

Food: Different By Design

*A First Nations Perspective of
Food and Agriculture*



2021 National Science Week Teachers' Resource:

Lesson Content Directory for Cross-Curriculum Priority
Aboriginal and Torres Strait Islander Histories and Cultures



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Acknowledgements

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All links to websites were valid in June 2021. As content on the websites used in this resource book might be updated or moved, hyperlinks may cease to function.

Using this Resource

The following resource contains a selection of available materials that teachers may find useful when addressing Aboriginal and Torres Strait Islander Histories and Cultures during National Science Week, as a part of the Cross-Curriculum Priority.

The excerpts and links included in this document should not be considered an exhaustive resource.

ASTA strongly recommends that teachers consult with local or national Indigenous organisations and First Nations Elders when presenting Aboriginal and Torres Strait Islander lessons or concepts.

! *Warning*

Aboriginal and Torres Strait Islander teachers and students are advised that this curriculum resource directory and any links therein may contain images, voices or names of deceased people.

Hunter-gatherers or agriculturalists?

Historians have long considered Australia's First Nations peoples as having been hunter-gatherers. However, in 2014, writer and farmer Bruce Pascoe offered a new perspective in his book *Dark Emu*, which controversially challenged this belief. Pascoe's interpretations of historical sources presented in *Dark Emu* and his subsequent children's edition, *Young Dark Emu*, have been met with criticism by some and celebrated by others.

"As European explorers and settlers moved across Australia in search of land to claim, they made records and kept diaries, and drew and painted what they saw...The journals show that, for many thousands of years, Aboriginal people had been working together across the country to farm and care for the land... Indigenous Australians lived in permanent structures and in large communities, built dams and wells, planted and irrigated and harvested seed, and preserved and stored the surplus. In fact, Aboriginal people had been shaping their land for thousands of years." — Bruce Pascoe (*Young Dark Emu*, 2019)

In his newly released academic publication, *Farmers or Hunter-Gatherers? The Dark Emu Debate*, anthropologist and linguist Peter Sutton refutes Pascoe's assertions. Sutton and his co-author, archaeologist Keryn Walshe, assert that Pascoe's description of hunter-gatherers as "primitive", "simple" or "mere" diminishes the dignity of traditional Aboriginal culture, by focusing on the writing of "blow-through" European explorers that did not respect or acknowledge the hunter-gatherer society as having "ownership" of the land on which they lived.¹

Michael Westaway and Joshua Gorringe write that contemporary archaeological research may hold the key to debates around *Dark Emu*. They report on a major research project, working with the Mithaka Aboriginal Corporation in the Channel Country in Central Australia, which seeks to test Pascoe's hypothesis. They are investigating Aboriginal settlement sites and pit dwelling huts and have found more than 140 quarries where rock was excavated to make seed grinding stones. Using sophisticated techniques, they are searching for evidence of villages, combing through ancient fireplaces and studying plant use.²

Ask your students to investigate different sources of information about Indigenous food and culture to discover the many ways that First Nations people utilised science to help them live in and nurture their environment for thousands of years.



An aerial view of an Aboriginal stone arrangement in the Channel Country of Central Australia. Such arrangements may be associated with initiation ceremonies and exchange of marriage partners, as well as trade. The main structure is around 30 metres long – Photo: The Conversation – Mithaka Aboriginal Corporation.

¹ "Debunking *Dark Emu*: did the publishing phenomenon get it wrong?" <https://www.theage.com.au/national/debunking-dark-emu-did-the-publishing-phenomenon-get-it-wrong-20210507-p57pyl.html>, The Age, Stuart Rintoul 12 June 2021.

² "Friday essay: how our new archaeological research investigates *Dark Emu*'s idea of Aboriginal 'agriculture' and villages" <https://theconversation.com/friday-essay-how-our-new-archaeological-research-investigates-dark-emus-idea-of-aboriginal-agriculture-and-villages-146754>. The Conversation, Michael Westaway and Joshua Gorringe 18 June 2021.

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Introduction

National Science Week is Australia's annual celebration of science and technology, and in 2021, the theme is Food: Different by Design. The theme offers teachers an opportunity to explore Australia's enormous contribution to food production and to learn more about the ways in which science and technology are continually shaping its future, in farming, nutrition and sustainability.

When exploring the topic of agriculture and food in Australia, we must also uncover its rich history in Indigenous culture and understand how Australia's traditional owners harnessed the land's natural resources in innovative and sustainable ways that would feed their communities whilst protecting country across generations.

In compiling this list of resources, we have tried to sample a range of resources that might interest students in early childhood, primary and secondary school settings, including ACARA Science Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority elaborations and content.

“By introducing Indigenous perspectives into your teaching your students will develop:

- *an increased respect and understanding of other cultures*
- *an ability to think more broadly when exploring social and environmental problems*
- *an awareness of the relationship between people and their environment*
- *an understanding of Australia's Indigenous history.”*

– Living Knowledge website
(<http://livingknowledge.anu.edu.au/>)

ACARA Australian Curriculum:

Science Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority

Content elaborations and teacher background information

Food and agriculture are an integral part of the Australian Science Curriculum Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority. This resource compilation includes a selection of ACARA content for different year levels relevant to this year's theme. The original ACARA content elaborations and teacher background information can be accessed via the following links:

- Foundation to Year 6: [ccp-tbi-f-6-ver5-online.pdf](http://australiancurriculum.edu.au/ccp-tbi-f-6-ver5-online.pdf) (australiancurriculum.edu.au)
- Years 7 to 10: [ccp-tbi-7-10.pdf](http://australiancurriculum.edu.au/ccp-tbi-7-10.pdf) (australiancurriculum.edu.au)

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Foundation

Source: Shutterstock

Foundation Year | Science | Science Understanding

Biological sciences

🔍 Living things have basic needs, including food and water (ACSSU002 - Scootle)

👉 recognising how Aboriginal and Torres Strait Islander Peoples care for living things (OI.2, OI.3)

Connecting the elaboration and content description

Aboriginal and Torres Strait Islander Peoples have long held understandings of the needs of living things, including the provision of vital resources such as food and water. For millennia, Aboriginal and Torres Strait Islander Peoples have sensitively cared for the living things in their Country or Place and have implemented sustainable practices to maintain environmental balance. Country and Place have immense spiritual and cultural significance for Aboriginal and Torres Strait Islander Peoples, and the plants and animals within the environment have long been tended to as part of Caring for Country responsibilities. This elaboration provides students with the opportunity to recognise that Aboriginal and Torres Strait Islander Peoples understand the basic needs of plants and animals and have long cared for the living things in their environment.

Foundation Year | Science | Science as a Human Endeavour

Nature and development of science

🔍 Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013 - Scootle)

👉 recognising how Aboriginal and Torres Strait Islander Peoples gain knowledge about the land and its vital resources, such as water and food, through observation (OI.3, OI.5)

Connecting the elaboration and content description

Aboriginal and Torres Strait Islander Peoples have worked scientifically for millennia to gain knowledge about the land and vital resources, such as water and food. The wealth of environmental knowledge held by Aboriginal and Torres Strait Islander Peoples is a result of continuous observations of the environment, noticing changes that have occurred, asking questions, and documenting and preserving knowledges and understandings. These knowledges and understandings have long informed how to access and sustainably manage important natural resources. Astute observations of the environment provide important information: the location of water sources, particularly in times of drought or in arid parts of Australia when water is limited, and the availability of natural resources that provide food, medicines and matter for material culture. This elaboration provides students with the opportunity to recognise how Aboriginal and Torres Strait Islander Peoples have vast knowledges about the land and its vital resources that have developed through many thousands of years of observations.

FOUNDATION Science, HASS - Caring for Country: how Indigenous scientific observation and cultural practices support ecosystems

This unit explores the special, reciprocal relationship First Nations Peoples have with Country. It investigates how Indigenous scientific knowledge, gained through observation of the environment, has informed cultural and land management practices for millennia enabling the land, sea, plants, animals and humans to survive and thrive.



- Science involves observing, asking questions about, and describing changes in, objects and events. (ACSHE013)
- The Aboriginal or Torres Strait Islander Country/Place on which the school is located and why Country/Place is important to Aboriginal and Torres Strait Islander Peoples. (ACHASSK016)

Teacher Resource: Australians Together website. *Caring for Country* (https://australianstogether.org.au/education/curriculum-resources/?Keywords=Science&action_doCurriculumSearch=Search)

FOUNDATION Science – Talking About Plants

Learners use appropriate vocabulary to describe Tasmanian native plants. They listen, respond and pose questions in order to play a game of bingo.



- Objects are made of materials that have observable properties (ACSSU003).
- Pose and respond to questions about familiar objects and events (ACSIS014).
- Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013).

Teacher Resource: The Orb website. *Foundation Science and English - Talking About Plants* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

FOUNDATION Geography – Aboriginal sites at Bobbin Head



These learning activities meet both the Geography and History syllabus content as well as the cross curricula priority area of Aboriginal Histories and Cultures. Students will explore Guringai Country, take a closer look at a midden site visit a local engraving site and see grinding grooves. Students will find out what kinds of Aboriginal sites you might find at Bobbin Head.

Teacher Resource: NSW Education website. *Aboriginal sites at Bobbin Head* (<https://sites.google.com/education.nsw.gov.au/lessons-in-nature/stage-1/local-aboriginal-sites-at-bobbin-head>)


YEAR 1




Kakadu during the wet season. Source: Shutterstock

Year 1 | Science | Science as a Human Endeavour

Nature and development of science

 Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE021 - Scootle)

 recognising how Aboriginal and Torres Strait Islander Peoples use changes in the landscape and the sky to answer questions about when to gather certain resources (OI.3, OI.5)

Connecting the elaboration and content description

For many thousands of years Aboriginal and Torres Strait Islander Peoples have used observable changes in the sky and landscape as indicators of seasonal change and resource availability. Through continuous observation and asking questions about environmental changes, a wealth of scientific knowledge and understanding of many different ecosystems has been collated. These knowledges and understandings have long provided detailed information about resources that are important sources of food, medicines and materials for tools, material culture and shelters. Asking questions and describing changes in the landscape, such as ephemeral waterbodies and plant life cycle stages, provides information about seasonal availability of resources. Similarly, through continuous observations of changes in the sky including the patterns of movement of celestial bodies and weather indicators, and asking questions about the significance of these changes, Aboriginal and Torres Strait Islander Peoples have developed methods of monitoring time and seasons that are connected with the availability of particular resources. This elaboration provides students with the opportunity to recognise that the vast knowledges about changes in the sky and landscape held by Aboriginal and Torres Strait Islander Peoples can answer questions about when to gather certain resources.

Y1 Science, HASS – Observing and living with the seasons

This unit guides learners to explore seasons, both Western and Indigenous, through observation, community research, hands-on activities and critical thinking. Indigenous seasonal knowledge was essential in the past for living well, and remains important today in order to live with and look after Country for future generations.

- Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE021)



- The weather and seasons of places and the ways in which different cultural groups, including Aboriginal and Torres Strait Islander Peoples, describe them (ACHASSK032)
- Observable changes occur in the sky and landscape (ACSSU019)

Teacher Resource: Australians Together website. *Observing and living with the seasons* (https://australianstogether.org.au/education/curriculum-resources/?Keywords=Science&action_doCurriculumSearch=Search)

Y1 Science – Our Weather, Patterns in the sky

The focus of this unit is to look at the weather and discuss the different impacts that this has on everyday life. Students will discuss, observe and record weather in their own environment and explore in an attempt to understand how it impacts people and places. Students will use a variety of science skill such as discussing, illustrating, observing, predicting, testing, experimenting and posing questions. This unit is integrated with both Art and Aboriginal topics to give students a broad understanding of weather in their world.

- Science involves asking questions about, and describing changes in, objects and events (ACSHE021)
- Earth and space sciences: Observable changes occur in the sky and landscape (ACSSU019)
- Nature and development of science: Science involves asking questions about, and describing changes in, objects and events (ACSHE034)
- Questioning and predicting: Respond to and pose questions, and make predictions about familiar objects and events (AC SIS024)
- Processing and analysing data and information: Use a range of methods to sort information, including drawings and provided tables (AC SIS027)

- Aboriginal and Torres Strait Islander Peoples have unique belief systems that are spiritually connected to the land, sea, sky and waterways (OI.3)



- Aboriginal and Torres Strait Islander communities maintain a special connection to and responsibility for Country/ Place throughout all of Australia (OI.2)

Teacher Resource: Australian Curriculum Lessons website. *Our Weather* (<https://www.australiancurriculumlessons.com.au/wp-content/uploads/2015/11/Science-Unit-of-Lessons-Resources-and-Links-Our-Weather.docx>)

Y1 Science – Big Rain Coming by Katrina Germein

This lesson adopts an integrated approach to teaching science, incorporating picture story books and maths concepts. The lesson aims to expand the students understanding of the differing seasons in Northern Australia and draws on their developing understanding of scientific concepts such as evaporation. The lesson should be taught as part of a continuing exploration of the importance of living sustainably.

