

LESSON IDEA - YR 3

Big idea

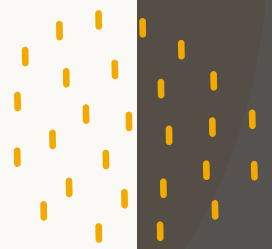
- First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways (Country/Place A_TSICP1)
- First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing (Culture A_TSIC2)

Application

formulate connected multiplication and division expressions by representing situations from First Nations Australians' cultural stories and dances about how they care for Country/Place such as turtle egg gathering using number sentences



AC9M3N04
multiply and divide one- and two-digit numbers, representing problems using number sentences, diagrams and arrays, and using a variety of calculation strategies



Connection

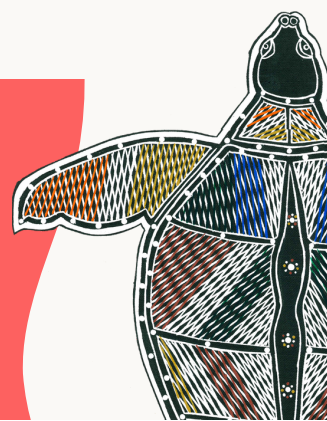
First Nations Australians have cared for turtle populations for millennia through sustainable harvesting practices, needing a detailed knowledge and understanding of counting.

The Yolngu People of North East Arnhem Land use a base 5 counting system when counting or sharing turtle eggs.

Lesson ideas

- use stones or ping pong balls to represent turtle eggs, burying or arranging in sand
- use diagrams and arrays to model quantities in multiple ways, including using a rulu or pyramid structure in base 5
- introduce subtraction to model harvesting and fractions eg harvesting one-third of the eggs or division by sharing the eggs among family members
- extension - explore how many eggs a turtle lays in a lifetime:

<https://www.digitaltechnologieshub.edu.au/teach-and-assess/classroom-resources/lesson-ideas/turtles-exploring-data-in-turtle-population-dynamics/>



BACKGROUND

Cultural significance

Marine turtles have important cultural and social values for Aboriginal and Torres Strait Islander people living in coastal areas of northern Australia. Hunting these species is important for maintaining family relations (kinship) and social structure, has important ceremonial and community purposes and also provides valuable protein in regions where fresh food is expensive and difficult to obtain.

First Nations communities are working collaboratively with government agencies and scientists to develop and implement community-based management for sustainable hunting of marine turtles. This work is primarily supported through the Australian Government's Caring for Our Country and Working on Country programs.

Under the Native Title Act 1993, Traditional Owners have the right to take marine resources, including hunting of marine turtles for personal, domestic or non-commercial communal needs and in exercise and enjoyment of their native title rights and interests.

Counting in base 5

In the Yirrkala Community School Yolŋu mathematics is taught everyday and is based on learning on Country. Students and teachers talk about the Yolŋu way of counting turtle eggs:

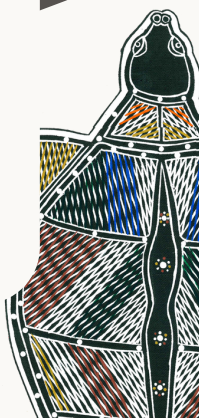
"Then when we bring the eggs out we use a Yolŋu way of counting—*wangany, marrma, lurrkun, dāmbu miriw*, one, two, three, four—and then one on the top, that's one *rulu*—and then there's two *rulu*, three *rulu*—and that's how the children are counting there—so learning their way of mathematics. Then they decide, how many will I be taking—how many eggs shall I take home to my mum and dad. It's a living maths."



(a)



(b)



