



First Nations Scientists: Working with Materials

YEAR 2 AND 4
CHEMICAL SCIENCES
DESIGN AND TECHNOLOGIES



QGC

FUTUREMAKERS



QUEENSLAND
MUSEUM NETWORK



Queensland
Government

Future Makers

Future Makers is an innovative partnership between Queensland Museum Network and Shell's QGC business aiming to increase awareness and understanding of the value of science, technology, engineering and maths (STEM) education and skills in Queensland.

This partnership aims to engage and inspire people with the wonder of science, and increase the participation and performance of students in STEM-related subjects and careers – creating a highly capable workforce for the future.

Cover image: Weres from Queensland Museum Network collection. © Queensland Museum

Copyright © 2022 Queensland Museum.



The images included in this teaching resource may be used for non-commercial, educational and private study purposes. They may not be reproduced for any other purpose, in any other form, without the permission of the Queensland Museum.

EXPLORE – EXPLAIN

First Nations Scientists: Working with Materials

Teacher Resource

Aboriginal and Torres Strait Islander Peoples deep scientific knowledge and understanding of the properties of natural materials has informed, and continues to inform, the selection, use and modification of materials for specific purposes.

In this activity, students firstly explore how an Aboriginal artist from the Girringun [*girr-ig-un*] region uses their knowledge and understanding of the properties of natural materials to create objects, specifically objects made from string.

Students then use objects from Queensland Museum Network's Cultures and Histories collection to explore how Aboriginal and Torres Strait Island Peoples use natural materials to produce different objects and tools. Students in Year 2 explore how Aboriginal and Torres Strait Islander Peoples physically change and combine natural materials to make them useful for particular purposes, while Year 4 students consider how Aboriginal and Torres Strait Islander Peoples use natural and processed materials for different purposes based on their properties.

Queensland Museum Network's Cultures and Histories collection is comprised of objects that are significant to the people of Queensland, including the material culture of Aboriginal Peoples and Torres Strait Islander Peoples. You can view objects from these collections [online](#) and in person at exhibitions on display across the Queensland Museum Network.

Video Resource

Students explore how an Aboriginal artist from the Girringun [*girr-ig-un*] region uses their knowledge and understanding of the properties of natural materials, specifically string, to create objects. Join the artist as they describe:

- Why string is a useful material to work with based on its properties.
- How string is made and how materials are changed during this process.
- How string is used to make objects.
- How work with string has changed over time.

This video resource is available at the [Queensland Museum Network Learning Resources site](#).

Object Analysis

Students use objects from Queensland Museum Network's Cultures and Histories collection to explore how Aboriginal and Torres Strait Island Peoples use natural and processed materials to create and produce different objects and tools. Students will use images of these collection items to complete an object analysis. During the object analysis, students will:

- Identify and describe the features and characteristics of each object.
- Examine the materials used to construct each object.
- Explore how materials have been changed in the construction of the objects.
- Investigate how materials have been combined to construct the objects.
- Consider how the properties of materials have influenced their use and the design of the objects.

Detailed step-by-step instructions can be seen below. It is recommended that you use these instructions to guide your students through the activity.

1. Divide students into groups of two or three. Distribute one object image to each group. Ask students to analyse the object using the See-Scan-Analyse strategy:

See: Describe what you see.
 What materials is the object made from?
 What colour is the object?
 What shape is the object?
 What size is the object?

Scan: Look closely at the object.
 What extra details do you notice now that you didn't before?
 How are the different materials combined?
 How are the different parts of the object combined?
 How do you think the materials used in the object have been changed?

Analyse: What do you think the object was used for? Why?
 Who do you think used this object? Why?
 Why do you think these materials were used to create this object?

You may wish for students to record their observations and ideas on the provided *Object Analysis Template* (page 26).

2. Student groups then share their objects and responses to the See-Scan-Analyse questions with the class. Alternatively, you may wish for students to repeat this process with a number of different objects, before sharing their observations and responses.

