient management, by-product reuse, alternative waste management and soil health.

Source: Australian Pork Limited

Food safety – the challenges and opportunities

The Australian pig herd is free from many serious diseases afflicting other pork producing countries. This is why product integrity continues to be one of the most important aspects of Australian pork production. The industry has quickly responded to growing consumer demand for top quality produce that is safe to eat. The Australian Pork Industry Quality Assurance Program (APIQ✓®) is an on-farm quality assurance program that allows producers to demonstrate good farming practice using the principles of Hazard Analysis and managing Critical Control Points for management, food safety, animal welfare, bio-security and traceability. The uptake of APIQ✓® by producers throughout Australia has reached 91% of the national herd, and is increasing.

Australia's pork industry is also leading the world to ensure its pork products are fully traceable from paddock to plate. This has been realised through a traceability system (PigPass National Vendor Declaration—NVD). The PigPass NVD provides key information that can be used to trace pigs or pork back to the property of origin in the event of an emergency, such as an animal disease outbreak or a food safety incident.

Additionally, Australia's pork industry newest traceability system Physi-Trace enables rapid trace-back of pork in the event of a food safety incident. Physi-Trace also offers a compliance verifying pork product label that can identify where nearly every domestic pork product comes from.

These systems help to ensure the integrity of the Australian pork supply chain which makes the Australian pork industry leaders in their field.

Looking after Pigs – the challenges and opportunities

Australian pig producers have the same concerns as the community when it comes to taking care of their pigs. To demonstrate that pig farmers are listening to consumer sentiment, in November 2010 the industry announced the voluntary phase-out of sow stalls by 2017. Australia's pig farmers are the first in the world to make such a voluntary commitment.

Producers understand more than anyone that providing excellent care results in a contented animal that provides a high quality product—pig producers' livelihoods depend on it. The industry invests millions of dollars each year to research new technologies and practices to improve pig welfare, and provide valuable education and training to industry personnel throughout Australia. APL invests over $800 000 annually in research to improve pig welfare alone.

The *Model Code of Practice for the Welfare of Animals (Pigs), third addition*—(the Model Code)—is a guide that has been developed by the Australian government in consultation with all levels of industry, regulators, RSCPA and scientists to detail the acceptable practice for the management of pigs. It outlines all responsibilities involved in caring for pigs—including their housing, food, water and special needs. Standards in the Model Code have been incorporated into APIQ✓® and all APIQ✓® accredited farms are independently audited each year to ensure producers comply with these standards.

Pigs Farming – the challenges and opportunities

All pigs grown for pig meat are housed in different sized groups depending on their age and weight.

A sow raised for breeding will have her first litter when she's about one-year-old. The gestation period (the time from conception to birth) for a sow is 3 months, 3 weeks and 3 days. She can have up to two litters each year and usually has between 10–14 piglets weaned per litter. The piglets feed from their mother for three to four weeks before being weaned and grouped with other pigs the same age in a weaner or grower facility.

Pigs are hand fed on mostly grains and continue to grow until they reach between 24-55kg and are sold as 'porkers'. Pigs that are sold between 55-110kg are known as 'baconers/ finishers'- most pigs are sold between 80-100kg. It usually takes between 18-20 weeks for a pig to reach 100kg.

There are three main types of pig farming methods used in Australia—indoor housing, deep litter housing and outdoor bred/free range systems.

Indoor housing systems are for pigs from birth to sale and for lactating and weaned sows. This system allows pigs of similar ages to be kept together. Group pens and individual pens are often used indoors.

Deep litter housing systems are usually large open-sided sheds or hoop–like structures with deep litter flooring (rice hulls, straw, sawdust). These systems are used extensively for growing pigs and for group housing of dry sows.

Free range systems consist of outdoor paddocks, including rooting areas, wallows and shelter huts. The weaners, grower pigs and sows all have access to paddocks at all times throughout their lives. The paddocks must be rotated with a crop-forage-pasture phase.

