TIPIAC 8 WAYS
CSIRO STAFF WORKBOOKLET



ONE-DAY ONLINE TRAINING

8 WAYS IN A DAY

INDIGENOUS STEM LEARNING

TIPIAC EDUCATION

Who are we

TIPIAC (Teaching Indigenous Perspectives in the Australian Curriculum) grew from the need for First Nations-led resources and learning that strengthen connection, belonging and understanding. We are Aboriginal and Torres Strait Islander educators and collaborators who support schools to engage with culture carefully and meaningfully.

Today we will use the 8 Ways to look closely at how CSIRO's Indigenous STEM resources invite students to observe, connect, test, revisit and learn. We will keep the science learning clear while recognising that stories, images, practices and knowledge are connected to people, Country and cultural authority.

This workbooklet is a place to think, sketch and ask questions together. You do not need to have every answer today. The important work is to notice what is already strong, identify what can be improved, and be clear about what needs local relationship or permission before it is used.

Bonnie Cochrane

Outcomes

By the end of this workshop, we will:

- Describe the 8 Ways of Learning and how each pathway can shape the way students learn.
- Recognise where 8 Ways approaches are already visible in CSIRO's Indigenous STEM Education resources.
- Explore how selected pathways could support learning in Cultural Burning, Fire-starting, Traditional cooking methods and Traditional separation techniques.
- Practise applying selected pathways to an existing CSIRO activity, considering what students might observe, discuss, make and revisit.
- Identify questions about local context, cultural authority, permission and Indigenous Cultural and Intellectual Property (ICIP) to carry into future planning and the follow-up session.



How do the 8 Ways shape what students do in a CSIRO activity?

Pedagogy Notes

For each framework, note one idea that could improve a STEM resource and one question you still have.

Possum Skin Pedagogy

Uncle Ernie Grant's My Land, My Tracks Pedagogy (Interconnectedness)

Pedagogy Notes

Professor Martin Nakata's Cultural Interface Pedagogy

Tyson Yunkaporta's 8 Ways Pedagogy

Educational Pedagogies

These frameworks invite us to look beyond adding content. As you listen, consider how learners make meaning, who holds authority for a practice or story, and how a resource can guide respectful local adaptation.

Possum Skin Pedagogy

Possum Skin Pedagogy

Notice how identity, story, place and relationship may shape a learning journey.

For CSIRO:
What can a national resource model, and what must be developed with a local community?

Uncle Ernie Grant's My Land, My Tracks Pedagogy (Interconnectedness)

My Land, My Tracks

Land, language, culture and identity are connected, not separate add-ons.

For CSIRO:
Does the activity make these relationships visible without claiming to speak for every Country?

Professor Martin Nakata's Cultural Interface Pedagogy

Cultural Interface

Different knowledge systems meet in education, but they are not interchangeable.

For CSIRO:
Where does a resource distinguish scientific explanation from culturally held knowledge and authority?

Tyson Yunkaporta's 8 Ways Pedagogy

8 Ways of Learning

The pathways focus on how learning happens through story, mapping, observation, images, place, making, revisiting and community.

For CSIRO:
Choose the pathways that serve the activity; do not force all eight.

8 Ways Pedagogy

8 Ways is a way to plan how learners meet knowledge, not a checklist of cultural decorations. Story, visual thinking, observation, making, place, community and returning to an idea can all change the learning process.

As you work through the CSIRO resources, ask:
What are students actually doing?
Which three to five pathways would deepen the science learning and strengthen respect for Country and community authority?
Keep the recognised symbols beside their pathway names, and use this booklet to map your choices.

8 Ways Summary

Story Sharing

Learning Maps

Non-Verbal

Symbols & Images

Land Links

Non-Linear

Deconstruct/Reconstruct

Community Links

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8 Ways Pedagogy

My first resource review: topic / current activity / three promising 8 Ways pathways / one question about cultural authority or permission.