During the class discussion, you may wish to prompt students to focus on year-level specific content when discussing their responses. For instance, Year 2 students can be prompted to further consider how materials have been changed and combined. Year 4 students can be prompted to consider how the properties of the various materials affect their use.

3. After students have shared their responses, explore the *Object Profile Cards* (page 12) with students to learn more about each object, including the materials the objects were made from and how they were used.

4. Students research other objects which have been created by Aboriginal and Torres Strait Islander Peoples. During this research task, students could analyse the materials used to create these objects, how the materials were changed and combined, and how the properties of the materials influenced how they were used. An *Object Analysis Template* is provided on the following pages to guide students' responses to the task (page 26).

Additional research may be conducted through a visit to Queensland Museum's [Discovery Centre](#) to view the *First Scientists* display. You can see examples of other First Nations objects in the Queensland Museum collection by searching 'Aboriginal and Torres Strait Islander' on the [Queensland Museum Learning Resources platform](#) and selecting 'collection items'.

The video resource and object analysis featured within this activity can also be used as a starting point from which you can explore:

- How different geographical regions encompassing a community's Country or Place produce different resources and how the availability of resources influences and impacts the production of objects.
- How Aboriginal and Torres Strait Islander Peoples have long used science to inform the sustainable harvest of environmental resources to meet their needs.
- How Aboriginal and Torres Strait Islander Peoples' cultural practices have continued and changed over time.

When discussing Aboriginal and Torres Strait Islander practices, it is important to highlight that these cultural practices are strong and continue to be practised today by First Nations Peoples.

You may also wish to invite local Aboriginal and/or Torres Strait Islander community members into your school as you complete this activity to build relationships and facilitate the sharing of knowledge and perspectives.

Curriculum Links

Science

YEAR 2

Science Understanding

Different materials can be combined for a particular purpose (ACSSU031)

Science as a Human Endeavour

Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE034)

People use science in their daily lives, including when caring for their environment and living things (ACSHE035)

Science Inquiry Skills

Pose and respond to questions, and make predictions about familiar objects and events (ACSIS037)

Participate in guided investigations to explore and answer questions (ACSIS038)

Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions (ACSIS040)

Compare observations with those of others (ACSIS041)

Represent and communicate observations and ideas in a variety of ways (ACSIS042)

YEAR 4

Science Understanding

Natural and processed materials have a range of physical properties that can influence their use (ACSSU074)

Science as a Human Endeavour

Science knowledge helps people to understand the effect of their actions (ACSHE062)

Science Inquiry Skills

Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS071)

Design and Technologies

YEAR 2

Design and Technologies: Knowledge and Understanding

Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)

Explore the characteristics and properties of materials and components that are used to produce designed solutions (ACTDEK004)

YEAR 4

Design and Technologies: Knowledge and Understanding

Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (ACTDEK013)

General Capabilities

Critical and Creative Thinking

Inquiring – identifying, exploring and organising information and ideas

Generating ideas, possibilities and actions

Analysing, synthesising and evaluating reasoning and procedures

Literacy

Word Knowledge

Composing texts through speaking, writing and creating

Intercultural Understanding

Recognising culture and developing respect

Cross-curriculum Priorities

Aboriginal and Torres Strait Islander Histories and Cultures

Australia has two distinct Indigenous groups: Aboriginal Peoples and Torres Strait Islander Peoples, and within those groups there is significant diversity (OI.1)

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

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)