- 🔍 Observable changes occur in the sky and landscape (ACSSU019)
- 🔍 Science involves asking questions about, and describing changes in, objects and events (ACSHE021)

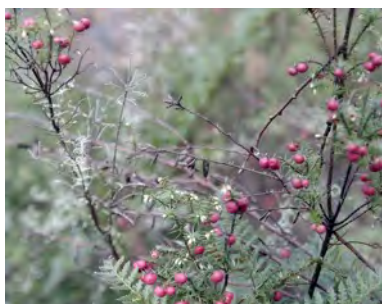


- 🔍 Science involves exploring and observing the world using the senses (ACSHE013)
- 👋 Aboriginal and Torres Strait Islander histories and cultures: investigating the seasons used by Aboriginal people, comparing them to those used in Western society and recognising the connection to weather patterns.

Teacher Resource: Australian Curriculum Lessons website. *Big Rain Coming* (<https://www.australiancurriculumlessons.com.au/2014/03/22/big-rain-coming-katrina-germein-integrated-maths-science-lesson-12/>)

Y1 Science – What's in your lunchbox?

Learners explore the different types of foods eaten by Aboriginal people pre-European contact. They identify where these foods sit on the healthy eating pyramid before creating a poster with their findings, to present to the class.



- 🔍 Living things have a variety of external features (ACSSU017).
- 🔍 People use science in their daily lives, including when caring for their environment and living things (ACSHE022)

Teacher Resource: The Orb website. Year 1 English and Science - *What's in Your Lunchbox?* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

YEAR 2



Budj Bim eel traps. Source: The Conversation / Photo: Damien Bell

Year 2 | Science | Science as a Human Endeavour

Use and influence of science

- 🔍 People use science in their daily lives, including when caring for their environment and living things (ACSH035 - Scootle)
- 👋 investigating how Aboriginal and Torres Strait Islander Peoples use science to meet their needs, such as food supply (OI.2, OI.3, OI.5)

Connecting the elaboration and content description

Aboriginal and Torres Strait Islander Peoples have long used science to inform the sustainable harvest of environmental resources to meet their needs, such as the supply of food. Sustainable harvesting practices employed by Aboriginal and Torres Strait Islander Peoples demonstrate care for the environment and living things through the considered acquisition of resources. A diverse range of scientific knowledges and understandings underpins the harvest of resources to ensure that ecosystem balances are maintained and that the living things within an environment are protected for the ongoing generation of resources. Cultural protocols, founded on these deep ecological understandings, safeguard and care for living things and the environment. This elaboration provides students with the opportunity to investigate how Aboriginal and Torres Strait Islander Peoples use science in their daily lives to harvest resources sustainably in order to meet their needs.

Y2 Science, Geography – Living Sites

Learners go on Country with an Aboriginal Sharer of Knowledge to investigate and develop their knowledge of living sites. They learn about the Aboriginal Relics Act that protects living sites, before making their own representation as a display, to help teach others about Tasmanian Aboriginal living sites.



- People use science in their daily lives, including when caring for their environment and living things (ACSHE035).
- Compare observations with those of others (AC SIS041).
- ✋ Aboriginal and Torres Strait Islander communities maintain a special connection to and responsibility for Country/Place (OI.2).

Teacher Resource: The Orb website. Year 2 Science and Geography - *Living Sites* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y2 Maths – Comparing Western and Indigenous concepts of seasons, ordering Western months and understanding seasonal cycles

Students learn months of the year; European seasons; and how for thousands of years, First Nations people in Australia marked seasons and seasonal change by observing animal behaviours and natural features. Students begin to develop an understanding of the cyclical nature of time.



- Investigating the seasons used by Aboriginal people, comparing them to those used in Western society and recognising the connection to weather patterns (ACMMG040)

Teacher Resource: Australians Together website. *Comparing Western and Indigenous Seasons* (https://australianstogether.org.au/education/curriculum-resources/?Keywords=Science&action_doCurriculumSearch=Search)

YEAR 3



Aboriginal Technology - Women collecting pippies and men cooking them in a sand oven - Source: Thomas Dick Collection, Australian Museum.

Year 3 | Science | Science Understanding

Physical sciences

🔗 Heat can be produced in many ways and can move from one object to another (ACSSU049 - Scootle)

✋ investigating the production and transfer of heat in Aboriginal and Torres Strait Islander Peoples' methods of cooking, such as the use of ground ovens (OI.5)

Connecting the elaboration and content description

This elaboration provides students with the opportunity to investigate Aboriginal and Torres Strait Islander Peoples' understanding of the concept of heat transfer through the context of cooking methods such as the use of ground ovens. Over millennia, heat has been produced through various methods to initiate combustion and utilised for many purposes such as the production of heat for cooking. Combustion and the transfer of heat from one object to another, such as from hot stones to food in an oven, was utilised by Aboriginal and Torres Strait Islander Peoples prior to colonisation. Across Australia ground ovens remain an important cooking method for many people. Through this elaboration students can investigate methods of heat transfer in cooking practices that have long been understood and implemented by Aboriginal and Torres Strait Islander Peoples.

Year 3 | Science | Science as a Human Endeavour

Use and influence of science

🔗 Science knowledge helps people to understand the effect of their actions (ACSHE051 - Scootle)

✋ researching Aboriginal and Torres Strait Islander Peoples' knowledge of the local natural environment, such as the characteristics of plants and animals (OI.2, OI.3, OI.5)

Connecting the elaboration and content description

Aboriginal and Torres Strait Islander Peoples' deep scientific understanding of the complex interrelationships of biotic and abiotic factors within the natural environment has long informed and continues to inform the management of Country/Place. Scientific knowledge of the behaviour of fire ensures that the effects of burning Country/Place are well understood and appropriately implemented. Aboriginal and Torres Strait Islander Peoples possess detailed understanding of the characteristics of flora and fauna in the local natural environment, including adaptations to fire and how organisms respond to fire management practices. This elaboration provides students with the opportunity to research Aboriginal and Torres Strait Islander Peoples' knowledge of the local natural environment and how this knowledge informs human actions, such as fire management of the environment.

Y3 Design and Technologies – Taste of Tasmania

Learners compare their diet with the native foods that Tasmanian Aboriginal people have relied upon for millennia. They research a particular food and use appropriate software to create a text that includes information on their chosen food as well as a recipe.



- 4. Design and Technology Investigate food and fibre production and food technologies used in modern and traditional societies (ACTDEK012).

Teacher Resource: The Orb website. Year 3 Design and Technologies - *Taste of Tasmania* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y3 Science & HASS – Botany of Kamay

This resource explores the plants of Kamay Botany Bay – their significance to the Aboriginal people of Kamay, and to the botanists on the Endeavour in 1770. This resource is one part of the 'Endeavour – eight days in Kamay' resource.

- 4. Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044)
- 4. Science involves making predictions and describing patterns and relationships (ACSHE050)



- 4. The importance of Country/Place to Aboriginal and/or Torres Strait Islander Peoples who belong to a local area (ACHASSK062)
- 4. How the community has changed and remained the same over time and the role that people of diverse backgrounds have played in the development and character of the local community (ACHASSK063)

Teacher Resource: NSW Education website. *Botany of Kamay* (<https://sites.google.com/education.nsw.gov.au/botany-of-kamay/home>)

Y3 Science, HASS – Aboriginal Plant Use in south-eastern Australia



The Aboriginal Plant Use activities focus on the Australian bush providing all the basic needs for survival of Aboriginal people for over 40,000 years, looks at aspects of the social fabric of Aboriginal society, and plant use today. It includes use of plants for food, medicine, tools, utensils, ceremony, hunting and everyday life.

Teacher Resource: Australian National Botanic Gardens website.

Indigenous plant use (https://parksaustralia.gov.au/botanic-gardens/pub/anbg_educationresources_aboriginalplantuse_150802.pdf)

Y3 HASS – Through Our Eyes

18 short videos provide insights into the land management practices and social, spiritual and cultural knowledge of the Ngemba, Kamilaroi and Euahlayi Aboriginal language groups in north-western NSW. The videos are presented by the Aboriginal Elders and knowledge-holders and cover a range of topics including the cultural use of billabongs and gilgai, the use of native foods and medicines and traditional stories from the region. Some of the videos explore the European water management practices on the ecology of the catchment and the importance of sustainable land and water management.



This resource also provides a very valuable source of information for Year 3 History for local area studies of Language groups in north-western NSW and discusses the importance of Country and Place to Aboriginal peoples.

Video Link: NSW Local Land Services website. *Through Our Eyes* (5mins 45secs) (https://www.youtube.com/user/WesternLLS/playlists?view=50&sort=dd&shelf_id=5)



The Lilly Pilly is often used for medicine and the fruit is eaten (Photo - Shutterstock)



Harvesting Yams - Sketch by Andrew Todd in 1835. Source: AgriEducate

Year 4 | Science | Science Understanding

Biological sciences

- Living things have life cycles (ACSSU072 - Scootle)

✎ investigating how Aboriginal and Torres Strait Islander Peoples understand and utilise the life cycles of certain species (OI.2, OI.3, OI.5)

Connecting the elaboration and content description

This elaboration provides students with the opportunity to investigate the long-held scientific understanding Aboriginal and Torres Strait Islander Peoples have of the life cycles of species within their Country/Place. For millennia Aboriginal and Torres Strait Islander Peoples have used knowledge and understanding of the life cycles of organisms to acquire and utilise resources from the environment. These resources are important for the construction of tools, weapons, implements and shelters, to manufacture clothing and to procure food and medicines. An understanding of the life cycles of organisms informs the appropriate time for the careful, considered harvest of flora and fauna species to protect the sustainability of the organism and provide continued access to the resource. Students will learn how the intricate understanding of the life cycles of organisms has long informed Aboriginal and Torres Strait Islander Peoples' decisions regarding when to acquire and utilise resources.

Year 4 | Science | Science Inquiry Skills

Questioning and predicting

- With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge (AC SIS064 - Scootle)

✎ acknowledging and using information from Aboriginal and Torres Strait Islander Peoples to guide the formulation of investigable questions regarding life cycles (OI.2, OI.3, OI.5)

Detail

This elaboration provides students with an opportunity to develop this core Science Inquiry Skill whilst addressing intercultural science inquiry skills relevant to Aboriginal and Torres Strait Islander Histories and Cultures within the context of the following content description(s) from the Science Understanding and/or Science as a Human Endeavour strand(s).

Y4 Science – Billabongs

Aboriginal and Torres Strait Islander peoples understand the value of billabongs and utilise the life cycles of certain species of plants and animals that are part of billabong ecosystems. This knowledge and value has allowed Aboriginal and Torres Strait Islander people to survive in some of the harshest places on the continent.



- Living things have life cycles (ACSSU072)
- Living things depend on each other and the environment to survive (ACSSU073)
- Science involves making predictions and describing patterns and relationships (ACSHE061)

Teacher Resource: University of Melbourne Indigenous Knowledge Institute website. *Billabongs* (<https://indigenousknowledge.unimelb.edu.au/curriculum/resources/billabongs>)

Y4 HASS – Foods Around the World

Learners conduct an inquiry into the various foods eaten by different peoples around the world, and compare it with the traditional diet of Tasmanian Aboriginal people. They will identify how the different types of foods are produced and discuss the sustainability and waste aspects.

- The importance of environments, including natural vegetation, to animals and people (ACHASSK088).



- The custodial responsibility Aboriginal and Torres Strait Islander Peoples have for Country/Place, and how this influences views about sustainability (ACHASSK089).
- The use and management of natural resources and waste, and the different views on how to do this sustainably (ACHASSK090).

Teacher Resource: The Orb website. Year 4 HASS - *Foods Around the World* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y4 Science – The many uses of indigenous plants

Discover the cultural significance and of some native plants to the local Indigenous peoples of the Botany Bay region. Find out the many ways these plants can be used. Gardening Australia's Clarence Slockee joins Dean Kelly (park officer) and the Towra Team, a group of trainees from the La Perouse Aboriginal Community, on a walk through Towra Point Nature Reserve.



- Living things, including plants and animals, depend on each other and the environment to survive (ACSSU073)
- Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE120)

Teachers Resource: ABC Education website. *The many uses of indigenous plants* (6 mins 5 secs) (<https://education.abc.net.au/home#!/media/30780/>)

Y4 Science & HASS – Botany of Kamay

This resource explores the plants of Kamay Botany Bay – their significance to the Aboriginal people of Kamay, and to the botanists on the Endeavour in 1770.

- Living things depend on each other and the environment to survive (ACSSU073)
- The diversity of Australia's first peoples and the long and continuous connection of Aboriginal and Torres Strait Islander Peoples to Country/Place (land, sea, waterways and skies) (ACHASSK083)
- The journey(s) of AT LEAST ONE world navigator, explorer or trader up to the late eighteenth century, including their contacts with other societies and any impacts (ACHASSK084)



- The nature of contact between Aboriginal and Torres Strait Islander Peoples and others, for example, the Macassans and the Europeans, and the effects of these interactions on, for example, people and environments (ACHASSK086)
- The importance of environments, including natural vegetation, to animals and people (ACHASSK088)

Teacher Resource: NSW Education website. *Botany of Kamay* (<https://sites.google.com/education.nsw.gov.au/botany-of-kamay/home>)

Y4 HASS – Farms and people's connections to them

This is a video about the operation of the Outback Pride project and the value of the Australian native food produced in conjunction with Aboriginal peoples. To a visual background of the nursery at Reedy Creek in South Australia and some of 25 Aboriginal communities involved in the project in SA and Northern Territory, Mike and Gayle Quarmby explain that Outback Pride produces 40 tonnes of native foods a year; grows up to 60 plant species, works with Aboriginal Elders to identify the best species, propagates plants at the nursery and grows them there and in the communities' gardens.