Opening resource conversation

What changes when Indigenous pedagogy shapes how students learn a STEM concept, rather than appearing only as cultural background? Name one current CSIRO activity and one uncertainty to carry into your breakout.

Discussion notes:

Story Sharing



As Bonnie tells her story, note the people, place, relationships and responsibilities that give it meaning.

Map the connections in the story

Story Sharing



Story Sharing — resource team reflection

- What makes Bonnie's story meaningful beyond the object or image we see?
- When we move to an attributed public CSIRO example, whose voice and Country are named?
- What is outside our authority to retell?
- How could learners hear, discuss or revisit a story without treating it as a generic "Aboriginal story"?

Our resource decision:

What context, credit or permission note must travel with this activity?

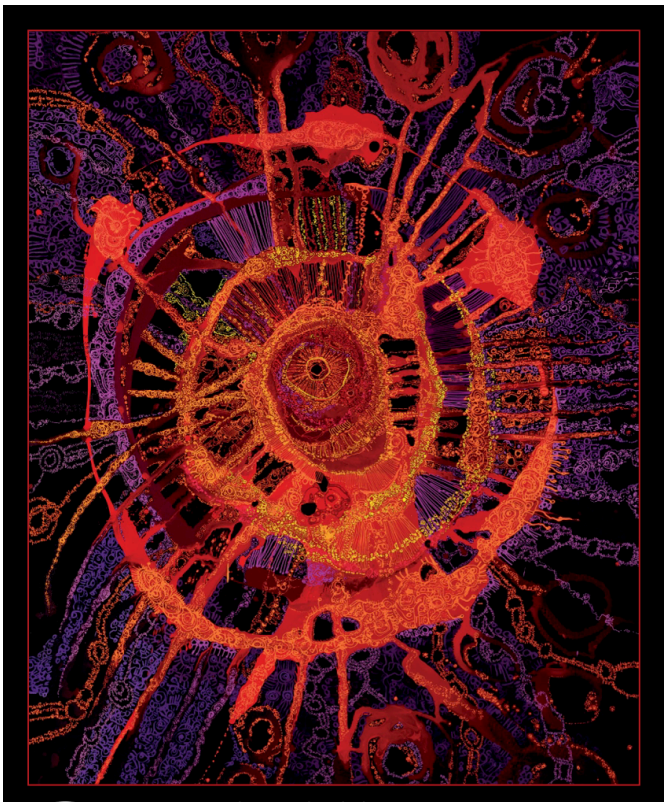
MAP A LEARNING JOURNEY



Non-Verbal — observe first



Symbols & Images — visual audit



Land Links

Land Links asks us to learn with attention to place, relationships and responsibility. A national CSIRO resource can name a public, attributed example; it cannot make that example stand for every Country.

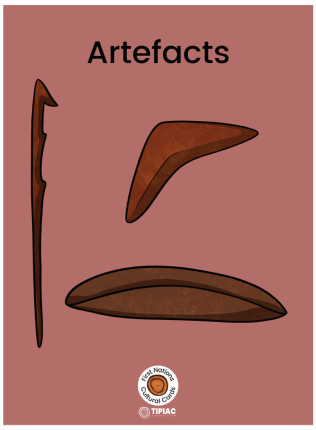
As you work, separate what the resource can say nationally from what an educator should establish locally with the appropriate community. Record the source and permission for any story, image or practice you retain.

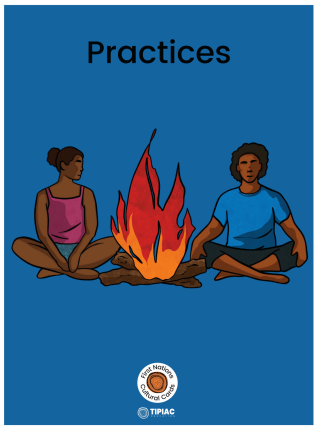
Land Links – place-based questions



Photo credit: ABC Western Plains – Facebook page.