First Nations Scientists: Working with Materials

Teacher Resource

Object Images



Object A

QM, Jeff Wright

Object B



QM, Jeff Wright

Object C



QM, Peter Waddington

Object D



QM, Peter Waddington

Object E



QM, Peter Waddington

Object F



QM, Jeff Wright

Object G



QM, Peter Waddington

First Nations Scientists: Working with Materials

Teacher Resource

Object Profile Cards

Object A	<i>Weres</i> (fish scoop) from Mer Island, Torres Strait
Materials used to construct the tool/object?	Bamboo, plant fibres (from palm leaves)
What properties of the materials make them a good choice for this tool/object?	Bamboo: lightweight, flexible, strong Plant fibres: flexible, strong, durable
How were the materials changed/modified for use in this object?	Bamboo was soaked in sea water and bent into shape. Fibres prepared through processes that may involve a combination of steaming, soaking, splitting, scraping, chewing, stripping, washing, pounding and drying. Once the string was prepared it was physically changed through twisting, twining, plaiting or knotting.
What was/is the purpose of the object? How was/is it used?	<i>Weres</i> were used to catch sardines, which are found close to the shore of the eastern islands of the Torres Strait. The fish would be ‘scooped’ after being driven into shallow waters. Larger scoops could also be set between the gaps of stone fish traps. Some Torres Strait Islander Peoples use <i>weres</i> in art and dance to tell stories. <i>Weres</i> and fish traps made of natural materials are still used by some Aboriginal and Torres Strait Islander Peoples today. However, modern nylon nets have become the marine technology of choice for most Aboriginal and Torres Strait Islander Peoples. The same weaving techniques can be used for both natural fibres and synthetic materials to make and mend nets.

Object B	Palm spathe container from Erub Island, Torres Strait
Materials used to construct the tool/object?	Palm spathe (part of leaf) Grass stem (culm)
What properties of the materials make them a good choice for this tool/object?	Palm spathe: flexible, strong, waterproof Grass culm: flexible, strong, durable
How were the materials changed/modified for use in this object?	This object was made from a single palm spathe which was folded and tied to create a container. The grass culm was plaited together to improve strength and durability.
What was/is the purpose of the object? How was/is it used?	Palm containers were primarily used to transport water, however they are a multi-purpose tool used for a number of functions. These containers are impermeable and easily transported. Some other uses for palm containers include: carrying infants, foods and other materials.

Object C	<i>Coolamon</i>
Materials used to construct the tool/object?	Hardwood
What properties of the materials make them a good choice for this tool/object?	Wood: strong, durable, mouldable, waterproof (when treated)
How were the materials changed/modified for use in this object?	<p>The wood used to create this object was moulded to its desired shape.</p> <p>There are a number of techniques used by Aboriginal and Torres Strait Islander Peoples to bend and shape wood. These include:</p> <ul style="list-style-type: none"> • Stone tools were used to cut and strip away wood to shape the object. • Steam bending: heat and moisture are applied to wood or bark to enable the material to be moulded • Using flexible, green timber • Soaking wood in water • Burying wood in hot, dry sand • Bending and fastening wood in place with twine or sinew <p><i>Coolamons</i> were treated using resin to make them waterproof.</p> <p>To help preserve and protect <i>coolamon</i> they were regularly rubbed with animal fat to keep the wood in good condition.</p>
What was/is the purpose of the object? How was/is it used?	<p><i>Coolamons</i> were traditionally used by Aboriginal women to carry water, fruits, nuts and to cradle babies. They were also used for winnowing grains in the traditional bread-making process and as a general heating and cooking vessel.</p> <p><i>Coolamons</i> were often carried on the head when traveling or under the arm as a cradle.</p>

Object D	Turtle shell fish hooks from Badu Island, Torres Strait
Materials used to construct the tool/object?	Turtle shell
What properties of the materials make them a good choice for this tool/object?	Turtle shell: hard, strong, mouldable, dense, durable
How were the materials changed/modified for use in this object?	<p>These fish hooks were manufactured from turtle shell by cutting or scraping the shell. Heat was then applied to soften the shell, allowing it to be bent into shape.</p> <p>The heat was then removed from the shell. As the shell cools it hardens and sets in the desired shape/form.</p>
What was/is the purpose of the object? How was/is it used?	<p>Fishing forms part of the deep cultural and spiritual connection many Aboriginal and Torres Strait Islander communities have with their oceans or inland waterways that form part of their Country.</p> <p>Today, Aboriginal and Torres Strait Islander Peoples primarily use fishing lines with metal hooks, rather than those made from turtle shells or animal bones. Although new technologies have changed Aboriginal and Torres Strait Islander Peoples' means of fishing, the traditional knowledge of how, where and when to gather marine food resources (such as fish and shellfish) hasn't changed.</p>