Outdoor bred systems are where adult breeding sows live in open spaces with free access to paddocks for their entire adult life. Piglets are born and raised under these conditions until weaning when they are moved to grow out housing. The paddocks must be rotated with a crop-forage-pasture phase.

Gestation stalls: In November 2010, the industry overwhelmingly agreed that Australia would be the first nation in the world to voluntarily phase-out the use of sow stalls by 2017. This means sows and gilts must be kept in loose housing from five days after mating until one week before farrowing.

The reason producers have used sow stalls in the past is because pigs can be extremely aggressive animals- especially during the early stage of pregnancy. The best and safest way to ensure sows get enough food and water and aren't bullied, bitten and injured has been to protect them in individual stalls. Australian producers are now transitioning to a sow stall free status.

Piglet Protection Pen: The average sow weighs between 120–300 kg (equivalent to three standard fridges) and after farrowing, her new piglets are at serious risk of being crushed to death. A piglet protection pen allows a sow to stand up, lie down and stretch out, while keeping her piglets safe and warm in a separate section. The temporary use of a piglet protection pen during the piglets' most vulnerable weeks plays a vital role in their protection. In the wild sows build nests which don't allow the piglet to leave until they are big and strong enough. This protects the piglets in a similar way to piglet protection pen. It's estimated that the use of piglet protection pens saves over a million piglets each year

Buying Australian Pork – the challenges and opportunities

All fresh pork sold in Australia is 100% Australian grown. However, 70% of processed pork (ham, bacon and smallgoods products) is made from frozen boneless pork imported from places like Denmark, Canada and the United States.

When buying Australian pork, look for one of three things:

- the packet label states 'Product of Australia'
- the bright pink Australian PorkMark logo
- the green Australian Grown kangaroo logo.

Or visit the Australian pork consumer website: www.pork.com.au and look for a butcher near you that sells Australian grown pork to make ham, bacon and smallgoods products.

Resource 1.4

Physi-Trace

FACT SHEET

PHYSI-TRACE®

Introduction

Currently Physi-Trace® is a scientific tool that can be employed to validate the traceability or label claim of a pork product. That is, in the case of fresh pork it is possible to trace the fresh pork back to a kill lot (tattoo code). For processed product, the Physi-Trace® tool can be used to provide an assessment of a label claim (e.g. PorkMark or Product of Australia). A PhD program is investigating the potential use of trace elements and stable isotopes in the traceability of pork offal and its relationship to the "Pork Meat Physi-Trace® Database."

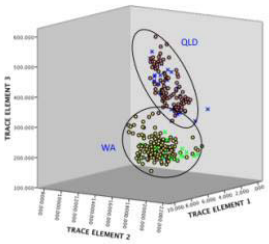
The Physi-Trace® validation tool works on the basis of comparing determined elemental distribution patterns with a database of reference patterns. This involves the regular collection of reference samples from selected kill lots. In the event of a food safety incident or any other incident where traceability is required, these samples can be used to quickly and accurately identify potential sources of 'suspect' product. This enables the rapid exclusion of unaffected product, producing areas and processors, therefore facilitating rapid re-entry to markets.

Minimising Disruption to Market Access

A trace back project was undertaken in Singapore in April 2010 in conjunction with the Singapore Agri-Food and Veterinary Authority, the Australian Government, Australian processors and a Singaporean importer and processor to demonstrate how the Physi-Trace® tool could be used to trace 'suspect' product in an export market.

A number of known origin pork products were sent to Singapore. These pork products were sampled at the distributor (as it entered Singapore) and at the retailer. The samples were then provided to TSW Analytical in Australia as unknowns. These samples were pre-processed in Singapore (to comply with biosecurity requirements) before being shipped back to TSW Analytical for analysis and traceability determined. The outcome of this trial was that the technology was able to correctly identify the source of 100% of all unknown samples taken.

The demonstration trial also provided the first indication of how fast a trace back could be undertaken.