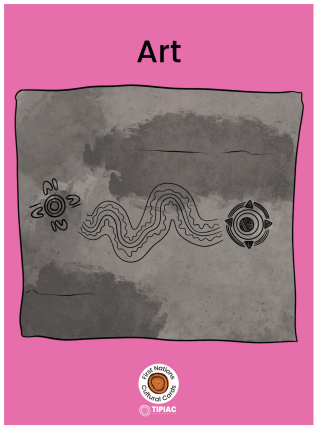
Cultural cards

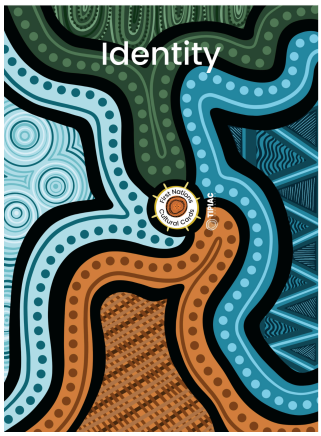




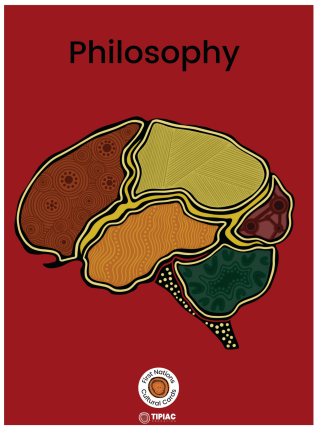


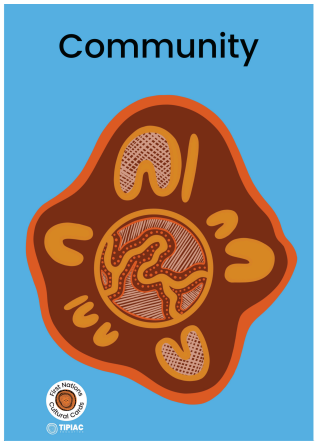


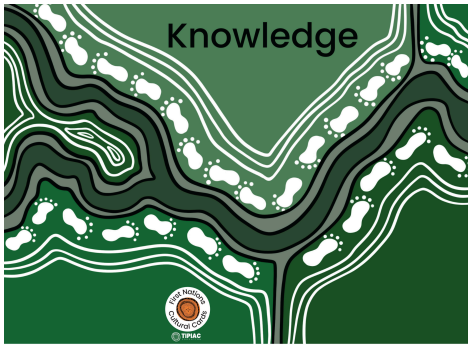




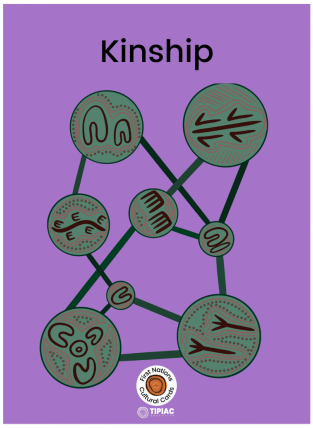
















8 Ways cards: choose 3-5 pathways

STORY TELLING



These lessons will be based on story telling and sharing personal experiences and knowledge. Providing opportunities in the classroom and school environment to share our stories and knowledge will help us to understand each other more deeply. Sharing our stories and connection to land is a vital part of our culture. The stories allow us to share the deep inherent knowledge that we hold.

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NON-VERBAL



Non-verbal communication is an important cultural practice. Therefore, the use of gestures, inferences, pictures, symbols and movement help to share experience and allow for a culturally safe relationship to be established. It is important to provide opportunities that focus on storytelling, dance, artwork and body movements using skills and knowledge past down from the Elders.

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LEARNING MAPS



First Nations people will often draw in the sand as they sit in a yarning circle. They develop pictures in their minds and share ideas with their mob working out the best solution to solve a problem or work out a pathway to support a learning journey. The visual approach supports many ways to get the same end result to a specific investigation. Using this method allows for trial and error, creativity and working as a team. In a classroom the provision of graphic organisers for the students supports this thinking.