BACKGROUND

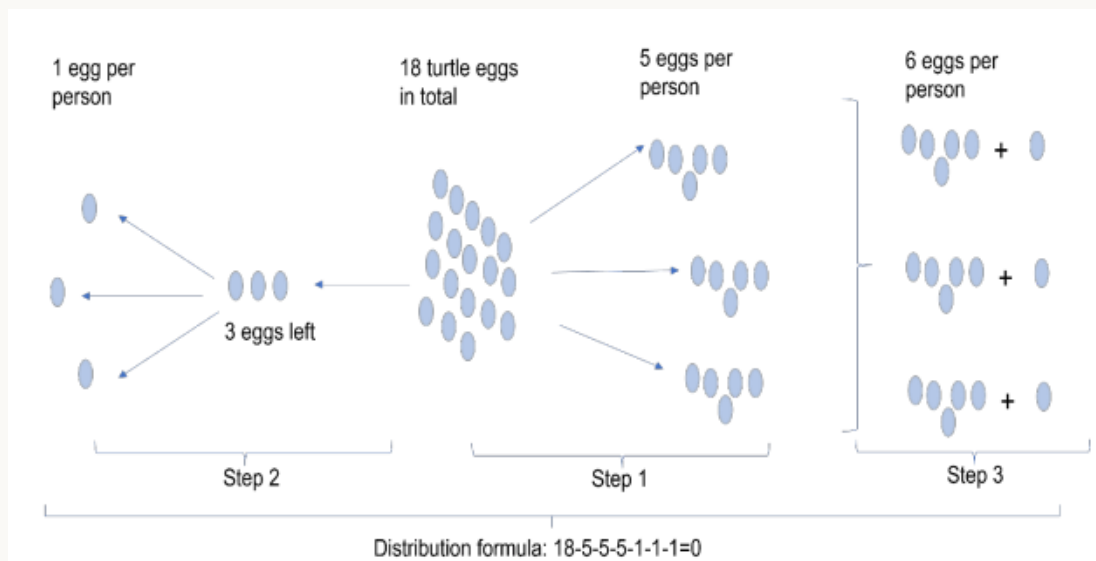
Division in base 5

In the same way that counting is done in groups of 5, division can be done with Yolŋu mathematics in groups of 5.

This anecdote is from 1984 and describes how a group of three men on a turtle hunting expedition shared some turtle eggs:

We had in our boat one adult turtle but were keen on getting one or two more. However the tide was against us, so while waiting for the tide to turn we went to a small island where we had seen recent turtle tracks on the sand, indicating nests of turtle eggs. Carrying a couple of sacks we proceeded to walk around the island (two in one direction and one in the other) to gather eggs. On meeting together again we emptied out the eggs to share them out. First the eggs were arranged in groups of five by placing four eggs together on the sand and placing the fifth on top. This arrangement of five eggs called a **rulu** (this being one of several meanings for the word). As this was done one of the men proceeded to "deal out" eggs to each of us **rulu** by **rulu** until they were all gone. Each of us took what we wanted to eat from our own shares and the rest were put in our private containers to take back home.

And here is a visualisation of how to share 18 eggs among three men using Yolŋu mathematics:



BACKGROUND

Sustainability

The cultural practices of Aboriginal and Torres Strait Islander Peoples have sustainably managed the coastal waters of Australia for thousands of years. Traditional ecological knowledge considers the impact of community practices on the environment to ensure that the organism populations within the ecosystems are not detrimentally affected. Organisms are purposefully harvested at specific times in their lifecycle, drawing on knowledge about population density and dynamics, to ensure the long-term survival of the species and its dependent organisms.

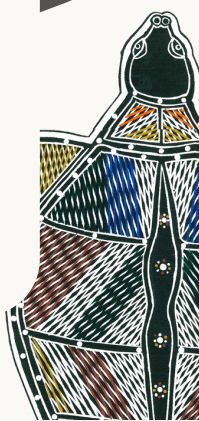
Dugongs and turtles are culturally important species for many Aboriginal and Torres Strait Islander peoples. Careful and controlled dugong and turtle harvesting practices are undertaken according to cultural laws and protocols and this system informs community decisions regarding take (acquisition). Sustainability of these species, now affected by a multitude of contemporary issues, requires consultation and co-development of programs that incorporate Aboriginal and Torres Strait Islander Peoples' scientific knowledges, co-management and cultural perspectives.

Aboriginal and Torres Strait Islander Peoples use zoological knowledge pertaining to dugongs and turtles such as animal size, sex, egg clutch size, nesting frequency, and species maturation to inform harvesting practices. Ecological knowledge built over millennia includes the location of animal habitats, food sources of the species, seasonal patterns of movement, and nesting and breeding locations. This essential scientific knowledge, that is well understood by First Nations Australians, safeguards the habitats of species thereby ensuring that species are protected. For many thousands of years Aboriginal and Torres Strait Islander Peoples have implemented carefully considered protocols for harvesting these marine species, informed by the zoological and ecological knowledge of the organisms and ecosystem.

The Kaurareg Peoples of the lower Western Islands of the Torres Strait developed a collaborative approach with the Traditional Owners of surrounding Islands and all levels of government, for sustainable harvesting of turtles and dugongs.

Only a certain quota of dugongs and turtles can be harvested to maintain population numbers; Peoples of some of the Western Torres Strait Islands keep the skull bones of dugong and turtle to monitor the number of animals being harvested in a season.

The practice of harvesting turtle eggs is also limited to a specific quota and requires ecological knowledge to identify the beaches where turtles return to lay eggs and the time within the season that the eggs can be harvested. Such long held zoological and ecological knowledges have ensured sustainable population numbers of dugongs and turtles for thousands of years.



BACKGROUND

Artwork

Artworks have been created by:

- Sheri Skele, a proud Bidjara woman and a contemporary Aboriginal artist who calls her artworks Bigi Nagala, which means 'I am dreaming' in Bidjara
- Kakadu Organics, which encompasses two designers, Sheril Cahill, a Murrumburr woman and senior traditional owner of Kakadu National Park, and Dale Austin, a talented painter, carver and artist with connections to Bininj Nation (Western Arnhemland/Kakadu) and Ngurrungurdjba Country (Yellow Water).

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