



TEACHER BACKGROUND INFORMATION

Foundation - Year 10

AUSTRALIAN ABORIGINAL CULTURES GALLERY

Aboriginal and Torres Strait
Islander Histories and
Cultures in Science

Aboriginal and Torres Strait Islander people:

Aboriginal and Torres Strait Islander visitors are advised that the Australian Aboriginal Cultures Gallery contains images, voices and names of people who have died.

This resource also contains links to sites that may use content of Aboriginal and Torres Strait Islander people who have died. Please ensure that any Aboriginal and Torres Strait Islander people in your group feel comfortable entering this gallery.



**Government
of South Australia**

Department for Education



**SOUTH
AUSTRALIAN
MUSEUM**



Image: Shield. Owner/ Maker and date unknown (thought to be from the 1800's, acquired by the South Australian Museum in 1980's). Murlapaka, Kurna Shield, Karra or Red Gum Eucalyptus bark and red ochre. Photo Johanis Lyons-Reid.

NINNA MARNI

(hello in Kurna language)

We stand on Tarntanya, Red Kangaroo Place, land of the Kurna people who are the traditional owners of the Adelaide Plains. The Kurna People are an enduring community with ongoing connections to Country, including this space, where traditional knowledge and practices inspire wonder and innovation. The South Australian Museum acknowledges and celebrates people from all Aboriginal and Torres Strait Islander nations who have lived on these lands for tens of thousands of years, and stands together with them to help share knowledge, culture, understanding and respect.

Science Elaborations for the Aboriginal and Torres Strait Islander Cross-curriculum priority

Through the cross-curriculum priority dimension of the Australian Curriculum, carefully selected aspects of Aboriginal and Torres Strait Islander histories and cultures relevant to the core science content are woven into the F–10 Science curriculum. These aspects broadly pertain to Aboriginal and Torres Strait Islander knowledges, the technologies, processes, contributions to science and ethical considerations that overlap the content of the F-10 Science curriculum.

This resource highlights some of the objects displayed in the Australian Aboriginal Cultures Gallery at the South Australian Museum which illustrate some of these aspects and link to specific Science curriculum content descriptions and elaborations.

Contexts that can be explored through the collections on display at the Museum in order to engage the learning of core science concepts are:

- Knowledges relating to chemistry, physics, geology, botany, zoology, physiology, genetics, meteorology, astronomy, nutrition, hydrology, ecology.
- Technologies such as the development of machines, specialised tools, weaponry, architecture, clothing, blankets, torches, nets, traps and domestic utensils (baskets, knives, chisels, sieves).
- Processes, both physical and chemical including; lithic heat treatment, detoxification, stone knapping, skin tanning, use of acids and alkalis, use of poisons, production of medicines, medicine delivery, cooking methods, production of pigments and dyes, production of adhesives, fire lighting methods, fibre, string and rope production.
- Contributions to medicine, mining, ecology, archaeology, anthropology, exploration, zoology, botany, agriculture, bio-security, nutrition, fire management, ecological restoration, water management, sustainability, reduction of atmospheric pollution and bio-geography.
- Ethical considerations regarding the treatment of cultural heritage sites and the respect of intellectual property rights are investigated as they relate to 21st century scientists.

All the core information in this resource is from the Australian Curriculum Assessment and Reporting Authority, July 2019, Australian Curriculum: Science Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority, Content elaborations and teacher background information, F-10.

australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/aboriginal-and-torres-strait-islander-histories-and-cultures/
australiancurriculum.edu.au/media/5644/new-content-elaborations-for-the-australian-curriculum-science-f-10.pdf

Earth and space sciences – Foundation

Daily and seasonal changes in our environment affect everyday life.

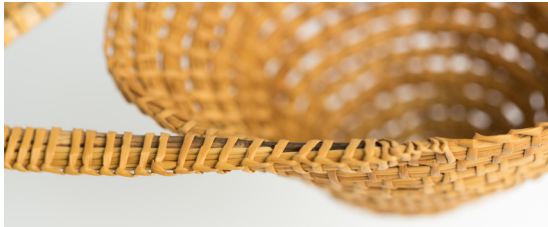
Learning how Aboriginal and Torres Strait Islander Peoples' concepts of time and weather patterns explain how things happen in the world around them (OI.3,OI.5).

'The Kurna Peoples of the Adelaide Plains region of South Australia know that pukarra (north-west winds) and kudmu (dew on the ground) indicates the time to prepare skin rugs and seaweed cloaks for the impending cold weather season'. Ivaritji's wallaby skin cloak and other animal skin items are on display on the Ground Floor of the Australian Aboriginal Cultures Gallery.