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LAND-LINKS



Community involvement is an essential aspect of this pedagogy. A sense of direction and an awareness of place connect students to their country. Local land and sacred places are important connections to Aboriginal culture. Exploring all aspects of your school and home environment will provide authentic approaches to learning that embrace respect and inclusivity of Aboriginal pedagogy.

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SYMBOLS & IMAGES



First Nations people often think in images and shapes as they have a visual culture bias. First Nations peoples have a deep connection to the landscape or environment which holds memory codes in the form of images that allow First Nations people to tap into knowledge systems. Pictures sometimes represent words and concepts which express detailed meaning and specific cultural practices. When students are confident, they can explore their feelings and emotions with respect and dignity and make positive contributions to share their cultural knowledge.

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NON-LINEAR



This type of learning is circular in theory. It involves going forward and back connecting with everything in one's pathway. We set problems and create solutions. There is a strong cultural interconnection that leads us to different levels of knowledge and learning. It is difficult to plan for but working in a flexible classroom allows the opportunity to develop a deeper understanding of a cultural topic. Eg: Kangaroo. Taking the lead by modelling different cultural viewpoints, sharing ideas, gathering information supports deep learning and cross-cultural understanding.
(Always done with the involvement of community members)

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DECONSTRUCT/ RECONSTRUCT



"Watch first and than do"
We must always model what we want the students to produce. It is important to use detail and explain each part of the process providing examples of the finished product. Breaking down the project into small ideas allows for the students to use creativity and trial and error to produce a finished product. Providing a sequence of events/ stages, showing examples and making scaffolds available will lead to independent learning and pride in what they achieve.

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COMMUNITY LINK



Engagement with local community (Elders and Family members) is necessary to develop solid relationships built on respect. The Local community will be happy to share their knowledge and contribute to the school culture. It is important that First Nations people feel valued and accepted which opens the learning cycle for great possibilities. This allows for rich learning that has real meaning for the students which can contribute to whole community engagement. This opens a way forward to build on positive outcomes and a deeper understanding of First Nations history, language and cultural practices linked to the local First Nations communities.

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GUMBAYNGGIRR DREAMING STORY

The EMU and Platypus Story
Cultural Connections
Told by Uncle Michael Jarrett

Record the decision and an open question

What can this national resource explain?
What needs local community relationship or permission before teaching on a particular Country?

National core:

Local step:



