

Comparing 12- and 24-hour time systems and Indigenous concepts of time

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

GLOSSARY

abstract: relating to ideas, not objects.

agricultural: relating to farming practices, including soil cultivation, crop production and raising livestock (farm animals).

cyclical: happening as a collection of events that keep repeating themselves in the same order or at a given time interval.

domestic: relating to a household or family.

First Nations people: Aboriginal and Torres Strait Islander people.

lunar cycle: the way the moon periodically changes from a thin crescent through to a full moon and back again; the time between one new moon and the next new moon (approximately 29.5 days) is one lunar cycle.

missions and reserves: places where Aboriginal and Torres Strait Islander people were forced to live to learn European culture, religion and the English language.

neap tide: a tide just after the first or third quarters of the moon when there's least difference between high and low water.

sequential: following or arranged in order, in sequence.

Songline: a traditional story or song that's been passed down orally in First Nations cultures for thousands of years. A Songline may track the landscape of Australia and can be used to navigate across the country. It may also explain cultural laws. Songlines capture the interweaving of time and place by telling both Dreaming stories and the place of people today in these stories.

spring tide: a tide just after a new or full moon, when there's the greatest difference between high and low water.

variability: being likely to change frequently.

Introduction

First Nations people have been able to work out daily time for thousands of years by using sophisticated methods that don't involve a clock. These methods are often based on features of the earth and relate more to the natural environment that we live in than an **abstract** clock face.

In Western cultures, time is **sequential**; it's measured using numbers, down to the second.

In contrast, Aboriginal and Torres Strait Islander people use features of the earth such as "daybreak, sunrise, morning, afternoon, late afternoon, sunset, evening and night" (Donaldson, 1996) to mark daily time. Time in First Nations cultures is **cyclical**, measured by counting sleeps and moons, and noticing phases of the moon and seasons – not seasons defined by months on a wall calendar, but seasons defined by changes in the earth. Time is more complex than clocks and calendars – past, present and future are all connected; this concept is often described as "everywhen" (Stanner, 1979).

The first mathematicians measured time without clocks

First Nations people were the first mathematicians in Australia. Going back many thousands of years, Aboriginal and Torres Strait Islander people have had a detailed understanding of complex mathematical concepts relating to daily or short time, medium time and long time, including:

- time being measured using natural daily events, such as sunrise and sunset (Donaldson, 1996).
- the relationship between **lunar cycles** and tides being used to decide when the best time to fish is (University of Melbourne, n. d.).
- the position of stars in the sky being used to predict changes in seasons and decide the best times to carry out particular activities, such as hunting particular animals or harvesting particular foods (Quach, 2017; Bureau of Meteorology, 2016, 2016a).
- the blossoming of certain flowers marking the beginning or end of a season (Bureau of Meteorology, 2016, 2016a).
- using the slow and subtle **variability** in the brightness of three huge, red stars in the sky - Betelgeuse, Aldebaran and Antares - to describe long time: First Nations people recognised that Betelgeuse varies faster than Aldebaran (Betelgeuse varies by an order of magnitude about every 400 days) and used this fact in measuring time (Hamacher, 2017).

This kind of knowledge continues to be an important part of cultural identity for many First Nations people today.

Loss of Indigenous mathematical knowledge

When Europeans colonised Australia in 1788, much of the Indigenous population was killed from violence, disease and loss of land, food and livelihoods. Many Aboriginal and Torres Strait Islander people who survived were forced to live in places called **missions** and **reserves**, which were under

government control, and sought to separate First Nations people from their cultural and spiritual identities. This prevented many First Nations people from passing on Indigenous mathematical knowledge to their children. First Nations people who grew up on missions and reserves were forced to tell time using a clock rather than traditional methods and were taught only a basic level of mathematics suitable for **domestic** and **agricultural** labour.

Today, however, it's recognised that telling time using features of the earth is an important skill because it makes us more aware of what's happening to the earth - more aware of how to live on the earth in a way that takes good care of it. More and more it's recognised that non-Indigenous people can learn a lot from Indigenous timekeeping methods.

How do you use time in your everyday life?

It's easy to plan our lives around the clock without thinking about whether this is working well for us. For example, does it make sense to go to sleep at the same time each night all year round, including during daylight savings? Does it make sense for each person to have to spend the same amount of time on an activity at school?

Sometimes, we think of time as a line, with activities in an order: first, second, third, etc. Or with one activity before another. Another way of thinking about time is as a cycle, with activities that repeat and happen at the right time on the cycle.

In Aboriginal and Torres Strait Islander cultures, time is cyclical, rather than sequential. It's flexible and shifts according to people's needs and what's happening on the earth. Time isn't rigid; for example, a fish trap isn't set each day at the same time on a clock because you won't catch any fish that way. Tides don't come in and out at the same time every day. Coastal fish traps, for example, need to be set up at particular times of day when the tide is coming in or going out in order to catch fish.

Does your way of thinking about time reflect your reality?

It's important to think about how whether the way you work with time actually reflects what's really happening in your reality, or not. Being able to adjust your ideas about time to fit the reality of what happens in nature and the reality of how you work is an important mathematical skill. If mathematics is going to be useful to you, it needs to work with your real-life experiences and not just be about writing numbers in a book.

Deepening our understanding of time

Developing an understanding of time that's connected to the earth we live on is important for helping us develop a better understanding of nature, and for helping us to notice whether the way we use time actually works well. For example, if we needed to set a fish trap and just set it at the same time each day, without paying attention to the earth, would we actually catch any fish? Exploring the interaction between natural events and timekeeping can be an interesting way to deepen our understanding of time.