Farms and people's connections to them, develops students' understanding of place, as they learn that places may be defined differently by diverse groups of people. Students discover more about different products, foods, clothes and toys used and where the primary resources for them are found, grown or manufactured.

- The importance of environments, including natural vegetation, to animals and people (ACHASSK088)

Teacher Resource: Primezone website. *Farms and people's connections to them* (5mins 11sec) (<https://youtu.be/poA99DAPrZA>)

Y4 Geography – Discovering past methods of food & fibre production

This is a video about the native food plants of the Mount Gambier region in South Australia and how they were used by the local Buandig Aboriginal people. It is introduced by ethnobotanist and author Neville Bonney who shows a wide range of local plants, often giving their names in Bungandidj language. The plants include currant bush, golden wattle, kunzea, bulrush, succulents, wild spinach, river mint and wild celery.



This resource material aims to help teachers and students in primary schools explore some of the historical understandings about geographical concepts of factors that shape the characteristics of places, the influence of natural and human factors on food and fibre production and strategies to learn how primary producers are adapting to the changing conditions they face.

- The importance of environments, including natural vegetation, to animals and people (ACHASSK088)

Teacher Resource: Primezone website. *Discovering past methods of food and fibre production* (5mins 1sec) (<https://youtu.be/41xUAT-SSyg>)



Santalum acuminatum, desert bush tucker peach quandong. (Photo - Shutterstock)

YEAR 5



Collecting Oysters (State Library of NSW)

Year 5 | Science | Science Understanding

Biological sciences

- Living things have structural features and adaptations that help them to survive in their environment (ACSSU043 - Scootle)
- ✎ investigating Aboriginal and Torres Strait Islander Peoples' knowledge of the adaptations of certain species and how those adaptations can be exploited (OI.5, OI.9)

Connecting the elaboration and content description

This elaboration provides students with the opportunity to understand how Aboriginal and Torres Strait Islander Peoples have observed the structural adaptations of organisms and exploited these adaptations for material culture and domestic use. Aboriginal and Torres Strait Islander Peoples have long recognised the structural adaptations of organisms and such adaptations figure prominently in many facets of life including weaponry, utensils, regalia and costumes. Students have the opportunity to learn how Aboriginal and Torres Strait Islander Peoples understand that the structural adaptations of organisms have enabled the survival of the organism in the environment and that these adaptations can be exploited for other purposes.

Year 5 | Science | Science Understanding

Chemical sciences


- Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077 - Scootle)
- ✎ recognising Aboriginal and Torres Strait Islander People's knowledge and understanding of solids, liquids and gases (OI.5)


Connecting the elaboration and content description

This elaboration provides students with the opportunity to recognise Aboriginal and Torres Strait Islander Peoples' knowledge and understanding of changes in states of matter. Aboriginal and Torres Strait Islander Peoples have worked, and continue to work, with materials that have the chemical propensity for changing state. The scientific knowledge of applying or removing heat to produce changes in states of matter is evidenced in many long-held and ongoing Aboriginal and Torres Strait Islander practices, including the extraction of oils (solid-liquid), medicinal therapies (liquid-gas) and cooking practices (liquid-gas). Students will have the opportunity to understand how Aboriginal and Torres Strait Islander Peoples' knowledge about states of matter is used in many processes and practices.

Year 5 | Science | Science as a Human Endeavour

Use and influence of science

 Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083 - Scootle)


 investigating how Aboriginal and Torres Strait Islander Peoples' traditional ecological and zoological knowledge informs sustainable harvesting practices of certain species, such as dugongs and turtles (OI.2, OI.6)


Connecting the elaboration and content description

Aboriginal and Torres Strait Islander Peoples have accumulated sophisticated ecological and zoological knowledge about culturally important key species, including life cycles, organism longevity, mating systems, and diets. This knowledge and understanding about organisms and their life cycle requirements is applied to the careful selection of organisms when they are harvested. Over millennia, in every aspect of life, Aboriginal and Torres Strait Islander Peoples have considered the impact of their practices on the environment to ensure that the growth, regeneration and reproductive cycles of organisms are not interrupted. This elaboration provides students with the opportunity to understand how Aboriginal and Torres Strait Islander Peoples' ecological and zoological knowledge of particular species, such as dugongs and turtles, informs sustainable harvesting practices to protect the species from endangerment and provide continued access to culturally important species. Students will have the opportunity to learn how Aboriginal and Torres Strait Islander Peoples' scientific knowledges, that have long ensured the continuous population growth of these species, are now critical in the co-development of conservation practices.

Year 5 | Science | Science as a Human Endeavour

Use and influence of science

 Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083 - Scootle)

 investigating how Torres Strait Islander Peoples and Aboriginal Peoples of arid regions of Australia use scientific knowledge to manage precious water resources (OI.5)

Connecting the elaboration and content description

Water is a vital life resource. Access to clean safe water in parts of arid Australia has become a contemporary issue that requires innovative scientific solutions. This elaboration provides students with the opportunity to investigate challenges in the provision of clean, safe water to remote communities in parts of arid Australia, and the scientific knowledges that are being implemented to solve these problems. Aboriginal and Torres Strait Islander Peoples have long understood how to obtain and purify water. However, changes in land usage in contemporary times, including changes in agricultural practices and land use affecting groundwater resources, have posed new challenges for Aboriginal and Torres Strait Islander communities. This elaboration provides students with the opportunity to understand how scientific knowledge is being used to solve water supply issues that affect communities in remote and regional Australia.

Y5 Science, HASS – Sustainable solutions: how Indigenous knowledge can lead to better land and water management in Australia

Students explore sustainable Indigenous resource management practices. Students engage with perspectives of Aboriginal and Torres Strait Islander Peoples about how relationship to Country shapes decision-making, and they examine a geographical site to show how the environment was altered to sustain ways of living.

- Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)



- The influence of people, including Aboriginal and Torres Strait Islander Peoples, on the environmental characteristics of Australian places (ACHASSK112)
- Types of resources (natural, human, capital) and the ways societies use them to satisfy the needs and wants of present and future generations (ACHASSK120)

Teacher Resource: Australians Together website. *Sustainable solutions* (https://australianstogether.org.au/education/curriculum-resources/?Keywords=Science&action_doCurriculumSearch=Search)

Y5 Geography, Design and Technologies – Foragers or Farmers

Learners analyse a range of sources to investigate the ways that Tasmanian Aboriginal people skilfully managed their environment in order to have reliable access to a range of food resources through the purposeful use of fire.

- The influence of people, including Aboriginal and Torres Strait Islander Peoples, on the environmental characteristics of Australian places (ACHASSK112).



- Evaluate evidence to draw conclusions (ACHASSI101).
- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021).

Teacher Resource: The Orb website. Year 5 Geography and Design and Technologies - *Foragers or Farmers* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y5 Design and Technologies - Brewarrina Fish Traps

In this activity, students explore how Aboriginal and Torres Strait Islander Peoples' capacity for innovation is evident through the incorporation and application of a range of traditional, contemporary and emerging technologies and practices to purposefully build and/or maintain cultural, community and economic capacity. In particular, students explore how culture has guided Aboriginal and Torres Strait Islander Peoples' ability to design technologies that support sustainable living within the environment, namely fish traps.



4. Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)

Teacher Resource: *Working with Indigenous Australian Students – Science* (<http://teacherscamp.weebly.com/science.html>)

Y5 Health and Physical Education – Seasonal foods and Aboriginal astronomy

Aboriginal and Torres Strait Islander people pay close attention to the positions of the stars to determine seasonal change. This informs them about the behaviours of plants and animals that are used for food and medicine.



4. Investigate the role of preventive health in promoting and maintaining health, safety and wellbeing for individuals and their communities (ACPPS058)

Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Seasonal foods and Aboriginal astronomy*. (<https://indigenousknowledge.unimelb.edu.au/curriculum/resources/seasonal-foods-and-aboriginal-astronomy>)

Y5 Design & Technologies – Recognising the potential of native vegetables

Have you ever tasted youlk? How about kulyu? These are just two of the native Australian vegetables that have traditionally sustained Aboriginal communities. Geoff Woodall is a native plant agronomist who's been researching and growing these indigenous root vegetables on his farm at Arthur River in Western Australia. Why did Geoff originally have more success growing youlk (a sort of bush carrot) than kulyu (a type of sweet potato)? What did he do to improve the process of growing kulyu?



4. Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021).

Teacher Resource: ABC Education website. *Recognising the potential of native vegetables* (5 mins 13 secs) (<https://education.abc.net.au/home#!/media/2343020/>)


YEAR 6




Joseph Lycett's c.1817 watercolour, "Aborigines Using Fire to Hunt Kangaroos", depicts the innovative use of fire burning.
Credit: National Library

Year 6 | Science | Science Understanding

Biological sciences

 The growth and survival of living things are affected by physical conditions of their environment (ACSSU094 - Scootle)

 investigating Aboriginal and Torres Strait Islander Peoples' knowledge and understanding of the physical conditions necessary for the survival of certain plants and animals in the environment (OI.2, OI.3)


Connecting the elaboration and content description

This elaboration enables students to study how Aboriginal and Torres Strait Islander Peoples' knowledge and understanding of the complex ecosystems that exist across the Australian continent are reliant on physical conditions that exist within a defined geographical region. Aboriginal and Torres Strait Islander Peoples' understanding of the requirement of specific physical conditions for the growth and survival of particular plant and animal species is evidenced through intricate seasonal calendars, land management practices and important cultural gatherings. Such knowledge is essential in maintaining or restoring particular environmental physical conditions that ensure the continued availability of resources and support the reproductive/migratory cycles of important organisms.

Year 6 | Science | Science Understanding

Chemical sciences

 Changes to materials can be reversible or irreversible (ACSSU095 - Scootle)

 investigating Aboriginal and Torres Strait Islander Peoples' knowledge of reversible processes, such as the application of adhesives, and of irreversible processes, such as the use of fuels for torches (OI.5)

Connecting the elaboration and content description

This elaboration provides students with the opportunity to learn how Aboriginal and Torres Strait Islander Peoples developed adhesive technologies thousands of years ago through the knowledge of reversible and irreversible changes. Aboriginal and Torres Strait Islander Peoples used, and continue to use, resins in the in the manufacture, maintenance and repair of various implements and regalia. The reversible thermoplastic properties of resins are used to advantage; when heat is applied, the resins change state from solid to liquid, and when heat is removed, they return to a solid state. Aboriginal and Torres Strait Islander Peoples understand the thermal limits of resins, that is, if too much heat is applied to the resin it causes an irreversible change to the material, rendering it unusable. Students will have the opportunity to learn about Aboriginal and Torres Strait Islander Peoples' understanding of reversible changes as evidenced in the use of resins as adhesives, and irreversible changes, such as the use of fuel for torches.

Year 6 | Science | Science as a Human Endeavour

Use and influence of science

🔗 Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100 - Scootle)

✋ discussing how modern approaches to fire ecology in Australia are being informed by Aboriginal and Torres Strait Islander Peoples' traditional ecological knowledge and fire management practices (OI.2, OI.9)

Connecting the elaboration and content description

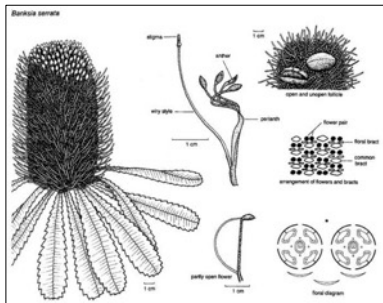
This elaboration provides students with the opportunity to understand how solutions to contemporary environmental issues in Australia are being informed by the traditional ecological knowledges of Aboriginal and Torres Strait Islander Peoples. Traditional ecological knowledges of Aboriginal and Torres Strait Islander Peoples have long been used to manage and maintain the environment. Contemporary environmental issues such as uncontrolled bushfires, carbon emissions and endangered biodiversity require complex scientific approaches to slow or prevent continued damage to the environment and danger to Australian communities. Scientists are turning to the ecological knowledges of Aboriginal and Torres Strait Islander Peoples to inform and implement solutions to these contemporary environmental issues.



Modern fire managers can learn much from Aboriginal fire practice. Tasmanian Aboriginal Man Linton Burgess engaging in Tasmanian Cultural practices – The Conversation (Photo Matthew Newton/RUMMIN Productions)

Y6 Science – Understanding plants and animals

The controlled application of fire by Aboriginal and Torres Strait Islander people requires a deep knowledge of the environment, including vegetation communities, precipitation patterns, seasonal variability, weather and wind.



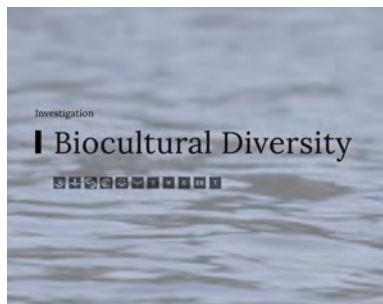
- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)
- Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)

Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Understanding plants and animals* (<https://indigenous-knowledge.unimelb.edu.au/curriculum/resources/understanding-plants-and-animals>)

Y6 Design and Technologies – Biodiversity, Food and Farming for a Healthy Planet

Learners undertake a research task into sustainable food production practices and compare these to traditional Tasmanian Aboriginal food production practices, before completing their own checklist detailing ways they can contribute positively to a sustainable future.

- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021).



- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019).

Teacher Resource: The Orb website. *Biodiversity Food and Farming for a Healthy Planet* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y6 Science – Australian edible plants

Australia's native plants are not only beautiful to look at, but many can also be used as medicine and even food! Join Costa and Jody Orcher on a tour of the Royal Botanic Garden Sydney and learn about some of the native plants that can be eaten. What are some of the plants mentioned, and have you heard of them before?



- Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)

Teachers Resource Link: ABC Education website. *Australian edible plants* (4 mins 46 secs) (<https://education.abc.net.au/home#!/media/2825118/>)

Y5,6 Design and Technologies - Brewarrina Fish Traps

In this activity, students explore how Aboriginal and Torres Strait Islander Peoples' capacity for innovation is evident through the incorporation and application of a range of traditional, contemporary and emerging technologies and practices to purposefully build and/or maintain cultural, community and economic capacity. In particular, students explore how culture has guided Aboriginal and Torres Strait Islander Peoples' ability to design technologies that support sustainable living within the environment, namely fish traps.



- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)

Resource Link: Teachers Camp website. *Working with Indigenous Australian Students – Science* (<http://teacherscamp.weebly.com/science.html>)

Y6 Science – First Australians were also the first farmers

Discover a method for catching eels while watching how archaeologist Dr Heather Built works scientifically at Lake Condah to determine whether the Gunditjmarra community were truly nomadic or used advanced farming techniques to support their way of life.



- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)
- Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)

Teacher Resource: ABC Education website. *First Australians were also the first farmers* (3mins 27 secs) (<https://education.abc.net.au/home#!/media/29898/>)

Y6 Science – Bush tucker super crop!

Which native plant might provide a ready-made crop that could be used as a very nutritious food source? Meet two South Australian growers who are investigating just such a native crop. Find out more about the seed crop that does not require significant amounts of water or fertiliser and has a long history of use by Indigenous Australians.



- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

Teacher Resource: ABC Education website. *Bush tucker super crop!* (4 mins 57 secs) (<https://education.abc.net.au/home-!/media/103110/>)

Y6 Science – Tasty bush tucker

Did you know that you can mix the nectar from some native flowers with water to make a sweet drink? Explore the Royal Botanic Gardens of Sydney with Gardening Australia presenter Clarence Stockee, and discover plants used by Aboriginal people. Find out about some native Australian bush foods, such as Kurrajong seeds, and how to prepare them safely.



- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

Teacher Resource: ABC Education website. *Tasty bush tucker* (4mins 14secs) (<https://education.abc.net.au/home#!/media/30798/>)

Y6 Science – Have you ever cooked with wattleseed?

If you were a farmer, what native plants could you grow to provide a new food crop? Find out how Mark Lucas, a South Australian farmer, makes use of scientific research and innovative chefs to create a market for a new native plant food product.



- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

Teacher Resource: ABC Education website. *Have you ever cooked with wattleseed?* (3mins 39secs) (<https://education.abc.net.au/home#!/media/85272/>)

Y6 Science – Learning from Indigenous fire management practices

Students learn about Indigenous ecological knowledge and fire management practices. They investigate how Indigenous knowledge continues to be used today to look after plants, animals and the landscape; and how the science of reversible or irreversible change applies.

- Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)



- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)
- Changes to materials can be reversible or irreversible (ACSSU095)

Teacher Resource: Australians Together website. *Learning from Indigenous fire management practices* (https://australianstogether.org.au/education/curriculum-resources/?Keywords=Science&action_doCurriculumSearch=Search)

YEAR 7



Many wattles exude a gum either naturally or as a response to wounding. For some Aboriginal groups this was a snack food or a food for children. The gum could also be dissolved in water and nectar added to make a drink. Photo by Patrick Kavanagh.

Year 7 | Science | Science Understanding

Biological sciences

- 🔍 Interactions between organisms, including the effects of human activities can be represented by food chains and food webs (ACSSU112 - Scootle)
- 👤 investigating Aboriginal and Torres Strait Islander Peoples' responses to the disruptive interactions of invasive species and their effect on important food webs that many communities are a part of, and depend on, for produce and medicine (OI.2, OI.5, OI.6)

Connecting the elaboration and content description

This elaboration allows students to examine the impact of invasive species that have been imported through human activity such as agriculture. Students learn about how this is impacting upon important food webs of local ecosystems, which subsequently impact Aboriginal and Torres Strait Islander communities who depend on these ecosystems for cultural continuance, food and medicine.

This elaboration also provides students with opportunities to deepen their understanding of food chains and food webs as a way to represent interactions between organisms in ecosystems.

Year 7 | Science | Science Understanding

Chemical sciences

- 🔍 Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (ACSSU113 - Scootle)
- 👤 investigating separation techniques used by Aboriginal and Torres Strait Islander Peoples, such as hand picking, sieving, winnowing, yandying, filtering, cold-pressing and steam distilling (OI.5)

Connecting the elaboration and content description

This elaboration allows students the opportunity to explore a range of separation techniques developed and utilised by Aboriginal and Torres Strait Islander peoples across Australia for a variety of purposes. Students have opportunities to investigate the scientific principles underlying these techniques, and explore examples of specific separation methods developed by First Nations' Australians that enable the procurement and processing of resources necessary for everyday life and for survival in times of food and water shortages.

Year 7 | Science | Science Understanding

Earth and space sciences

- 🌐 Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon (ACSSU115 - Scootle)
- 👤 Investigating Aboriginal and Torres Strait Islander Peoples' calendars and how they are used to predict seasonal changes (OI.3, OI.5)

Connecting the elaboration and content description

This elaboration provides students with opportunities to learn about Aboriginal and Torres Strait Islander peoples' understandings of seasons through the investigation of seasonal calendars pertaining to various cultural groups. These calendars reflect Australia's varying climatic conditions, ecological diversity and expansive geographic locations inhabited by Aboriginal and Torres Strait Islander peoples. They include detailed understandings of recurring weather patterns and seasonal cycles. Aboriginal and Torres Strait Islander communities hold knowledge that links events in the natural world to cycles that are used in many facets of everyday life.

Year 7 | Science | Science Understanding

Earth and space sciences

- 🌐 Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116 - Scootle)
- 👤 exploring Aboriginal and Torres Strait Islander Peoples' connections with, and valuing of, water and water resource management (OI.2, OI.3)

Connecting the elaboration and content description

Aboriginal and Torres Strait Islander peoples have long held a deep knowledge and understanding of water as a renewable resource cycling through the environment. However, there are risks to the sustainability of the water supply available for drinking and for environmental and agricultural uses. Some of these risks can be minimised through the application of management practices informed by Aboriginal and Torres Strait Islander peoples' detailed and comprehensive understanding of water flows, and of the impact that water use may have on downstream ecosystems.

Year 7 | Science | Science Inquiry Skills

Processing and analysing data and information

- 🌐 Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (AC SIS129 - Scootle)
- 👤 collaborating with Aboriginal and Torres Strait Islander Peoples in the production of calendars that demonstrate seasonal patterns and relationships using digital technologies

Detail

This elaboration provides students with an opportunity to develop this core Science Inquiry Skill whilst addressing intercultural science inquiry skills relevant to Aboriginal and Torres Strait Islander Histories and Cultures within the context of the following content description(s) from the Science Understanding and/or Science as a Human Endeavour strand(s).

Year 7 | Science | Science as a Human Endeavour

Nature and development of science

- Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE223 - Scootle)
- investigating how land management practices of Aboriginal and Torres Strait Islander Peoples informs sustainable management of the environment to protect biodiversity (OI.5, OI.9)

Connecting the elaboration and content description

This elaboration allows students to investigate the role of Aboriginal and Torres Strait Islander peoples' fire regimes in protecting biodiversity and how the knowledge that underpins these practices is contributing to scientific understanding and sustainable land-management techniques.

Scientific research has reaffirmed these traditional practices as an effective means of managing a range of ecosystems and has provided the evidence framework for their reintroduction into a number of Australian environments.



Aquaculture was an important part of Aboriginal life - Nourlangie Rock Aboriginal art, Kakadu National Park (Photo: Shutterstock)

Y7 Design and Technologies – Australian edible plants

Australia's native plants are not only beautiful to look at, but many can also be used as medicine and even food! Join Costa and Jody Orcher on a tour of the Royal Botanic Garden Sydney and learn about some of the native plants that can be eaten. What are some of the plants mentioned, and have you heard of them before?



- Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

Teacher Resource: ABC Education website. *Australian edible plants* (4 mins 46 secs) (<https://education.abc.net.au/home#!/media/2825118/>)

Y7 Geography – Valuing Coastal Waters

Students understand how the characteristics of places are perceived and valued differently. They evaluate a range of primary and secondary sources to locate useful information and data.

- Economic, cultural, spiritual and aesthetic value of water for people, including Aboriginal and Torres Strait Islander Peoples and peoples of the Asia region (ACHGK041).



- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019).

Teacher Resource: The Orb website. *Valuing Coastal Waters* (<https://www.theorb.tas.gov.au/living-cultures/foods/teacher-drawer>)

Y7 Science – The many uses of indigenous plants

Discover the cultural significance and of some native plants to the local Indigenous peoples of the Botany Bay region. Find out the many ways these plants can be used. Gardening Australia's Clarence Slockee joins Dean Kelly (park officer) and the Towra Team, a group of trainees from the La Perouse Aboriginal Community, on a walk through Towra Point Nature Reserve.



- Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE120)

Teacher Resource: ABC Education website. *The many uses of indigenous plants* (6 mins 5 secs) (<https://education.abc.net.au/home-!/media/30780/>)

Y7 Science – Bush tucker super crop!

Which native plant might provide a ready-made crop that could be used as a very nutritious food source? Meet two South Australian growers who are investigating just such a native crop. Find out more about the seed crop that does not require significant amounts of water or fertiliser and has a long history of use by Indigenous Australians.



- People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121)

Teacher Resource: ABC Education website. *Bush tucker super crop!* (4 mins 57 secs) (<https://education.abc.net.au/home-!/media/103110/>)

Y7 Design and Technologies – Harvesting and cooking murnong

Murnong is an edible Australian native plant that was prolific in south-eastern Australia. Which part of the murnong is eaten? Why was it so abundant in certain parts of Victoria? Watch Aunty Julie to learn how murnong is harvested and cooked.



- Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

Teacher Resource: ABC Education website. *Harvesting and cooking murnong* (3mins 17secs) (<https://education.abc.net.au/home-!/media/3306473/>)

Y7 Design & Technologies – Recognising the potential of native vegetables

Have you ever tasted youlk? How about kulyu? These are just two of the native Australian vegetables that have traditionally sustained Aboriginal communities. Geoff Woodall is a native plant agronomist who's been researching and growing these indigenous root vegetables on his farm at Arthur River in Western Australia. Why did Geoff originally have more success growing youlk (a sort of bush carrot) than kulyu (a type of sweet potato)? What did he do to improve the process of growing kulyu?



- Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

Teacher Resource: ABC Education website. *Recognising the potential of native vegetables* (5 mins 13 secs) (<https://education.abc.net.au/home-!/media/2343020/>)

Y7 Geography – Through Our Eyes

18 short videos provide insights into the land management practices and social, spiritual and cultural knowledge of the Ngemba, Kamilaroi and Euahlayi Aboriginal language groups in north-western NSW. The videos are presented by the Aboriginal Elders and knowledge-holders and cover a range of topics including the cultural use of billabongs and gilgai, the use of native foods and medicines and traditional stories from the region. Some of the videos explore the European water management practices on the ecology of the catchment and the importance of sustainable land and water management.

This resource is highly valuable because of its relevance to the Aboriginal and Torres Strait Islander histories and cultures cross-curriculum priority because it examines the special connection that these Aboriginal groups have for their country. It also addresses the Sustainability cross-curriculum as it highlights the importance of taking action to sustainably manage the Narran Lakes system.



This resource is highly valuable for teaching units of study in years 7 and 8 geography curriculum because it demonstrates the economic, cultural, spiritual and aesthetic value of water and landscapes for the Aboriginal people of this region.

Video Link: NSW Local Land Services website. *Through Our Eyes - The Project (Introduction)* (5mins 45secs) (https://www.youtube.com/user/WesternLLS/playlists?view=50&sort=dd&shelf_id=5)

Y7-10 HASS – Walk with the Waugal

Students will learn about how the Waugal created the waterways in Perth. They will gain an understanding of how our waterways have changed over time and how they can protect it for the future. The learning objectives are to understand that the Waugal is a significant being within Noongar culture and is linked to creation, to understand that snakes play significant roles in other cultures and to understand that some places have special cultural or spiritual significance.