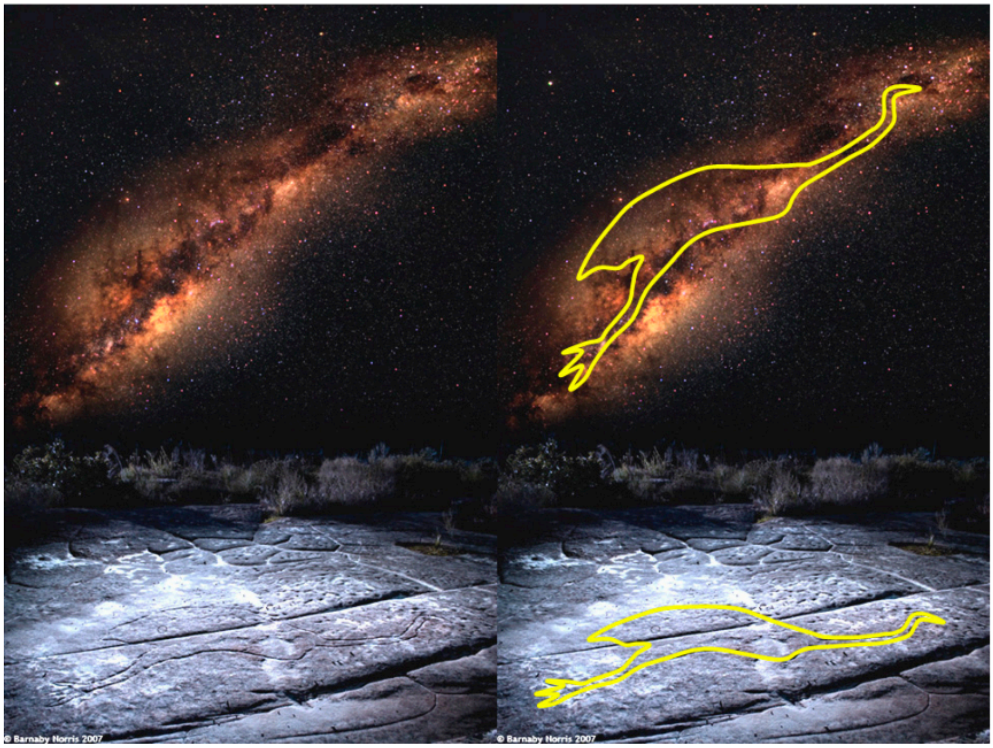
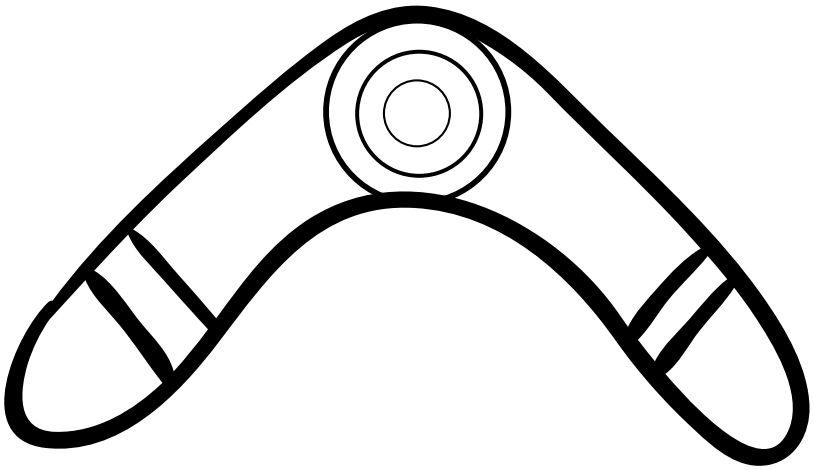


Figure 2: Kuringai Emu in the Sky. Images courtesy Barnaby Norris and Ray Norris.