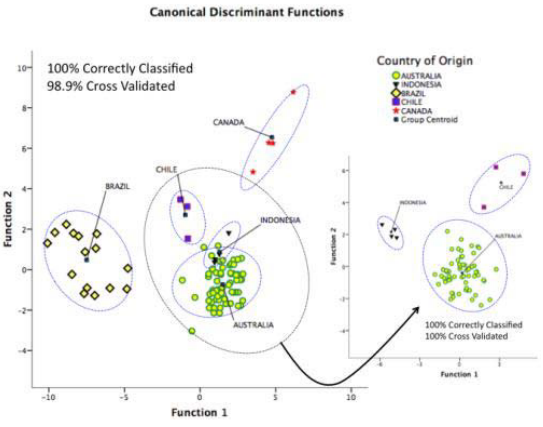
Classification of unknowns back to state of origin.

It is estimated that the state of origin of the unknown sample will be known within 36 hours of receipt at the laboratory. The tattoo identification will then take another 12-24 hours depending on what relevant reference samples are required and where these are currently located.

Country of Origin Labelling Compliance in Singapore

A country of origin labelling investigation was undertaken of Australia label claims on pork products in Singaporean retail outlets. This investigation was designed to provide a snapshot of current label compliance in the Singapore market.

A large number of retail products were analysed to provide an indication of the validity of label claims. This exercise was successful with a classification model developed that facilitated the assessment of country of origin claims.



Country of origin classification

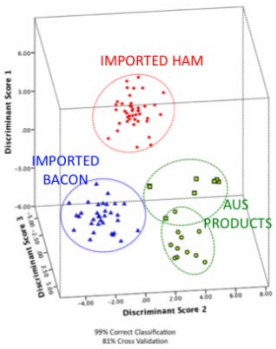
AUSTRALIAN Pork

Fact Sheet

PorkMark Compliance

The roll out of the APL PorkMark program in combination with the success of the Country of Origin Labelling (CoOL) investigation undertaken in Singapore provided the opportunity to apply the Physi-Trace® technology as a compliance testing tool in Australia.

Sampled retail ham and bacon products (both pre-packed and deli) collected from around Australia were assessed using Physi-Trace®, with reference to their respective label claims.



Processed meat classification model.

This enabled identification of potential mislabelling of products by either distributors or supermarkets and provides a snapshot of market compliance with CoOL laws and also a tool to promote honesty in labelling of pork products.

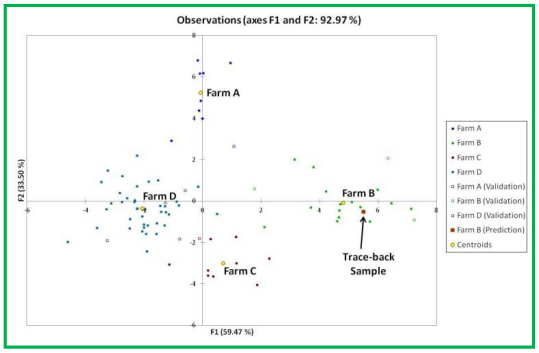
Trace Back Due to a Foreign Object Found in Fresh Pork Meat

In late 2011, a foreign object with the potential to cause serious injury was found embedded in a cut of fresh pork meat. The processor requested a trace back using Physi-Trace® technology to establish the origin of the tainted meat.

The tainted meat sample was classified with the pork meat profiles belonging to Farm B (100% correct classification), indicating that farm B is the most likely source.

The trace back result was available within 36 hours of receipt of the sample. The processor confirmed that animals from Farm B had been processed on the day that the sample was collected and was one of four most likely sources.

The conclusions of the investigation were firstly, the farm of origin was confidently identified and undisputed. Secondly, the trace back was completed in 36 hours, potentially saving the industry millions due to trade stoppages. Finally, it demonstrates to the public that the industry is in control of a situation where suspect pork is found.



National Livestock Traceability System (NLIS) – Pork

The Primary Industry Ministerial Council (PIMC) endorsed the National Livestock Identification System (NLIS) as the national system for livestock traceability (National Livestock Traceability Performance Standard).