- 4 The nature of water scarcity and ways of overcoming it, including studies drawn from Australia and West Asia and/or North Africa (ACHGK040)
- 4 Classification of environmental resources and the forms that water takes as a resource (ACHGK037)
- 4 Factors that influence the decisions people make about where to live and their perceptions of the liveability of places (ACHGK043)
- 4 The importance of conserving the remains of the ancient past, including the heritage of Aboriginal and Torres Strait Islander Peoples (ACDSEH148)
- ✎ Aboriginal and Torres Strait Islander communities maintain a special connection to and responsibility for Country/Place. (OI.2)
- ✎ Aboriginal and Torres Strait Islander Peoples have holistic belief systems and are spiritually and intellectually connected to the land, sea, sky and waterways. (OI.3)



- ✎ Aboriginal and Torres Strait Islander societies have many Language Groups. (OI.4)
- ✎ Aboriginal and Torres Strait Islander Peoples' ways of life are uniquely expressed through ways of being, knowing, thinking and doing. (OI.5)

Teacher Resource: Water Corporation website. *Waugal Lesson Plan* and *Video* (8mins 09secs) (<https://www.watercorporation.com.au/Education/Water-in-Aboriginal-culture/Walk-with-the-Waugal-videos>)

YEAR 8

Fire-stick Farming. Source: Cool Australia

Year 8 | Science | Science as a Human Endeavour

Use and influence of science

- 🔗 People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136 - Scootle)
- 👉 investigating how Aboriginal and Torres Strait Islander Peoples used scientific understandings of complex ecological relationships to develop specific fire-based agricultural practices (OI.2, OI.3, OI.5)

Connecting the elaboration and content description

This elaboration provides a context for students to investigate how the practice of fire-stick farming, the oldest known farming practice in the world, grew out of the sophisticated knowledge and science understanding of biotic and abiotic relationships and interdependencies of plant and animal communities within ecosystems possessed by Aboriginal and Torres Strait Islander peoples.

Y8 Design and Technologies – Australian edible plants

Australia's native plants are not only beautiful to look at, but many can also be used as medicine and even food! Join Costa and Jody Orcher on a tour of the Royal Botanic Garden Sydney and learn about some of the native plants that can be eaten. What are some of the plants mentioned, and have you heard of them before?



- Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

Teacher Resource: ABC Education website. *Australian edible plants* (4 mins 46 secs) (<https://education.abc.net.au/home#!/media/2825118/>)

Y8 Science – Have you ever cooked with wattleseed?

If you were a farmer, what native plants could you grow to provide a new food crop? Find out how Mark Lucas, a South Australian farmer, makes use of scientific research and innovative chefs to create a market for a new native plant food product.



- Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce (ACSSU150)
- People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)

Teacher Resource: ABC Education website. *Have you ever cooked with wattleseed?* (3mins 39secs) (<https://education.abc.net.au/home#!/media/85272/>)

Y8 HASS – First Nation Farmers, Episode 1: Bunya nuts

The fruit of the majestic Bunya Pine has been an important part of indigenous culture for thousands of years. Today many landowners consider it dangerous and garden waste but an Indigenous artist believes it deserves better.



- Spiritual, aesthetic and cultural value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander Peoples (ACHGK049)

Teacher Resource: ABC Education website. *First Nation Farmers, Episode 1: Bunya nuts* (11 mins 5 secs) (<https://education.abc.net.au/home#!/media/4240163/>)

Y8 HASS – First Nation Farmers, Episode 2: Oysters

The people of Goulburn Island in the Arafura Sea have been eating and trading oysters for centuries. Now the remote Aboriginal community has set up an oyster farm to grow black lip oysters and create jobs.



- 🌐 Spiritual, aesthetic and cultural value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander Peoples (ACHGK049)

Teacher Resource: ABC Education website. *First Nation Farmers, Episode 2: Oysters* (6 mins 49 secs) (<https://education.abc.net.au/home-!/media/4252381/>)

Y8 Geography – Taming the Australian desert

The Western Desert region of Australia has been lived on, charted and cared for by Aboriginal peoples for tens of thousands of years. European settlers, however, saw the same region as something to be conquered or tamed; full of challenges, extreme weather patterns and landscape. See how Indigenous and non-Indigenous peoples have approached the geography of this remarkable part of Australia.

Chapter 4: Biomes and food security

Watch this example of how Aboriginal people utilise the natural environment for their survival. There are no hardware stores in the desert!

Chapter 5: Bush tucker of the Western Desert region

People of the Western Desert eat a wide variety of plants. Plants are also used as medicine to treat fever, congestion, headache, skin sores and other conditions.



- 🌐 Spiritual, aesthetic and cultural value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander Peoples (ACHGK049)

Teacher Resource: ABC Education website. *Taming the Australian desert* (<https://education.abc.net.au/home-!/digibook/1587973/>)

Y8 Geography – Through Our Eyes

18 short videos provide insights into the land management practices and social, spiritual and cultural knowledge of the Ngemba, Kamilaroi and Euahlayi Aboriginal language groups in north-western NSW. The videos are presented by the Aboriginal Elders and knowledge-holders and cover a range of topics including the cultural use of billabongs and gilgai, the use of native foods and medicines and traditional stories from the region. Some of the videos explore the European water management practices on the ecology of the catchment and the importance of sustainable land and water management.

This resource is highly valuable because of its relevance to the Aboriginal and Torres Strait Islander histories and cultures cross-curriculum priority because it examines the special connection that these Aboriginal groups have for their country. It also addresses the Sustainability cross-curriculum as it highlights the importance of taking action to sustainably manage the Narran Lakes system.




This resource is highly valuable for teaching units of study in years 7 and 8 geography curriculum because it demonstrates the economic, cultural, spiritual and aesthetic value of water and landscapes for the Aboriginal people of this region.

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Y8 Design & Technologies – Recognising the potential of native vegetables

Have you ever tasted youlk? How about kulyu? These are just two of the native Australian vegetables that have traditionally sustained Aboriginal communities. Geoff Woodall is a native plant agronomist who's been researching and growing these indigenous root vegetables on his farm at Arthur River in Western Australia. Why did Geoff originally have more success growing youlk (a sort of bush carrot) than kulyu (a type of sweet potato)? What did he do to improve the process of growing kulyu?



 Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

Teacher Resource: ABC Education website. *Recognising the potential of native vegetables* (5 mins 13 secs) (<https://education.abc.net.au/home-!/media/2343020/>)

YEAR 9

Brewarrina fish traps (State Library of VIC)

Year 9 | Science | Science Understanding

Biological sciences

- 🔍 Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176 - Scootle)
- 👤 investigating the interdependence of communities and the role of Aboriginal and Torres Strait Islander Peoples in maintaining their environment (OI.2, OI.5)

Connecting the elaboration and content description

This elaboration provides an opportunity for students to learn about First Nations peoples' ecocentric perspectives. It allows students to investigate how this worldview, based on and encompassing an intimate knowledge of the complex inter-relationships that exist within ecosystems, aims to protect and sustain the natural environment and ensures sustainable harvesting practices.

Year 9 | Science | Science Understanding

Chemical sciences

- 🔍 Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (ACSSU179 - Scootle)
- 👤 investigating how Aboriginal and Torres Strait Islander Peoples use fire-mediated chemical reactions to facilitate energy and nutrient transfer in ecosystems through the practice of firestick farming (OI.2, OI.5)

Connecting the elaboration and content description

Many chemical reactions require the input of energy to initiate them. In cases, such as combustion, the exothermic nature of the reactions themselves provides sufficient energy to sustain the ongoing reaction. Fire, the result of a combustion reaction, is important in ecosystems, such as the tropical savanna regions of northern Australia, as it promotes the recycling of nutrients. This process is well-known by Aboriginal and Torres Strait Islander peoples and as such, fire has been used for millennia to control the transfer of matter and energy through the ecosystem in a practice known as firestick farming.

Year 9 | Geography | Geographical Knowledge and Understanding

Unit 1: Biomes and food security

- 🌐 Challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world (ACHGK063)
- ✋ investigating the impacts of alterations of biomes on the productivity and availability of staple resources for Aboriginal and Torres Strait Islander Peoples (for example, murnong or yam daisy in Victoria)

Connecting the elaboration and content description

This topic examines the significant disruption to Australian biomes by European colonisation. Native flora and fauna have struggled to compete with introduced species. Alterations in diet have negatively impacted many Aboriginal and Torres Strait Islander people. Students suggest ways native food sources can be developed and promoted.



Patch burning in the Midlands region of Tasmania. The technique draws on traditional Aboriginal knowledge and can help in modern fire management. (Photo: The Conversation - Alan McFetridge)

Y9 Science – Interdependence in the environment

Within an ecosystem there are interdependent relationships between the species of that environment which are recognised and understood in Aboriginal and Torres Strait Islander ecological knowledge and practices.

- Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE157)
- People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE160)
- Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)



Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Interdependence in the environment*. (<https://indigenous-knowledge.unimelb.edu.au/curriculum/resources/interdependence-in-the-environment>)

Y9 Geography – The Explorers' Diaries

Teachers Resource describes in their digital publication, "BRUCE PASCOE: Aboriginal agriculture, technology and ingenuity", that Pascoe used the journals of the early explorers to uncover evidence of "a complex civilisation that was using sophisticated technologies to live, farm and manage the land". Chapter 3 of the video, The Explorers' Diaries, looks at what Australia's early explorers observed:

Sir Thomas Mitchell and Sir George Grey explored unknown regions of Australia in the 19th century, they found sophisticated examples of agriculture practised by Indigenous peoples. Writer Bruce Pascoe considers why Aboriginal agriculture, economy and civilisation were not taught to generations of Australians. Do you agree with his conclusions?



- Challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world (ACHGK063)

Teacher Resource: ABC Education website. *The explorers' dairies* (4mins 10secs) (<https://education.abc.net.au/home-!/media/3123632/>)

Y9 Geography – Biomes and food security

This topic examines problems stemming from the significant disruption to Australian biomes caused by European colonisation. Alterations in diet have caused negative impacts on the health of many Aboriginal and Torres Strait Islander people. Additionally, there have been critical impacts on the survival of native flora and fauna due to introduced species. Students can examine solutions and come up with their own ideas for how native food sources can be developed and promoted.



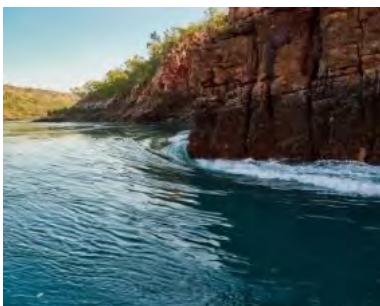
- 4 Explain challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world (ACHGK063).

Teacher Resource: Australians Together website. *Biomes and food security* (https://australianstogether.org.au/education/curriculum-resources/?Key-words=Science&action_doCurriculumSearch=Search)

Y9 Design & Technologies – Indigenous voices in water

Aboriginal Waterways Assessment is a tool that documents the way Aboriginal people value and use water, to assist in sharing knowledge, to communicate their water values, and help advocate for their needs in water management.

- 4 Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (ACTDEK041)
- 4 Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas (ACTDEP048)



- 4 Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (ACTDEP051)

Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Indigenous voices in water* (<https://indigenouknowledge.unimelb.edu.au/curriculum/resources/indigenous-voices-in-water>)

Y9 HASS, Design & Technologies – First Nation Farmers, Episode 2: Oysters

The people of Goulburn Island in the Arafura Sea have been eating and trading oysters for centuries. Now the remote Aboriginal community has set up an oyster farm to grow black lip oysters and create jobs.



- Challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world (ACHGK063)
- Investigate and make judgments on the ethical and sustainable production and marketing of food and fibre (ACTDEK044)

Teacher Resource: ABC Education website. *First Nation Farmers, Episode 2: Oysters* (6 mins 49 secs) (<https://education.abc.net.au/home-!/media/4252381/>)

Y9 Geography, Design & Technologies – Recognising the potential of native vegetables

Have you ever tasted youlk? How about kulyu? These are just two of the native Australian vegetables that have traditionally sustained Aboriginal communities. Geoff Woodall is a native plant agronomist who's been researching and growing these indigenous root vegetables on his farm at Arthur River in Western Australia. Why did Geoff originally have more success growing youlk (a sort of bush carrot) than kulyu (a type of sweet potato)? What did he do to improve the process of growing kulyu?

- Distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivity (ACHGK060)



- Environmental, economic and technological factors that influence crop yields in Australia and across the world (ACHGK062)
- Investigate and make judgments on the ethical and sustainable production and marketing of food and fibre (ACTDEK044)

Teacher Resource: ABC Education website. *Recognising the potential of native vegetables* (5 mins 13 secs) (<https://education.abc.net.au/home-!/media/2343020/>)

YEAR 10

*Australian cycad, *Macrozamia miquelii*. Cycads are a rich source of carbohydrates, but they contain a toxic substance called cycasin. Aboriginal people of North Queensland perfected a complex method to detoxify the seeds. Photo: Shutterstock.*

Year 10 | Science | Science Understanding

Chemical sciences

- Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187 - Scootle)
- ✎ investigating some of the chemical reactions and methods employed by Aboriginal and Torres Strait Islander Peoples to convert toxic plants into edible food products (OI.5)

Connecting the elaboration and content description

This elaboration provides the opportunity to learn how Aboriginal Peoples of tropical north Queensland developed complex detoxification processes that allow the exploitation of plentiful food resources that were previously inedible. The various and sophisticated methods to remove toxins from poisonous endemic plants employed by many of Australia's First Nation groups set the context for students to study the chemical reactions that underlie these processes and to investigate some of the factors that affect the rate of chemical reactions. At the same time, the exploration of these methods provides an opportunity to learn about the extensive scientific knowledge and highly developed inquiry skills of Aboriginal peoples in the detoxification of food products.