Non-Linear



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Deconstruct/Reconstruct

Deconstruct/Reconstruct



Photo Credit: Kentville Drums

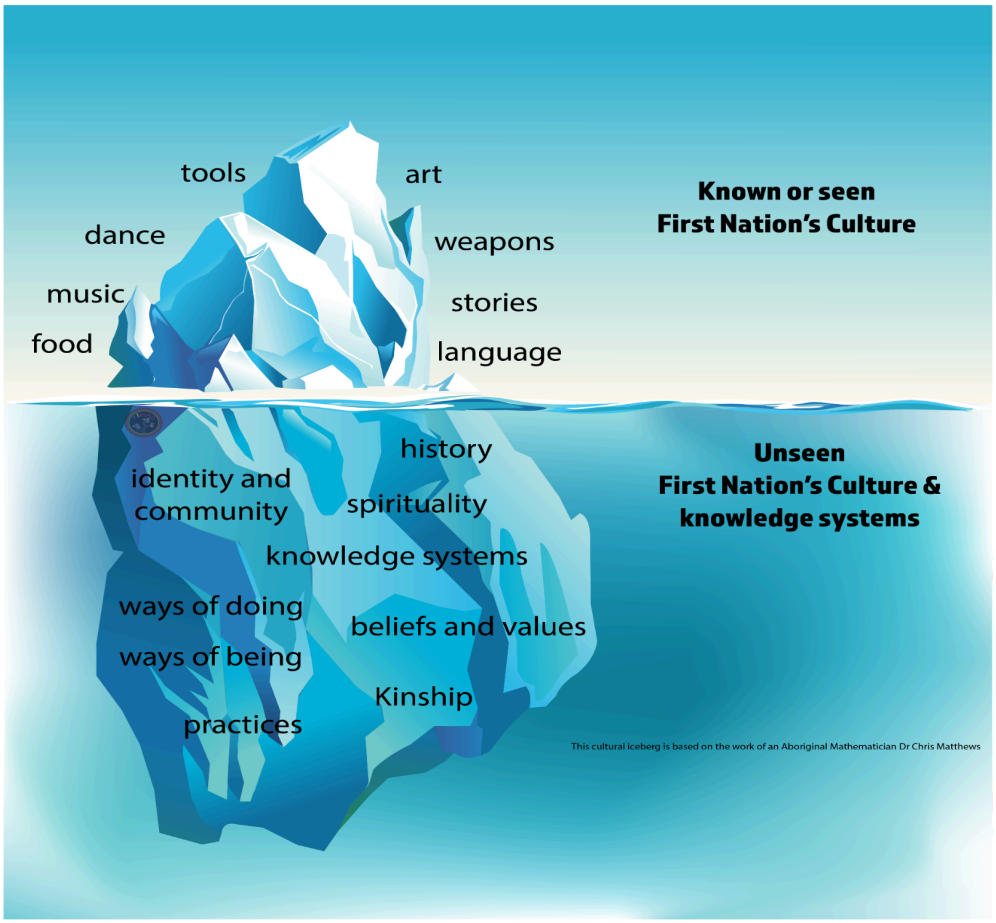