NLIS for cattle was introduced in 1999. NLIS-Pork commenced implementation in 2006. NLIS-Pork comprises: property identification; pig identification and movement documentation. It is underpinned by an approved on-farm Quality Assurance program and managed by the PigPass database.

Weaknesses have been identified in NLIS-Pork, particularly for saleyard transactions, and in NLIS (Sheep & Goats). The Primary Industries Steering Committee has agreed to an implementation pathway for Radio Frequency Identification Devices (RFIDs) for sheep and goats in 2014. The Victorian Minister is reported as being supportive of RFIDs for sheep and goats and the option has been raised by Victorian regulators in the past of implementation of RFIDs for saleyard pigs in Victoria to address the weakness in NLIS-Pork. If this were to occur, there is the potential for 'system creep' of RFIDs to pigs other than saleyard pigs and to other States.

Physi-Trace® is being developed as an alternative traceability tool to RFID, at significantly lower cost (estimated 18 cents per carcase for Physi-Trace® compared to $2 per pig for RFID). Physi-Trace® will also provide traceability along the whole supply chain, not just farm to abattoir as for RFID.

Appendix A: Industry Terms

Adult	Any pig over the age of nine months
Aerobic pond or lagoon	A dam that uses aerobic micro-organisms to treat the effluent. These are micro-organisms that require free oxygen from the air to function. Consequently, aerobic ponds/lagoons have a large surface area to volume ratio. They are usually less than 1.5 m deep
Approved authority	Local or State government entity with relevant statutory authority
APIQ✓®	The Australian Pork Industry on-farm quality assurance program
Best practice environmental management	A collection of exemplary and recommended practices at a farm level that piggery operators should strive to achieve in the long term to ensure their operation is environmentally sustainable
Block of paddocks	A group of adjacent paddocks used simultaneously to run pigs. For piggeries that operate with a radial paddock system, one radial would constitute a block of paddocks. Similarly, if a piggery uses eight adjacent paddocks at a time, this would constitute a block of paddocks
Boar	An uncastrated male pig over nine months of age
Breeder piggery / breeding unit	A unit where breeding stock are kept, along with sucker pigs
Buffer/buffer distance	The distances provided between the piggery complex or reuse areas and sensitive natural resources (e.g., bores, watercourses and major water storages) as an important secondary measure for reducing the risk of environmental impact
Compost	The product of the partial decomposition or organic matter by microorganisms
Conventional piggery	These typically house pigs within steel or timber framed sheds with corrugated iron or sandwich panel roofing and walls made from preformed concrete panels, concrete blocks, corrugated iron or sandwich panel (or some combination of these), sometimes with shutters or nylon curtains depending on the ventilation system. A fully environmentally controlled shed has enclosed walls with extraction fans and cooling pads providing ventilation and climate control. Conventional sheds have a concrete base, often with concrete under-floor effluent collection pits or channels. The flooring is usually partly or fully slatted, and spilt feed, water, urine and faeces fall through the slats into the underfloor channels or pits. These are regularly flushed or drained to remove effluent from the sheds. Sheds without slatted flooring usually include an open channel dunging area which is cleaned by flushing or hosing

