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[Ancestral Science Podcast](#)

The Ancestral Science Podcast explores scientific topics through conversations between Knowledge Keepers and Scientists, while *experiencing* the origins and depth of science on and with “the Land”. Join us as science COMES ALIVE when knowledges are shared alongside ancestor plants, rocks, animals, and rivers, creating connections between personal, Indigenous, and global science.

The Ancestral Science podcast is a place for *everyone* to see themselves in science, to be inspired by the SCIENCE that is all around them and expand the definitions of both *ancestor* and *science*.

SEASON 3: Episode 8 with **Dr. Chris Matthews** “Deadly Math: Movement, Kinship, & Action”

We were grateful to speak with [CHRIS MATTHEWS](#) from Quandamooka People of Minjerribah (Stradbroke Island) in Queensland Australia about his realization about the importance and depth of culture & country within mathematics, iron mines and nuclear testing highlighting land rights and Aboriginal voices, don’t hike Uluru, deadly coders, numbers as a process and action, kinship systems as group theory and algebra, and how to close the educational gap by *walking together*.

Honoraria from this episode was donated to [ATSIMA](#) (Aboriginal & Torres Strait Islander Mathematics Alliance).

Remember, you can support the pod and rock some unique Indigenous Science merch at www.relationalsciencecircle.com/shop, all proceeds go towards Knowledge Keeper honoraria, following protocols, and keeping the pod going.

Please like, share, follow, and rate the pod, it goes a long way to share this knowledge.

Thanks to Emil Starlight (@emilstarlight) of Limelight Multimedia for editing, videography, and editing as well as support from [Bespoke Productions Hub](#).

Intro composed and performed by [Walter White Bear](#), Sharon Ann Foster, and Emil Starlight.

Questions for the Pod? Email us at relational.science@gmail.com

SHOWNOTES:

-What is science to you?

Chris: Math helped get me through high school by allowing me to embrace objectivity
-faced a lot of negativity in school because of Aboriginal issues within culture, math allowed me to delve into imagination and thinking within computers.
“culture is always within math”

- [Brief Aboriginal History](#)

- [Māori Math](#): (Chris had an ah ha moment in the culture within mathematics when learning about Māori Math)

Resources: [Te Reo Club](#) (Math resources)
Journal Article: “[Reintroducing Māori ethnomathematical activities into the classroom: traditional Māori spatial orientation concepts](#)” Tony Trinick, Tamsin Meaney, Uenuku Fairhill.
“[Indigenous Mathematics in Australia and New Zealand](#)”
“[An Archaeology of Mathematical Structure in New Zealand](#)” Bill Barton
“[Pāngarau Maths](#)”

-Indigenising Curriculum

“[Indigenising the Griffith School of Environmental Curriculum](#)” Catherine Howlett, Jo-Anne Louise Ferreira, Monica Seini, Christopher John Matthews
“[Getting Skilled for education, training and employment: Indigenous Cultural knowledges and Mainstream knowledges of Mathematics](#)” Bronwyn F. Ewing, Thomas J. Cooper, Christopher John Matthews
“[The Place of Indigenous Knowledges in Tertiary Science Education: A Case Study of Canadian Practices in Indigenizing the Curriculum](#)” Vivian Lyall, Catherine Howlett, Christopher John Matthews.
“[Creating your own Symbols: Beginning algebraic thinking with Indigenous Students](#)” Christopher John Matthews, Thomas J. Coper, Annette R. Baturo.

- [Atsima](#) (Aboriginal & Torres Strait Islander Mathematics Alliance)

-STEM/STEAM Camps
-Resources
-Conferences

-“[Deadly Coders](#)”

Igniting a love of STEM for Indigenous Australians
- Deadly Coders is an Indigenous owned and managed not-for-profit on a mission to ignite learning and career pathways in STEM for Indigenous Australian students across Australia.

- Land Rights & Sacred Sites

- [Rio Tinto blasts 46,000 year old Aboriginal site to expand iron ore mine](#)
(The Guardian)

- destruction of sacred rock shelters on Puutu Kunti Kurrama Pinikura Country
- destroyed Juukan Gorge cave for iron mine
- “permission” given from outdated Aboriginal Heritage Law from 1972
- after blast, archaeological dig found 4000 year old plaited human hair.

- [Rio Tinto’s Destruction of Juukan Gorge](#) (Antar)

Juukan Gorge “...is known to be a place where the spirits of our relatives who have passed away, even recently, have come to rest. It is a place that the very, very old people still occupy...It is in the ancient blood of our people and contains their DNA. It houses history and the spirits of ancestors and it anchors the people to this country.”

Mr Burchell Hays, proud descendant of Juukan

- [“History of Uluru-Kata Tjuta National Park”](#)

- created at the beginning of time by Ancestral Beings
- [Tjukuritja Stories](#): physical evidence of activities with the ancestral beings
- [“Ayers Rock”](#) colonial name
- [“Gurindji Strike”](#) and Aboriginal Land Rights Act in 1976
- [“Uluru climbing prohibited”](#)

“The Land has Law and Culture. We welcome tourists here. Closing the climb is not something to feel upset about but a cause for celebration. Let’s come together; let’s close it together,” Former Chairman of the Uluru-Kata Tjuta Board of Management Sammy Wilson.