Image: bom.gov.au/iwk/calendars/kurna.shtml

Chemical sciences – Year 1



Top image: Sedge grass egg scoop. Amy Johnson, Tangane Woman of the Ngarrindjeri Coorong region, 1937.

Lower image: Sedge grass basket. Dorothy Kartinyeri, Ngarrindjeri Woman, 1982. Photos Johannis Lyons-Reid.

Everyday materials can be physically changed in a variety of ways.

Exploring how Aboriginal and Torres Strait Islander Peoples apply physical changes to natural materials to render them useful for particular purposes (OI.2,OI.5).

'Aboriginal and Torres Strait Islander Peoples process fibre by twisting and twining to manufacture items such as nets, baskets, bags, belts, mats and other woven or netted items. These items are used for fishing and to catch game, to process and prepare food resources, to carry items and for other domestic uses. A variety of natural resources are used to prepare fibre for string and cordage; these differ according to each geographical region and the desired purpose of the finished product'.

You can find many examples of fibre items made by many Aboriginal language groups across both floors of the Australian Aboriginal Cultures Gallery.

Physical sciences – Year 2

A push or a pull affects how an object moves or changes shape.

Investigating the push and pull movements of traditional Aboriginal and Torres Strait Islander children's instructive toys (OI.5).

'Water play and games have long been enjoyed by many Aboriginal and Torres Strait Islander children and are essential in building aquatic skills and knowledge. Water-based activities can assist the development of coordination and gross motor competence, building skills for the future. Water play includes play with miniaturised objects that float and model vessels, such as canoes or rafts used by adults.' **Aboriginal toys and games are situated on the First Floor of the Australian Aboriginal Cultures Gallery.**



Image: Yuendumu Doors and Aboriginal Children's Play display level 1 of the Australian Aboriginal Cultures Gallery. Photo Sia Duff.

Science Inquiry Skills – Year 3

With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge.

Consulting with and using existing knowledge held by Aboriginal and Torres Strait Islander Peoples to guide the formulation of investigable questions regarding invasive species.

'Students have the opportunity to understand that prior knowledge of the environment is held by Aboriginal and Torres Strait Islander Peoples, who have long and ongoing connections to the local environment. In developing scientific questions and predictions about invasive species, students consult with the local Aboriginal or Torres Strait Islander community to find out about the living things that have always been present, and those that are new and may not belong.' **The South Australian Museum Education Program staff are working with Kurna, Narungga and Ngarrindjeri elders to develop resources that align with the cross-curriculum priority of Aboriginal Perspectives in Science.**



Image: Rod O'Brien, Rex Angie, Major Moogy Sumner, Ronnie and Liz Newchurch, Peggy Weetra and Eva Wilson, South Australian Museum.

Biological sciences – Year 4



Image: Flower stem grass tree fire sticks. Owner/ Maker unknown, maybe from the Murray River region in the 1900's. Photo Johannis Lyons-Reid.

Living things depend on each other and the environment to survive.

Recognising how Aboriginal and Torres Strait Islander Peoples perceive themselves as being an integral part of the environment (OI.2, OI.3)

'For millennia Aboriginal and Torres Strait Islander Peoples have used fire to consciously and deliberately promote the well-being of organisms within their environment. This is often referred to by Aboriginal and Torres Strait Islander Peoples as "cleaning up the Country", and reflects a practice of care and consideration in maintaining a healthy and well-managed environment.

The Martu Peoples of the Western Desert use fire in specific areas to encourage the regrowth of plants that are important food sources for people and animals, to create habitats for species, including endangered species such as the mankarr (bilby), and to prevent larger, damaging fires'.

The fire display is situated on the Ground Floor of the Australian Aboriginal Cultures Gallery, there you will see examples of the tools used for different methods of fire production.

Earth and space sciences – Year 5

The Earth is part of a system of planets orbiting around a star (the sun).

Researching Aboriginal and Torres Strait Islander Peoples' understanding of the night sky and its use for timekeeping purposes as evidenced in oral cultural records, petroglyphs, paintings and stone arrangements (OI.3, OI.5)

'In the Hahndorf area of South Australia, the Peramangk Peoples marked the appearance of each new moon on an object, such as a digging stick, to record their own age. The patterns of the stars have also long been used as indicators of time, particularly in relation to the life cycles of organisms within their Country/Place to indicate a particular season, time for travel, or availability of a certain resource'.