Creep area	A separate area within a farrowing facility in which piglets are protected from crushing, or overlying, by the sow, and which is usually heated to provide a temperature that is more suitable for maintaining the welfare of piglets, while at the same time, maintaining the comfort of the sow
Deep litter piggery	A housing system in which pigs are typically accommodated within a series of hooped metal frames covered in a waterproof fabric, similar to the plastic greenhouses used in horticulture. However, skillion-roof sheds and converted conventional housing may also be used. Deep litter housing may be established on a concrete base or a compacted earth floor. Pigs are bedded on straw, sawdust, rice hulls or similar loose material that absorbs manure, eliminating the need to use water for cleaning. The used bedding is generally removed and replaced when the batch of the pigs is removed, or on a regular basis
Dry sow	A female pig that has been mated and has not yet farrowed
Environmental Management Plan (EMP)	An EMP focuses on the general management of the whole farm, taking into account the environment and associated risks. It should document design features and management practices; identify risks and mitigation strategies; include ongoing monitoring to ensure impacts are minimised; and processes for continual review and improvement
Erosion	The wearing away of the land surface by rain or wind, removing soil from one point to another (for example gully, rill or sheet erosion)
Farrow / farrowing	Give/giving birth to piglets
Farrow-to-finish	A production system incorporating a breeding herd, plus progeny, through to finished bacon weight (usually 100-110 kg)
Feedlot/Feedlot outdoor piggery	A piggery where the pigs are continuously accommodated in permanent outdoor enclosures located within a controlled drainage area
Feeder	Equipment from which feed is dispensed
Finisher	Pigs generally above 50 kg live-weight, until they are sold or retained for breeding. Usually refers to pigs that are in the final phase of their growth cycle
Free range	Free range means that pigs are kept permanently outdoors for their entire life with shelter from the elements provided, furnished with bedding. Free Range pork production consists of outdoor paddocks, which include rooting and/or foraging areas, wallows (where regulations and seasonal conditions permit) and kennels/huts for shelter. The huts allow the animals to seek shelter from environmental extremes. They also provide additional protection for the piglets when very young
Gestation	The period when a sow is pregnant
Gilt	A young female pig, selected for reproductive purposes, before she has been mated

Grower	Pigs generally with liveweight of 20-60 kg
Growing pigs	Weaners, growers and finishers
Grower/grow-out unit	A production system where pigs are grown from weaner, or grower weight, through to pork or bacon weight
Hut	A weatherproof structure designed for providing shelter for pigs in outdoor production systems
Indoor piggery	Piggery system in which the pigs are accommodated indoors in either conventional or deep litter sheds
Kennel	A weatherproof moveable structure designed to provide shelter and protection for farrowing sows and / or piglets in outdoor production systems
Lactating sow	A sow that has given birth and is producing milk to feed her piglets
Outdoor bred	APIQ✓® Outdoor bred production means that adult breeding sows live in open spaces with free access to paddocks for their entire adult life; with rooting and foraging areas, wallows where conditions allow, bedded shelter and adequate feed and water provided. Piglets are born and raised under these conditions until weaned
Outdoor piggery	System in which the pigs are kept outdoors but are confined within an area with housing provided for shelter and fed for the purpose of production, relying primarily on prepared or manufactured feedstuffs or rations to meet their nutritional requirements
Pen	An enclosure for confining pigs in which they can turn around, which may be used for housing pigs in groups, housing boars individually, management purposes, such as mating or farrowing, or for confining pigs individually
Piggery	System in which the pigs are confined within a structure and fed for the purpose of production, relying primarily on prepared or manufactured feedstuffs or rations to meet their nutritional requirements
Piggery complex	This includes all facilities where pigs are housed, adjoining or nearby areas where pigs are yarded, tended, loaded and unloaded; areas where manure from the piggery accumulates or is treated pending use or removal; and facilities for preparing, handling and storing feed. This does not include the reuse areas
Piglet	A pig up to the time it is weaned from the sow
Rotational outdoor piggery	An outdoor piggery where the pigs are kept in small paddocks that are used in rotation with a pasture or cropping phase. During the stocked phase, the pigs are supplied with prepared feed, but can also forage
Sow	An adult female pig, which has had one or more litters
Sucker/sucking piglet	A piglet between birth and weaning (i.e. an unweaned pig)

Wallow	A mud-filled depression in the ground where pigs can roll in. This allows them to cover themselves with mud which cools their bodies and protect against sunburn
Weaner	A pig after it has been weaned from the sow until approximately 30 kg in live-weight
Weaning	The act of permanently separating piglets from the sow

Notes

Notes

AUSTRALIAN Pork™

Primary Industries Education Foundation Australia

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