Photo Credit: Queensland Museum

Community Links

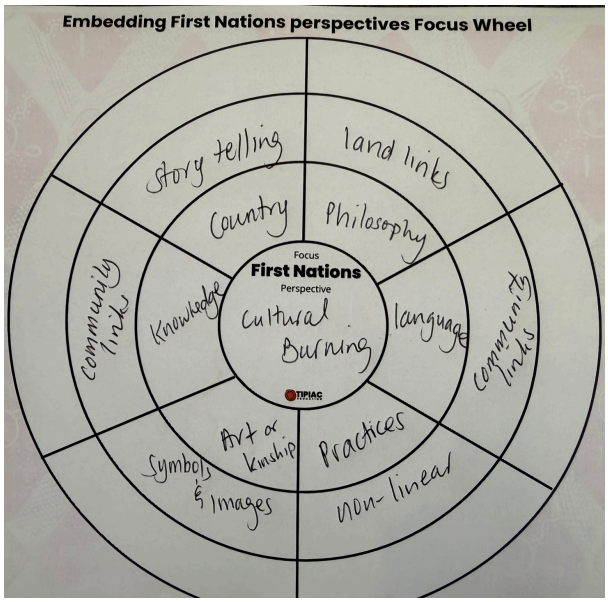
Community Links

Cultural Iceberg



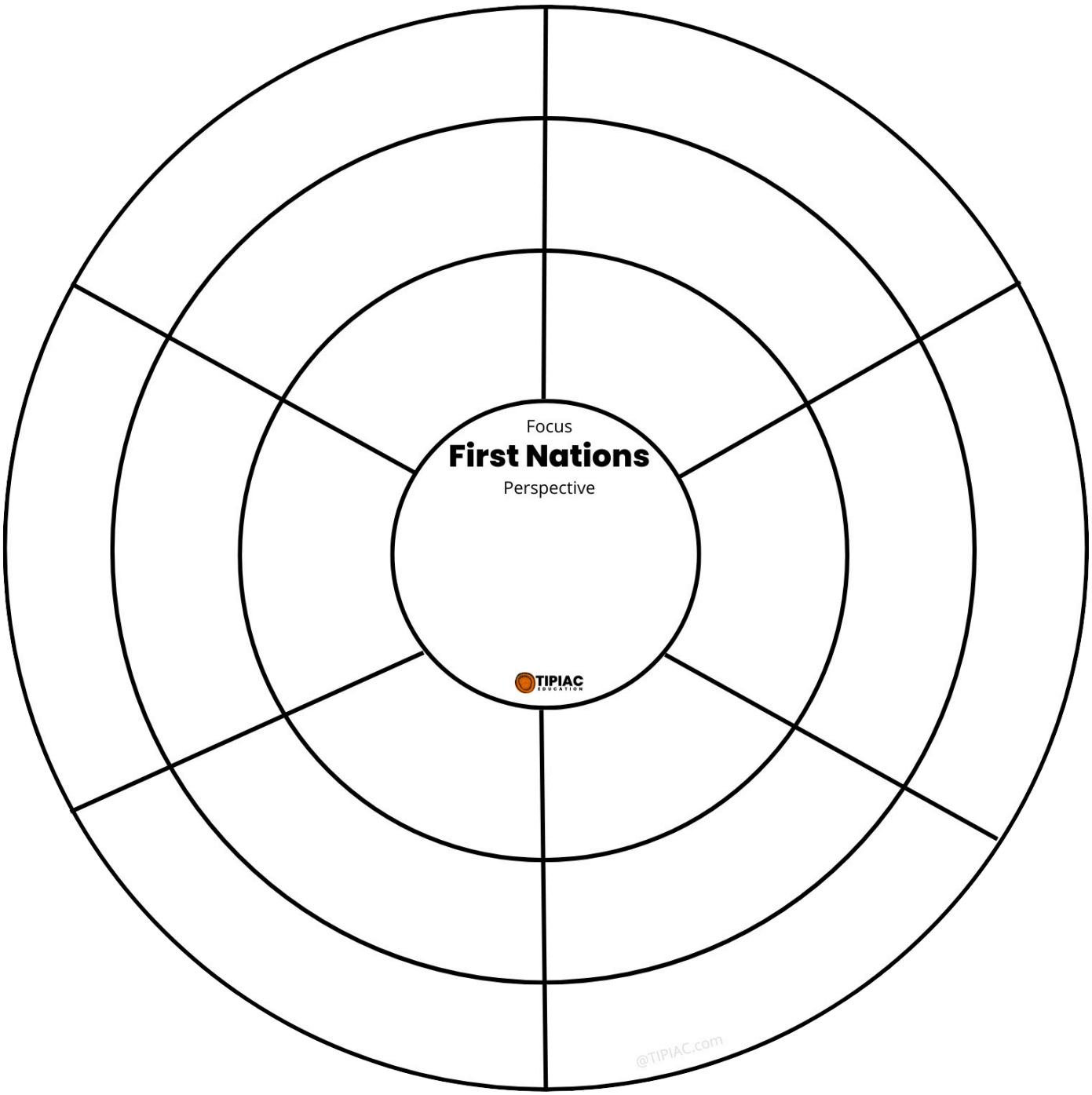
Who decides what may be shared?