In 1983 senior Walpari men painted Tjukurrpa (Dreaming) designs on the doors of the remote Yuendumu school 250 km north west of Alice Springs. There are 30 original doors now held in the Museum collection and nine are on display. **Door number 29 on the right painted by Paddy Jalpaljarri Sims features a painting about the Milky Way, you will find the Yuendumu doors on level 1 of the Australian Aboriginal Cultures Gallery.**



Image left: Display view of Yuendumu doors. Photo Sia Duff.

Image right: Paddy Jalpaljarri Sims, Yiwarra-kurlu (Of the Milky Way), Door 29, 1984, Acrylic paint on metal. Photo South Australian Museum.

Science as a Human Endeavour – Year 6

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

Investigating how Aboriginal and Torres Strait Islander Peoples test predictions and gather data in the development of technologies and processes (OI.5, OI.9).

'Aboriginal Peoples have demonstrated understanding of the phenomenon of leverage through the design and development of the spear-thrower, a lever mechanism that imparts greater force to a spear. The spear-thrower acts as an extension of the thrower's arm and the increased force within the lever system results in the spear having the capacity to travel further and impact with greater force than when a spear is thrown by arm alone. It has been suggested that in Australia, this technology may have existed more than 20,000 years ago'. There are many examples of spear-throwers situated on the Ground Floor of The Australian Aboriginal Cultures Gallery.



Image: Eucalyptus wood spear throwers. Owner/ Maker unknown, collected on Kaurua land early 1800's, Midla. Photo Johannis Lyons-Reid.

Chemical sciences – Year 7

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques.

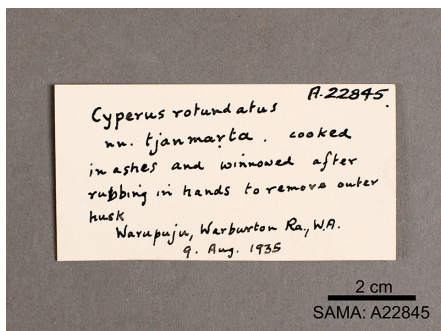


Image: Cooked and winnowed bulbs of Tjanmarta, *Cyperus rotundatus*, Warupuju, Warburton Ranges WA, 1935. Collected by NB Tindale. Photo South Australian Museum.

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).

'Winnowing is a separation method that is designed to remove lighter particles while maintaining heavier ones. It is commonly used in separating seeds from their outer shells or coatings (husks). The mixture of seeds and husks is placed in a specifically designed container, such as akoolamon. The word koolamon (orcoolamon) is derived from the language of the Kamilaroi people of northern New South Wales and southern Queensland and is now in the Australian vernacular. The mixture is then thrown lightly into the air allowing the wind to remove the lighter husk particles while the heavier seeds fall safely back into the container'.

You will find examples of seeds and coolamons used in winnowing process on the Ground floor of the Australian Aboriginal Cultures Gallery.

Science as a Human Endeavour - Year 8

Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures.

Investigating how Aboriginal and Torres Strait Islander Peoples connect knowledge from the disciplines of physics, chemistry, biology and geology in the development of material culture (OI.3, OI.5).



Grind stones from various Australian Aboriginal language groups. Photo South Australian Museum.

'Stone tools provide sophisticated examples of material culture that required the confluence of geological, chemical, bio-logical and physical knowledge. Creating highly efficient stone tools requires knowledge from: the geological sciences in understanding the location, composition and qualities of different types of rocks and stones; the physical sciences in developing and utilising effective stone knapping techniques; the biological sciences in understanding how the tools needed to be crafted for their uses in hunting, skinning, harvesting, peeling and surgical procedures; and the chemical sciences in the treatment of certain types of rocks to transform their physicochemical properties for technical purposes.' **Many stone tools including axes, knives and grind stones can be found on display in the Ground Floor of the Australian Aboriginal Cultures Gallery.**

Chemical Sciences - Year 9



Image: Wylie Swamp Boomerang. Maker/ Owner unknown, Radiocarbon dated at 10,000 years, Bunganditji (Boandik) country. Photo South Australian Museum.

All matter is made of atoms that are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms.

Investigating how radiocarbon and other dating methods have been used to establish that Aboriginal Peoples have been present on the Australian continent for more than 60,000 years (OI.6).

Radiocarbon dating procedures have been used by archaeologists to study

*the migration patterns of early humans and the antiquity of the habitation of the Australian continent by Aboriginal Australians. **The Wylie Swamp Boomerang pictured here, has been carbon dated at approximately 10, 000 years old and is displayed in the Antiquity area on the ground floor of the Australian Aboriginal Cultures Gallery.***

Science as a Human Endeavour - Year 10

Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community.