Year 10 | Science | Science as a Human Endeavour

Use and influence of science

- People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194 - Scootle)
- ✎ considering how ecological sciences are recognising the efficacy of traditional ecological practices of Aboriginal and Torres Strait Islander Peoples and how restorative programs based on these practices are generating new career opportunities (OI.2, OI.5)

Connecting the elaboration and the content description

Aboriginal and Torres Strait Islander peoples possess in-depth traditional ecological knowledge (TEK) of Australian ecosystems. Such knowledge of the environment, with its critical relationships and fragility, has allowed Aboriginal and Torres Strait Islander peoples to develop land-care practices that are conducted with a deep understanding of their impact. As technologies and data-collecting techniques develop, opportunities to demonstrate the efficacy of traditional ecological practices are emerging. For example, new scientific studies are monitoring the impact of traditional fire-management programs on greenhouse gas emissions. Furthermore, many land-care organisations are now utilising TEK in their regional land management programs which has led to new career opportunities for Aboriginal and Torres Strait Islander Peoples.

Y10 Geography – The Explorers’ Diaries

“BRUCE PASCOE: Aboriginal agriculture, technology and ingenuity”. Pascoe used the journals of the early explorers to uncover evidence of a complex civilisation that was using sophisticated technologies to live, farm and manage the land. By looking at scientific research, archival footage and the journals of early explorers, we learn about the vast agricultural fields, ingenious aquaculture systems, sophisticated use of fire and successful industries that existed in Australia prior to colonisation.

Chapter 3: Sir Thomas Mitchell and Sir George Grey explored unknown regions of Australia in the 19th century, they found sophisticated examples of agriculture practised by Indigenous peoples. Writer Bruce Pascoe considers why Aboriginal agriculture, economy and civilisation were not taught to generations of Australians. Do you agree with his conclusions?

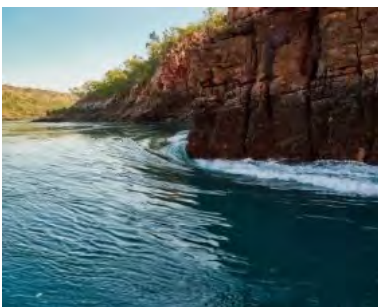


- Year 10: The Aboriginal and Torres Strait Islander Peoples’ approaches to custodial responsibility and environmental management in different regions of Australia (ACHGK072)

Teacher Resource: ABC Education website. *The explorers’ dairies* (4mins 10secs) (<https://education.abc.net.au/home#!/media/3123632/>)

Y10 Science – Groundwater

In this classroom activity, students will investigate how Aboriginal and Torres Strait Islander peoples knowledge of water management strategies is being used to inform contemporary groundwater issues. There are many current examples of issues affecting Australia’s water resources.



- People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people’s lives, including generating new career opportunities (ACSHE194)
- Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)

Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Groundwater* (<https://indigenous-knowledge.unimelb.edu.au/curriculum/resources/groundwater>)

Y 10 Design & Technologies – The challenges of growing bush foods

Indigenous landholders from Noongar communities across southern WA are taking the first steps towards forming a collective to grow and market bush vegetables commercially. What are the major challenges they’re facing? How will Rhys Bonshore’s bush tucker paddock help to move this new food industry forward?



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

Teacher Resource: ABC Education website. *The challenges of growing bush foods* (5 mins 22 secs) (<https://education.abc.net.au/home-!/media/2342988/>)

Y10 HASS, Geography – Budj Bim: an Aboriginal cultural heritage landscape

Students will investigate the cultural connections of the Budj Bim people to country, their development and use of environmental management strategies over thousands of years, and the modern context of collaborative management of the area.

- The Aboriginal and Torres Strait Islander Peoples' approaches to custodial responsibility and environmental management in different regions of Australia (ACHGK072)



- The application of geographical concepts and methods to the management of the environmental change being investigated (ACHGK074)

Teacher Resource: The University of Melbourne Indigenous Knowledge Institute website. *Budj Bim: an Aboriginal cultural heritage landscape* (<https://indigenousknowledge.unimelb.edu.au/curriculum/resources/budj-bim-an-aboriginal-cultural-heritage-landscape>)

Y9,10 Design & Technologies – Seven Seasons

Leveraging the Year 10 Geography curriculum, this sequence works with the CSIRO indigenous seasons calendars. Students produce a searchable database that will capture data using the two data sources.

This project allows students to examine and organise accurate data that is presented qualitatively, originates from Aboriginal traditional culture and is based on firsthand observation. Students learn how best to present the data to meet the research needs of school students. They develop preliminary specifications and consider the reliability, user-friendliness, portability and robustness of their solution.



- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038).

Teacher Resource: Digital Technology Hub website. *Seven Seasons* (<https://www.digitaltechnologieshub.edu.au/teachers/lesson-ideas/seven-seasons>)



Artist: Laurie Nilsen - The artwork used in the design of the Indigenous Weather Knowledge website represents the relationships between seasonal, meteorological and astronomical changes - and how the Mandandanji people read these changes to inform life on country.

Indigenous Seasons

Photo: Shutterstock

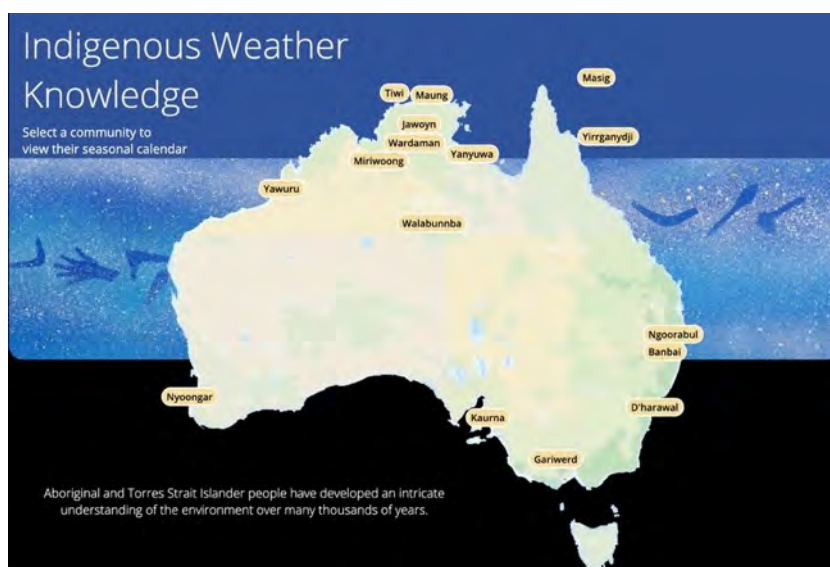
Bureau of Meteorology Indigenous Weather Knowledge Website

<http://www.bom.gov.au/iwk/index.shtml>

About the IWK website

The Indigenous Weather Knowledge website was launched in 2002 as a joint partnership between the Bureau, the Aboriginal and Torres Strait Islander Commission (ATSIC) and Monash University's Centre for Indigenous Studies. The website is a formal recognition of traditional weather and climate knowledge that has been developed and passed down through countless generations by Aboriginal and Torres Strait Islander people.

For the Bureau, reconciliation means meaningful engagement with Aboriginal and Torres Strait Islander people—whether as users of Bureau products and services, or otherwise contributing to or sharing knowledge with the Bureau. Central to this intent is striving to understand, then harness and celebrate the unique skills and perspectives of Aboriginal and Torres Strait Islander people. Through the Indigenous Weather Knowledge website, the Bureau is working with communities that wish to record and share valuable seasonal and environmental information and traditional knowledge.



Indigenous seasonal descriptions

Australia's climate is diverse. Monsoon tropics, desert, savannah, alpine and temperate regions can all be found in various locations. The sheer diversity of ecological zones can't be meaningfully simplified to a rigid European seasonal calendar for the entire continent. Aboriginal people inhabit regions that are geographically and ecologically distinct. The meteorological view of the Aboriginal and Torres Strait Islander people is one of great diversity, where the names of the seasons are often dependent on localised events or resources.

The ability to link events in the natural world to a cycle that predicts seasonal changes is a key factor in the successful development of Indigenous communities. These natural barometers are not uniform across the land but instead use the reaction of plants and animals to gauge what is happening in the environment.

To the people of D'harawal country during Marrai'gang, when the cries of the Marrai'gang (quoll) seeking his mate can be heard, is the time when the lilly-pilly fruit begins to ripen on trees. However, when the lilly-pillys start to fall, it is time to mend the old warm cloaks from the last cold season, or make new ones, and begin the yearly trek to the coastal areas.

As a result of all this, seasonal cycles as described by the various Aboriginal cultures differ substantially according to location.

This produces a far more intricate and subtle overview of Australia's climate than the four-season European climate description of summer, autumn, winter and spring, applied as it is across most areas of the continent.

| European terms | | Indigenous Australian seasons | | |
|----------------|--------|-------------------------------------|------------------------------------|------------------------------------|
| Month | Season | Miriwoong calendar | Nyoongar calendar | D'harawal calendar |
| DEC | Summer | Nyinggiyi-mageny (wet weather time) | Birak, (dry and hot) | Parra'dowee, (warm and wet) |
| JAN | | | Bunuru, (hottest) | Burran, (hot and dry) |
| FEB | | | | |
| MAR | Autumn | Warnka-mageny (cold weather time) | Bjeran, (cool begins) | Marrai'gang, (wet becoming cooler) |
| APR | | | | |
| MAY | | | | |
| JUN | Winter | | Makuru, (coldest, wettest) | Burrugin, (cold, short days) |
| JUL | | | | |
| AUG | | | Djilba, (wet days and cool nights) | Wiritjiribin, (cold and windy) |
| SEP | Spring | Barndenyiriny (hot weather time) | | Ngoonungi, (cool, getting warmer) |
| OCT | | | Kambarang, (long dry periods) | |
| NOV | | | | Parra'dowee, (warm and wet) |

A comparison of various Aboriginal seasons from around Australia with the Western four-season calendar

Banbai calendar

<http://www.bom.gov.au/iwk/calendars/banbai.shtml>

The Wattleridge Indigenous Protected Area covers 650 hectares of woodlands and forests on granite soils, home to an amazing diversity of plants and animals. The Banbai nation are the traditional owners of this country and fire is an important part of their way of life. Wattleridge was the first Indigenous Protected Area to be declared in New South Wales.



D'harawal calendar

<http://www.bom.gov.au/iwk/calendars/dharawal.shtml>

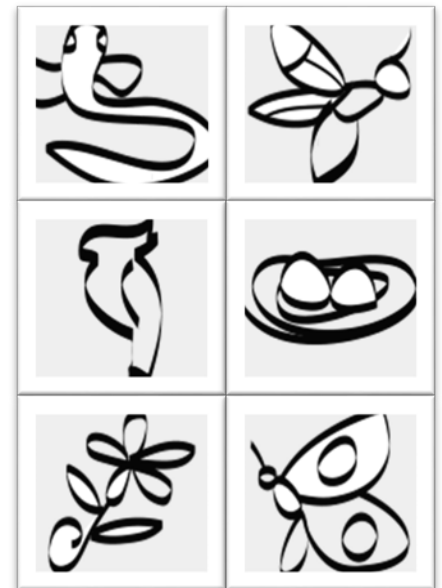
The D'harawal Country and language area extends from the southern shores of Port Jackson (Sydney Harbour) to the northern shores of the Shoalhaven River, and from the eastern shores of the Wollondilly River system to the eastern seaboard.



Gariwerd calendar

<http://www.bom.gov.au/iwk/calendars/gariwerd.shtml>

There are six distinct weather periods recognised in the Gariwerd seasonal cycle. The language groups, Djapwurrong and Jardwadjali are the languages used by the custodians for the Grampians/Gariwerd region.



Jawoyn calendar

<http://www.bom.gov.au/iwk/calendars/jawoyn.shtml>

The Jawoyn calendar from the Katherine region in northern Australia has five seasons. The seasons are defined by weather patterns and environmental events, with the onset and duration of each season varying from year to year. Jawoyn country covers 50,000 square kilometres of the Top End of the Northern Territory.

Kaurna calendar

<http://www.bom.gov.au/iwk/calendars/kaurna.shtml>

There are four distinct weather periods recognised in the Kaurna seasonal cycle, as well as winds which can act as seasonal indicators. The mapping of Kaurna seasons to the Australian calendar is approximate as the seasons are very changeable.



Masig calendar

<http://www.bom.gov.au/iwk/calendars/masig.shtml>

Masig is a very small low-lying coral cay in the Central Islands Cluster of the Torres Strait about 160km northeast of Thursday Island. The topography of Masig is very flat with ground level generally less than three metres above local mean sea level. More than half the Island is covered in undisturbed vegetation including dense trees on the eastern and western parts of the Island. Native Title is recognised over Masig and is held in trust by the Masigalgal (Torres Strait Islander) Corporation RNTBC.

Maung calendar

<http://www.bom.gov.au/iwk/calendars/maung.shtml>

The Maung country and language area are on the Goulburn Islands, off the north coast of Arnhem Land, in the Northern Territory.



Miriwoong calendar

<http://www.bom.gov.au/iwk/calendars/miriwoong.shtml>

The Miriwoong calendar has three major seasons, covering the hot, wet, and cold times of year. The land of the Miriwoong and Gajirrabeng people covers a wide area with Kununurra being the heart of Miriwoong land.