Object E	Dilly Bag
Materials used to construct the tool/object?	A variety of natural resources are used to prepare fibre for string. These differ according to each geographical region and the desired purpose of the finished product. Different groups throughout Queensland use different resources due to the region's very diverse plant life and geographical variation.
What properties of the materials make them a good choice for this tool/object?	Plant fibres: flexibility, strength, durability
How were the materials changed/modified for use in this object?	<p>Fibres were prepared through processes that may involve a combination of steaming, soaking, splitting, scraping, chewing, stripping, washing, pounding and drying. These processes are carried out to improve the flexibility, strength and durability of the fibre.</p> <p>Once the string is prepared it can then be physically changed through twisting, twining, plaiting or knotting to manufacture items for a desired purpose.</p>
What was/is the purpose of the object? How was/is it used?	<p>Bags and baskets have been used across all Indigenous Australian communities for a variety of purposes.</p> <p>Dilly bags are traditional bags used for gathering food and could be hung around the neck in order to leave the hands free.</p> <p>In recent times, the production of Dilly bags has become a centrepiece for weaving artistry. Artists have created Dilly bags with new designs, colours and forms, while still using traditional weaving techniques.</p>

Object F	<i>Jawun</i> (Bicornual basket)
Materials used to construct the tool/object?	Lawyer cane
What properties of the materials make them a good choice for this tool/object?	Lawyer cane: flexibility, strength, durability
How were the materials changed/modified for use in this object?	<p>Lawyer cane is physically changed in the construction of <i>Jawun</i>.</p> <p>The prickly outer casing of the plant is removed, and the fibre is split. A frame is made by bending several lengths of stripped lawyer cane over a fire. Fine fibre is then twined across this frame. To strengthen the basket, rings of bent cane are added to the inside.</p> <p>Handles are added by attaching bent strips of lawyer cane to the mouth of the basket.</p>
What was/is the purpose of the object? How was/is it used?	<p><i>Jawun</i> were used for collecting and processing food and at times for carrying young infants.</p> <p><i>Jawun</i> were used for collecting and carrying foods, such as nuts and seeds. A long handle was sometime included on <i>Jawun</i>. This would allow the user to loop this strap around their forehead, allowing the basket to be worn hanging down their back. This would keep the user's hands free.</p> <p><i>Jawun</i> were also used in the process of leaching toxic substances from certain plant foods, to render them safe to eat. The baskets were placed in running streams with the top facing upstream. The hornlike projections were wedged among rocks to keep the basket in place. The <i>Jawun</i> were left at times for several days. This allowed people to eat a much wider variety of foods, that would otherwise have been poisonous.</p>

Object G	Woven basket from Erub Island, Torres Strait
Materials used to construct the tool/object?	Plastic tape The practice of using plastic packaging tape is becoming more widespread, particularly in mainland communities where raw materials are hard to obtain.
What properties of the materials make them a good choice for this tool/object?	Plastic: flexible, durable, colourful, reused
How were the materials changed/modified for use in this object?	The plastic packaging tape was woven together to create this object using traditional skills and techniques.
What was/is the purpose of the object? How was/is it used?	Basketry and weaving are central to Torres Strait Islander lifestyle. The objects are used in a practical sense (for transporting items), although decorative pieces are also produced. The weaving of baskets are significant skills that have become symbols of identity for contemporary Torres Strait Islander women. Women learn from their mothers or aunties and their expertise helps link the generations together.

First Nations Scientists: Working with Materials

Student Activity

OBJECT		
SEE	Look at the object. Describe what you can see.	
	What materials is the object made from?	
	What colour is the object?	
	What shape is the object?	
	What size is the object?	
SCAN	Look closely at the object. What extra details do you notice?	
	How can you describe the object in more detail?	
	How are the different materials/parts of the object combined?	
	How do you think the materials used in the object have been changed?	
ANALYSE	Analyse the object to answer the following questions. Explain your responses.	
	What do you think this object was used for? Why?	
	Why do you think these materials were used to create this object?	