Investigating how prior to germ theory Aboriginal and Torres Strait Islander Peoples used their scientific observations to develop traditional medicines to treat wounds and infections of the skin (OI.5).

*'By investigating examples of how Aboriginal and Torres Strait Islander peoples used and continue to use their pharmacopeia to treat wounds and skin infections, students gain a deeper knowledge of, and a greater appreciation for, the richness of the scientific knowledge held by Aboriginal and Torres Strait Islander peoples. The elaboration also provides students with further opportunities to investigate examples of how the broader scientific community is constantly seeking to review and refine scientific understanding'. **Plants used by Aboriginal and Torres Strait Islander people for medicine can be found on the Ground Floor of the Australian Aboriginal Cultures Gallery.***



Image: Medicine and healing display.
Photo South Australian Museum.

RESOURCE LIST

Books

- Barlow, S, Haryniak, A, 2019,
Dark Emu in the Classroom: Teachers Resources for High School Geography,
Magabala Books Aboriginal Corporation, Broome, Western Australia.
- Clark, P, 2008,
Aboriginal Plant Collectors,
Rosenberg Publishing, Pty Ltd, Kenthurst, NSW.
- Clarke, P, 2000,
Australian Aboriginal Cultures Gallery,
The South Australian Museum, Adelaide SA.
- Clarke, P, 2003,
Where The Ancestors Walked: Australia as an Aboriginal Landscape,
Allen & Unwin, Crows Nest, NSW.
- Gammage, B, 2012,
The Biggest Estate on Earth: How Aborigines Made Australia,
Allen & Unwin, Crows Nest, NSW.
- Hemming, Steven J.
Objects and specimens [Conservative politics and the SA Museum's Aboriginal Cultures Gallery.
An earlier version of this paper was presented at the Museums Australia Conference (2002). Paper in Old Wounds. [online]. Overland, No. 171, Winter 2003: 64-69.
- Jorgensen, D. and McLean, I (ed)
Indigenous Archives: the Making and Unmaking of Aboriginal Art,
University of Western Australia Publishing, 2017.
- Pascoe, B, 2019,
Young Dark Emu,
Magabala Books Aboriginal Corporation, Broome, Western Australia.
- Pascoe, B, 2014,
Dark Emu,
Magabala Books Aboriginal Corporation, Broome, Western Australia.
- Steffensen, V, 2020,
How Indigenous fire management could help save Australia: Fire Country,
Hardy Grant Travel, Melbourne, Victoria.
- Turnbull, P and Pickering, M (eds), 2010,
The long way home: the meanings and values of repatriation,
Berghahn Books, New York: Oxford, pp. 24-29.

Online resources

- Australian Curriculum Assessment and reporting Authority (ACARA), 2019, Australian Curriculum: Science Aboriginal and Torres Strait Islander Histories and Cultures cross-curriculum priority: Content elaborations and teacher background information F-10,
australiancurriculum.edu.au/f-10-curriculum/science/aboriginalastronomy.com.au/
- bom.gov.au/iwk/calendars/kaurna.shtml
- bushheritage.org.au/what-we-do/landscape-management/fire
- monash.edu/arts/monash-indigenous-studies/wunungu-awara/animations/nganu-and-tjilbruke-a-tale-of-two-heroes-2018
- whc.unesco.org/en/list/1577/

Aboriginally owned resource sites

- rileycallieresources.com.au/teacherresources
magabala.com/

Kaurna language

- youtube.com/channel/UChOOYOnJuEeydJKOQjN_Fpw
adelaide.edu.au/kwp/

Important web based articles

- theguardian.com/australia-news/2017/mar/04/reuniting-indigenous-sticks-with-their-stories-the-museum-on-a-mission-to-give-back
- abc.net.au/news/2018-06-23/call-for-return-of-traditional-aboriginal-fire-control-methods/9877842
- insidestory.org.au/reading-bruce-pascoe/
- theconversation.com/kindred-skies-ancient-greeks-and-aboriginal-australians-saw-constellations-in-common-74850
- wec2019.org.au/2019/07/10/budj-bim-6000-year-old-aboriginal-engineering-site-earns-world-heritage-status/
- abc.net.au/news/2020-01-19/fire-reveals-further-parts-of-6600-year-old-aquatic-system/11876228
- anu.edu.au/news/all-news/indigenous-banana-cultivation-dates-back-over-2000-years