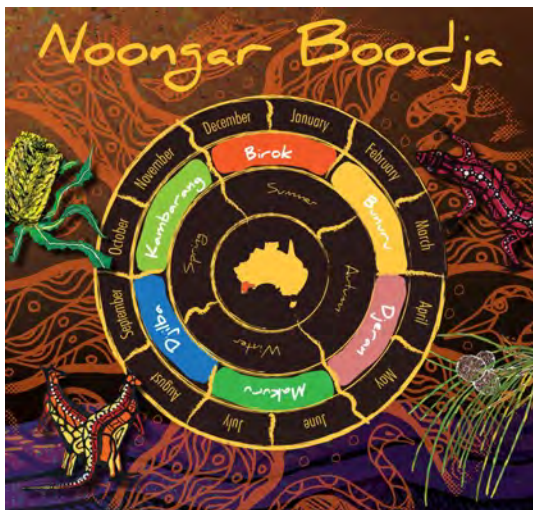
Ngoorabul calendar

<http://www.bom.gov.au/iwk/calendars/ngoorabul.shtml>

The Ngoorabul peoples traditional country covers the Glens Innes Highlands, including Boorabee and The Willows Indigenous Protected Area.

The Ngoorabul people manage around 3000 hectares of land, and hope to conserve the Koala (Burrbi) on their land.

The Ngoorabul people use traditional fire management practices to manage the region.



Nyoongar calendar

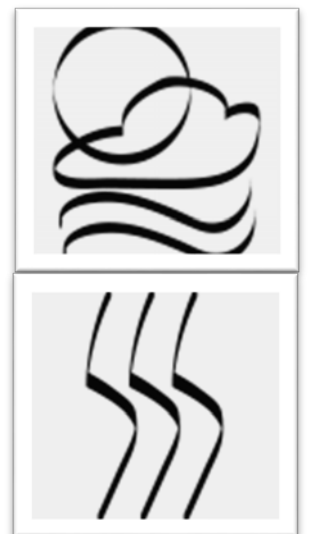
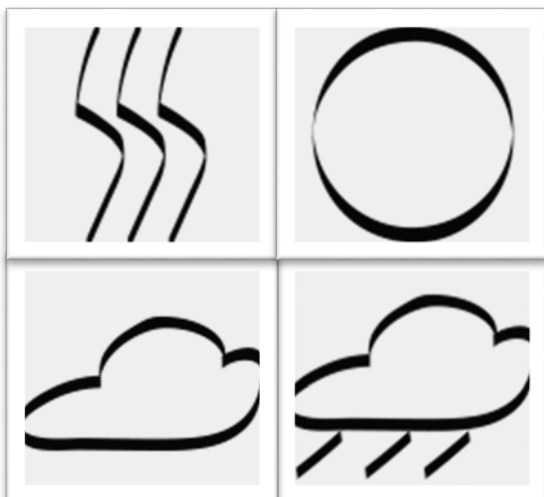
<http://www.bom.gov.au/iwk/calendars/nyoongar.shtml>

Nyoongar country spans from Leeman in the northwest to beyond Cape Arid in the southeast, in the southwest of Australia. The Nyoongar calendar includes six seasons.

Walabunnba calendar

<http://www.bom.gov.au/iwk/calendars/walabunnba.shtml>

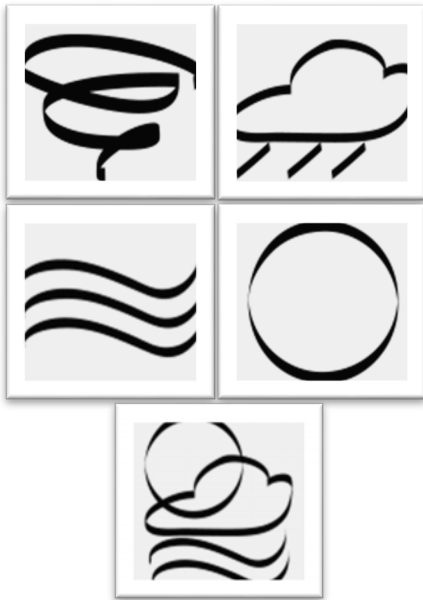
Approximately 300km north of Alice Springs, showing two seasons. The birth place of the Ngapa (water) Rain Dreaming. Part of the central desert of Australia.



Wardaman calendar

<http://www.bom.gov.au/iwk/calendars/wardaman.shtml>

Approximately 180km west of Katherine, showing four seasons. Wardaman land runs from the upper reaches of the Flora River in the north to Scott Creek in the northwest, south along the major waterways towards the Victoria river in the west and to Romula Knob in the east.



Yanyuwa calendar

<http://www.bom.gov.au/iwk/calendars/yanyuwa.shtml>

The Yanyuwa calendar covers the Gulf of Carpentaria and shows five seasons.

Yawuru calendar

<http://www.bom.gov.au/iwk/calendars/yawuru.shtml>

The Yawuru calendar shows six seasons. The Yawuru people are the native title holders of the town of Broome, including areas of land and sea in and around the location.



Yirrganydji calendar

<http://www.bom.gov.au/iwk/calendars/yirrganydji.shtml>

The Yirrganydji traditional lands and waters extend along the coastal plains from Cairns to Port Douglas in Far North Queensland. The Yirrganydji seasonal calendar shows two major seasons: Kurrabana (wet season) spanning November to May, which has two minor seasons: Jawarranyji (storm time) and Jimburralji (cyclone time). Kurraminya (dry season) spanning May to November, which has three minor seasons: Jinjim (winter time), Yiwanyji (windy time), and Wumbulji (hot time).

CSIRO Indigenous Seasons Calendars

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars>



About the Indigenous seasons calendars

Traditional knowledge, like that captured in these Indigenous seasons calendars, can tell us much about the ecology of Australia. CSIRO worked with a range of Indigenous language groups to develop a series of calendars representing seasonal ecological knowledge.

Six of the calendars were developed as part of the Tropical Rivers and Coastal Knowledge program, two as part of an Inspiring Australia Unlocking Australia's Potential grant, two as part of the National Environmental Research Program's Northern Australia Hub, and one as part of CSIRO's Indigenous Livelihoods project.

The calendars demonstrate the wealth of knowledge that Indigenous peoples in Australia hold about the environment.

The groups included:

- Gulumoerrgin/Larrakia people from the Darwin region in the Northern Territory
- Ngan'gi, MalakMalak and Wagiman people from the Daly River region in the Northern Territory
- Tiwi people from the Tiwi Islands, north of Darwin in the Northern Territory
- Kunwinjku people from western Arnhem Land in the Northern Territory
- Gooniyandi and Walmajarri people from the Fitzroy River area in the Kimberley region of Western Australia
- Ngadju people from the Great Western Woodlands region in south-west Western Australia
- Kundjeyhmi people from the Ngurrungurudjba (Yellow Water) region in Kakadu National Park in the Northern Territory

Documenting the calendars has informed the scientific understanding of the relationships between people and the seasonal cycles of resource availability. In the future the calendars may provide an important baseline for detecting ecological change associated with climate change. They have also had a positive social benefit by making Indigenous knowledge more accessible to school students and the broader community.

Gulumoerrgin (Larrakia) seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Gulumoerrgin>

Gulumoerrgin is the Indigenous language for Darwin and the surrounding regions of Cox Peninsula and Gunn Point in the Northern Territory.



MalakMalak and Matngala plant knowledge calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/MalakMalak>

MalakMalak traditional owners from the Daly River region in the Northern Territory worked with CSIRO to create a seasonal calendar of plant knowledge.

Ngan'gi seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Ngangi>

Ngan'gi knowledge holders from the Nauiyu Nambiyu community in the Daly River region of Northern Territory worked with CSIRO to create a seasonal calendar.





Tiwi seasons and plants and animals calendars

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Tiwi>

Traditional Owners from the Tiwi Islands, north of Darwin in the Northern Territory, worked with CSIRO to create two calendars representing Tiwi seasonal ecological knowledge.

Kunwinjku seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Kunwinjku>

Traditional Owners from Kunbarlanja (Gunbalanya) in western Arnhem Land have documented Kunwinjku knowledge of the seasons and the environment in a calendar.



Gooniyandi seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Gooniyandi>

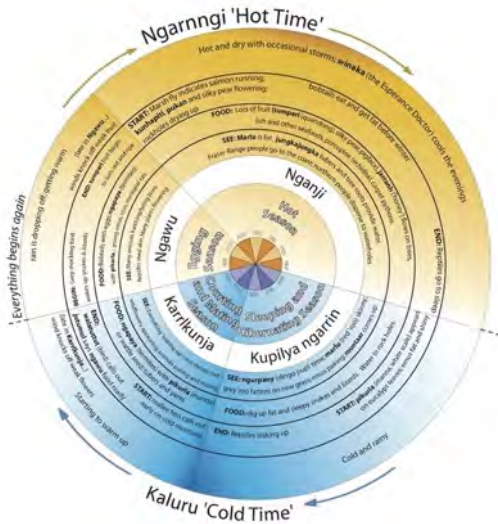
Members of Muludja community from the Kimberley region in Western Australia worked with CSIRO to create a seasonal calendar.



Walmajarri seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Walmajarri>

Members of the Walmajarri language group from the Kimberley region of Western Australia worked with CSIRO to create a calendar using their seasonal knowledge.



Ngardju seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Ngardju>

The Ngardju (also known as the Marlpa) people of Western Australia retain a detailed knowledge about their Indigenous 'calendar' of times, seasons and indicators as it pertains to Ngardju country

Ngurrungurrudjba (Yellow Water) seasons calendar

<https://www.csiro.au/en/research/natural-environment/land/About-the-calendars/Ngurrungurrudjba>

Kakadu Traditional Owner, Violet Lawson, worked with CSIRO to create a calendar of Ngurrungurrudjba (Yellow Water) seasons.



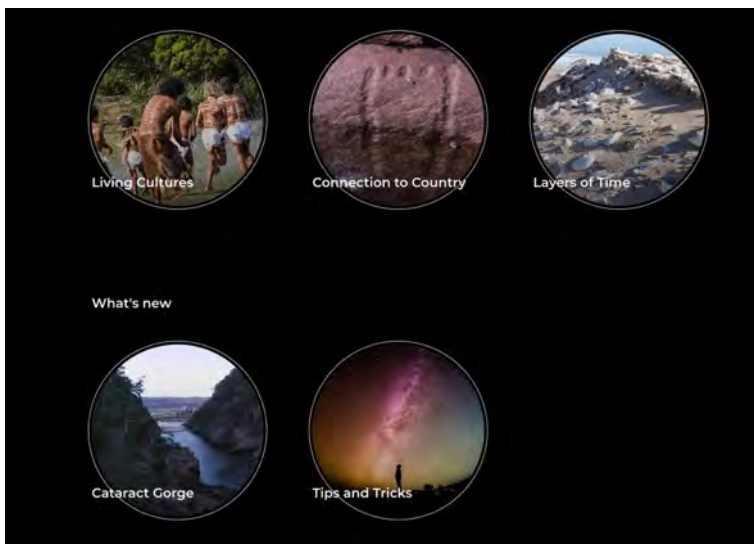
Additional Resources



Midgee Berry fruit

The Orb: Tasmanian Education

<https://www.theorb.tas.gov.au/>



Aboriginal Education Services, Department of Education, Tasmania, have developed a website called The Orb, a collection of online resources to assist the teaching of Tasmanian Aboriginal histories and cultures.

The Orb has an extensive range of curriculum aligned resources for investigations and learning tasks related to Foods. These materials support the teaching of Tasmanian Aboriginal histories and cultures, mapping the curriculum links to learning areas and the general capabilities.

Foods: Investigations

Biocultural Diversity

- Aboriginal people describe the diversity of native foods that they and their ancestors have utilised over millennia. This article introduces the concept of biocultural diversity and explores the effects that Aboriginal cultural practices have had in shaping the diversity of Tasmanian environments.

Customary Law

- Tasmanian Aboriginal people have engaged in hunting, fishing and gathering food from land and place for countless generations. This ongoing practice lies at the heart of a continuing cultural knowledge that is passed on from elders and parents to their children creating a continuing connection to Country from the past to the present.

Diet

- A traditional Tasmanian Aboriginal diet was drawn from marine and nonmarine environments, alpine and rain forests, as well as wet and dry forests. Food resources varied according to environments and seasons and people had sophisticated practices when hunting and gathering resources. The following article explores what the Tasmanian Aboriginal diet included, how it was resourced and some of the sources of evidence.

Living Knowledge: Indigenous knowledge in science education

<http://livingknowledge.anu.edu.au/>

The Living Knowledge website is part of a three year Australian Research Council (ARC) research project “Indigenous knowledge and Western science pedagogy: a comparative approach”.

The project aims to determine the most effective ways of incorporating Indigenous knowledge within the NSW secondary school science curricula.



Project Themes

- ✎ Reconciliation and working together
- ✎ Indigenous people handling Indigenous knowledge
- ✎ Recognising the value, complexity and status of Indigenous knowledge traditions
- ✎ The possibilities and benefits of 'both' knowledge systems contributing to land and sea management
- ✎ A connected world

Science in Context

The “Science in Context: schools working with Aboriginal communities (SiC)” program, developed by the NSW Department of Education, is a strategic response to the identified need for teachers to utilise appropriate teaching and learning strategies for Aboriginal students in science and to develop curriculum materials that are connected to the lives of Aboriginal students. This website has been developed as a part of the Living Knowledge project.