- [“Maralinga”](#) 1956, first nuclear weapons test by the British

- over 200 trails in 10 years
- extend of plutonium contamination not understood until AFTER land was returned to Aboriginal owners in 1984.
- none of tests considered presence of Anangu Pitjantjatjara people. They were seen camping near a test site crater.
- on top of this testing, the Aboriginal people faced extreme social, emotional, physical hardship- being denied access to food/water/resources
- 1967 they “cleaned up site” – ploughed plutonium into ground.
- by 2000- a clean up happened and was safe for unrestricted access
- [“Maralinga: Field of Thunder”](#) by Esme Mathis- Australian Geographic

- [TERRA NULLIUS](#)

- a way to legitimize dispossession, dispersal, inhuman treatment of First Nations people and land possession.
- 1992- Terra Nullius overturned by High Court of Australia’s Mabo Decision
 - continued connection and rights to Land through Native Title
- Terra Nullius- Australian Museum exhibit called [“Unsettled”](#)
- Have to understand history of the land in order to reconnect with the mathematics of the land. We had to start at the beginning, in order to show WHY Indigenous mathematics is both valid and important. First of all, this is about RELATIONSHIPS- with the land, with the ancestors, and with mathematics.

- **Indigenizing Curriculum**

- good work happening, but it is not mandatory. Shouldn’t this be baseline?
- how do we do this properly? In a good way?
- fear from non-Indigenous teachers teaching Indigenous knowledges

- afraid to make mistakes
- afraid to appropriate knowledge
- with this Indigenous people have to guide non-Indigenous teachers
 - NOTE:** but do this without putting TOO much work onto Indigenous people...allies take responsibility, accountability, speak for Indigenous people and rights when they are not in the room, and do NOT take voice or space.
- Chris says, we have to “close the gap”
 - this is from a lack of opportunity, lack of cultural teaching and supports for all teachers
 - as well, this is because there is a lack of Indigenous teachers
- “[Indigenous perspectives in Mathematics Education](#)” by Chris Matthews
- Validating Indigenous Knowledges and Mathematics
 - “[Facts and Fallacies of Aboriginal Number Systems](#)” by John Harris
 - base 5 number system

[-YuMi Deadly Maths](#)

- “deadly” means “awesome”
- unique mathematics pedagogical approach developed across 2010–12 to improve capacity to teach mathematics. It aims for the highest level of mathematics understanding through activity that engages students and involves parents and community. YDM aims to empower teachers to prepare effective mathematics lessons.
- YDC’s view of mathematics is illustrated in the diagram below. It shows the relationship between perceived reality and invented mathematics and is adapted from Matthews (2009)

-Human connection with Math

- Chris: you cannot leave your culture at the door!
- math lessons need to allow for creativity and self-expression! Where you feel like you are welcome to bring in your culture.
- “**Operations are about movement and action**”!
- there needs to be continued connections between mathematics and country/land
- teachers have to see and understand what is important to students.
- LISTEN!
- Country/land is central to knowledge

-Relationality and Mathematics

- math and kinship systems
- “[Traditional Aboriginal Kinship Systems](#)” by Drew Roberts (Arakwal & Bundjalung)
- it’s about building kinship systems with the world
 - like *All my Relations* – where all is “alive” and in motion, and therefore in relationship with one another. There is no isolation, no solidarity, but all interconnected.
- “[Indigenous Mathematics: From Mainstream Misconceptions to Educational Enrichment](#)” by Hongzhang Xu & Rowena Ball
- Aboriginal complex kinship systems connects with group theory and algebra
 - this is about reinforcing who you are through systems

- math is all interconnected, like humans!
- math is a process, like country/land
- the number 3 is not just an idea, but a process connected to country/land
- it's a measurement in connection to country- like length, width

-National Science Priorities (Australia)

[Australia's National Science and Research Priorities](#) (2024)

The priorities are:

1. transitioning to a net zero future
2. supporting healthy and thriving communities
3. **elevating Aboriginal and Torres Strait Islanders knowledge systems**
4. protecting and restoring Australia's environment
5. building a secure and resilient nation.

- this highlights the future of education and Aboriginal people
- to rebuilding who we (Aboriginal people) are
- to build a healthier connection to the Western System
- to **Walk Together**

-Additional Links

- “Mathematics & Culture” ([youtube](#))
- [Atsima](#) (Aboriginal & Torres Strait Islander Mathematics Alliance)
- “Mathematics education in North East Arnhem Land” ([article](#))
- “Indigenous perspectives in maths: Understanding Gurrutu” ([article](#))
- “Indigenous Perspectives in Mathematics Education” ([article](#))
- “[National Indigenous Research and Knowledges Network](#)” Australia
- “[Australia Mathematical Sciences Institute](#) (AMSI)

Want more Indigenous Science Resources? Check out [Relational Science Circle](#).

Want to learn more about Indigenous Science, Indigenous Science/Mathematics Teacher PD sessions, or have an idea for a guest or topic for the Ancestral Science Podcast, email relational.science@gmail.com

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