The Science in Context program is a response to the need to support teachers of science in planning and teaching Aboriginal community perspectives in the new NSW Science Stages 4 & 5 syllabus (2003). It recognises that students need to engage in the learning of Aboriginal community knowledge to strengthen and maintain Aboriginal identity and culture. Five schools participated in the program. The project requires schools to value and draw upon the knowledge and understandings within their local Aboriginal community.

The site includes sample teaching and learning units developed and trialled by the participating schools, student work samples, photographs and video and audio interviews. Teaching and learning units to support the NSW Science 7–10 syllabus (2003) were developed by: Kempsey High School, Doonside Technology High, Warren Central School, Vincentia High School and Willyama High School. The units were based on aspects of local Aboriginal community knowledge in the communities. Communities were: Broken Hill, Warren, Ulladulla, Penrith and Kempsey.

The University of Melbourne Indigenous Knowledge Institute

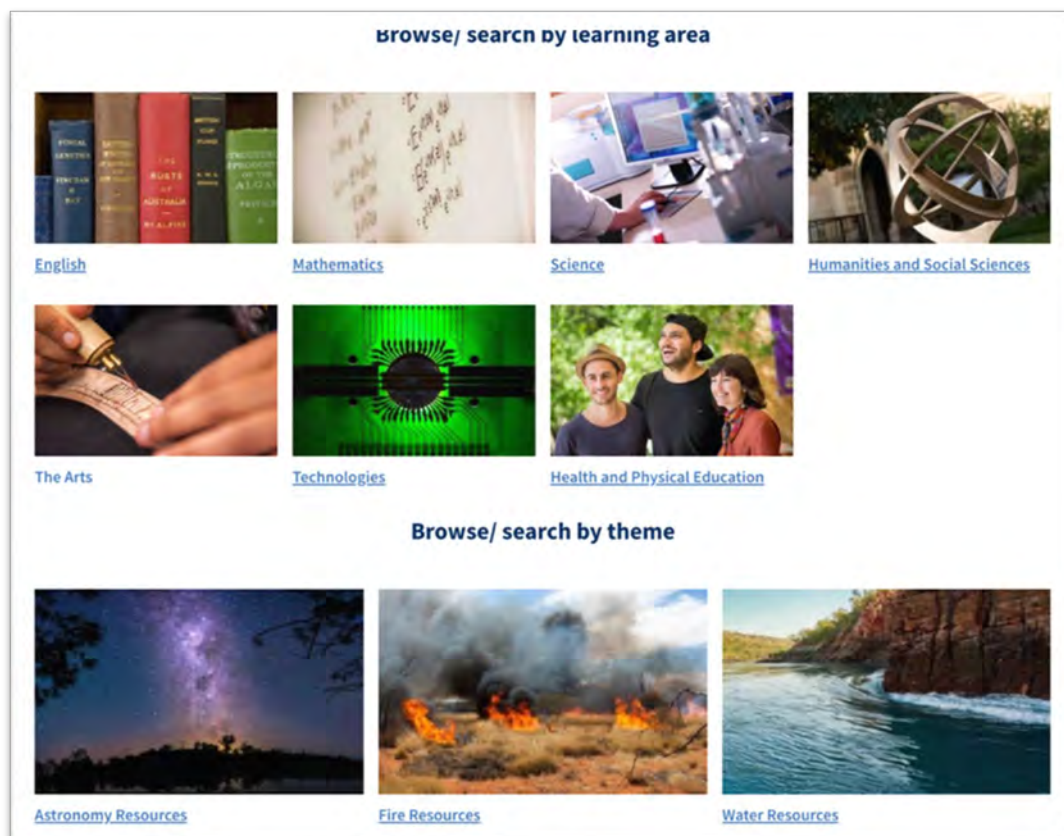
<https://indigenouknowledge.unimelb.edu.au/curriculum>

The **Indigenous Knowledge Institute** aims to advance research and education in Indigenous knowledge systems.

Following a commitment made by Vice-Chancellor Duncan Maskell at the Garma Festival in August 2019, the institute was launched at the 19th Symposium on Indigenous Music and Dance on 3 December 2020, led by the Research Unit for Indigenous Arts and Cultures at the Wilin Centre for Indigenous Arts and Cultural Development.

The Indigenous Knowledge Institute is one of five current Melbourne Interdisciplinary Research Institutes. These institutes aim to promote research linkages and collaboration across the University and to play a lead role in articulating University research to external audiences.

The Indigenous Knowledge Institute will build on the research and education activities already underway at the University to become a global leader in Indigenous knowledge research and education. The Institute will also build on the work of the Indigenous Hallmark Research Initiative which ceased operation in 2019.



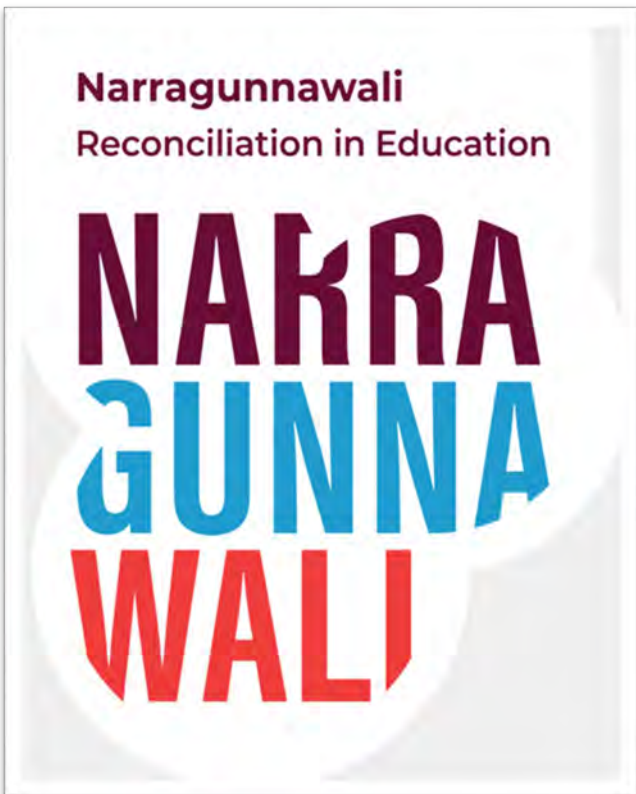
Indigenous Knowledge Resources for Australian School Curricula Project

The Aboriginal and Torres Strait Islander Curricula Project is a University of Melbourne initiative which aims to empower all teachers to integrate Aboriginal and Torres Strait Islander histories and cultures in their teaching using these curriculum resources that incorporate Indigenous knowledge.

The project is a partnership between the Indigenous Studies Unit (Centre for Health Equity, MDHS), the Melbourne Graduate School of Education and the Indigenous Knowledge Institute.

Narragunnawali: Reconciliation in Education

<https://www.narragunnawali.org.au/>



Narragunnawali supports all schools and early learning services in Australia to develop environments that foster a high level of knowledge and pride in Aboriginal and Torres Strait Islander histories, cultures and contributions.

Narragunnawali (pronounced narra-gunna-wally) is a word from the language of the Ngunnawal people, Traditional Owners of the land on which Reconciliation Australia's Canberra office is located, meaning alive, wellbeing, coming together and peace. We pay our respects and thank the United Ngunnawal Elders Council for giving us permission to use the word narragunnawali.

The Narragunnawali online platform is free to access and provides practical ways to introduce meaningful reconciliation initiatives in the classroom, around the school and with the community. Through the Narragunnawali platform, schools and early learning services can develop a Reconciliation Action Plan (RAP), and teachers and educators can access professional learning and curriculum resources to support the implementation of reconciliation initiatives.

Use the Narragunnawali suite of early learning, primary and secondary curriculum resources to promote reconciliation and to strengthen children and students' knowledge and understanding of Aboriginal and Torres Strait Islander histories, cultures and contributions.

The resources can be used as they are or adapted to suit the local community context.

Each resource encompasses elements of the Early Years Learning Framework and the Australian Curriculum, and aligns with Reconciliation Action Plan (RAP) Actions.

To support you in your curriculum planning, the Narragunnawali team has developed a suite of subject-specific resource guides spanning across all subject/learning areas! The information and resources contained in each of these guides provide a platform for teachers and educators to consider how to effectively embed important ideas around reconciliation, and Aboriginal and Torres Strait Islander histories, cultures and contributions, across the curriculum. Please note that the guides are neither prescriptive nor exhaustive, and that users are encouraged to consult with their local Aboriginal and Torres Strait Islander community, and critically evaluate resources, in engaging with the material contained in the guides.

Direct link to the Narragunnawali Science resource:

<https://www.narragunnawali.org.au/storage/media/page/c490bdd856b57c10088cd6c35037808d.pdf>

Kooriculum

<https://indigenoux.com.au/kooriculum-indigenous-science-program/>



The Kooriculum program is a collection of workshops built around the Elaborations developed by ACARA, for years K-6.

The purpose of these is to provide all students with a deeper understanding of and respect for Indigenous Science, and to support teachers with finding practical and engaging ways to incorporate these perspectives across the curriculum.

All the workshops involve hands-on activities for students designed to demonstrate and explore Indigenous Science concepts and link these directly to the Science curriculum.

Where possible we have also included Traditional stories, games and dances, which help to support the key learning concepts of the workshop and demonstrate how our sciences are interwoven within culture.

The Kooriculum Program is designed to be a full day program delivered on site at your school, due to COVID-19 Restrictions we are currently developing an electronic version of the program.

Reconciliation SA: South Australian Education Pack

<https://reconciliationsa.org.au/document/55000-years-and-counting-celebrating-our-shared-history/>



“The theme for this education pack is 55 000 years and counting: celebrating our shared history. The idea of Australia as a young nation continues to be challenged as the country embraces the ancient and ongoing cultures of the Aboriginal and Torres Strait Islander peoples, the traditional custodians of this land. Acknowledging the nexus between this shared history and the fabric of contemporary Australia is critical for us as a society to forge a future, together.”
– Prof Peter Buckskin PSM FACE, Reconciliation SA Co-Chair

The activities in the resource are designed to:

- Develop knowledge about the significance of land, climate, seasons, plants, animals and water resources in determining Aboriginal and Torres Strait Islander peoples' identity and social, cultural and economic practices. The significance of “land” has been ongoing in shaping the history of Australia.
- Provide understanding that Australia's inhabitants have comprised many nations throughout history, including Aboriginal and Torres Strait Islander peoples, European colonisers and more recent immigrants from across the world.
- Foster values and beliefs about the significance of Aboriginal and Torres Strait Islander peoples' history for 55 000 years, and our shared history since 1788.
- Develop respect towards and to value all perspectives, and foster actions toward Reconciliation and a sustainable future.
- Activities have been developed with an inquiry focus. Teachers and students are encouraged to adapt and modify suggested activities and resources to suit local contexts.
- The involvement of Aboriginal and Torres Strait Islander people is highly recommended wherever possible. Activities should maximise appropriate local historical information, primary resources and community members.
- The three focus areas are developmental and sequential across the Early Years, Primary Years and Middle Years. It may be relevant to adapt and interchange activities across the three phases, depending on local relevance, availability of resources, and students' prior knowledge and interest.

Australia's hidden agricultural legacy

By Bryanna Minchin | Aug 7, 2019 | Heritage

<https://www.integratesustainability.com.au/2019/08/07/australias-hidden-agricultural-legacy/>



“For many years it was widely believed that the indigenous population of Australia lived only a hunter-gatherer lifestyle before European settlement. However, there is growing evidence that Australia’s first nations people practised unique forms of agriculture that shaped Australia’s landscape.”

Fire-stick farming

Fire was an integral part of traditional aboriginal land management, used for hunting and shaping the landscape. Indigenous people had a keen understanding of the land, its flora, fauna and seasons, and this allowed them to effectively use fire as a sustainable land management technique.

Budj Bim eel traps

Situated in south-west Victoria, the Budj Bim Cultural Landscape provides irrefutable evidence of Indigenous agricultural activities in Australia. Volcanic rocks, formed by the now dormant volcano of Budj Bim, were used by the local Gunditjmara people to engineer aquaculture structures. These structures included weirs and ponds to manage water flows from Lake Condah and fish traps that were used to trap eels [3].

Yams fields

Source: Australian National Botanic Gardens

It is estimated that there are 6,000 edible native plants in Australia [6]. One of the most notable food sources were Yams, a high-starch tuber found in many regions of Australia in different varieties. Aboriginal women in these areas would grow and harvest Yams, found in crop-like pastures, but in such a way that allowed the tubers to regrow in the next season [1].

Native Grains

Accounts from early European explorers describe pastures and fields of native grains and grasses maintained by the aboriginal peoples. There is also evidence that Aboriginal people were among the worlds first bakers. Grindstones, used to grind seeds and grain to create flours, have been found and dated at up to 30,000 years old. It is estimated that aboriginal grain fields were grown in dry climates across a large portion of Australia, far exceeding our modern-day grain-belt regions [8].

Link to download: ISPL Insight – Aboriginal Agriculture (<https://www.integratesustainability.com.au/wp-content/uploads/2019/08/ISPL-Insight-Aboriginal-Agriculture.pdf>)