TIPIAC Focus Wheel

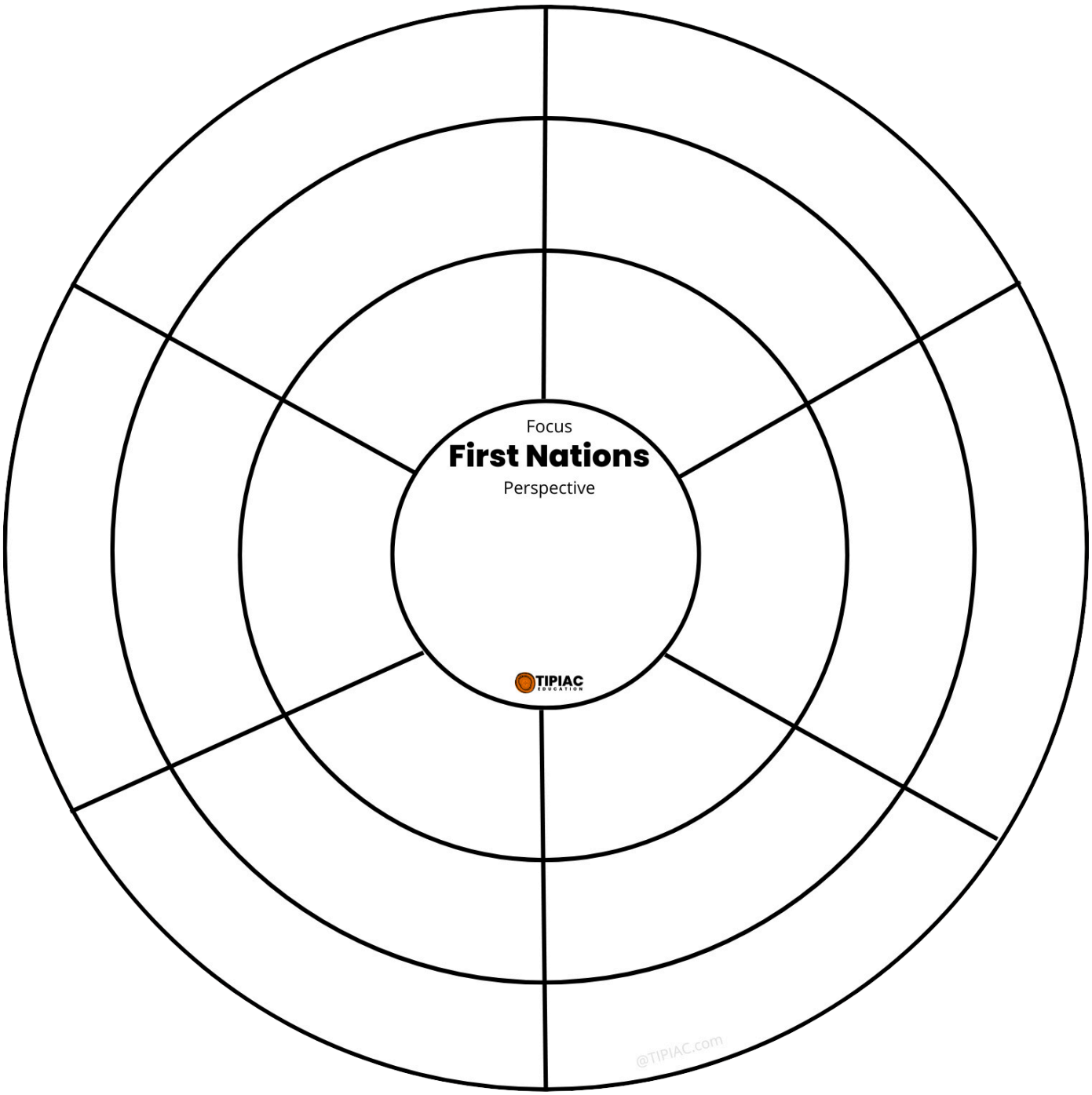




Focus Wheel


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Breakout 1 – Cultural Burning

Start with one existing CSIRO Cultural Burning activity and its public, attributed case.

STEM focus: fire as an abiotic factor; effects on living systems and ecological response.

Possible pathways: Land Links, Non-Linear, Story Sharing, Community Links, Learning Maps. Choose only those that strengthen this activity.

Map: What do learners observe? Who decides if and how burning happens? What changes are monitored? When is the learning revisited?

National core: What can this resource safely explain?
Local layer: What belongs to the relevant people and Country, and what permission or relationship is required?

Explore how two or three selected pathways could strengthen this activity. Record one planning idea and one question for further consideration.

Breakout 2 — Fire-starting

Start with one existing CSIRO Fire-starting activity or authorised visual.

STEM focus: movement, friction, heat and energy transfer.

Possible pathways: Non-Verbal, Deconstruct/Reconstruct, Learning Maps, Symbols and Images, Land Links. Choose purposefully.

First observation: What can learners notice before scientific terms are supplied?
Energy map: Where does movement become heat? How do material choices matter?

National core: Which scientific explanation and public example can be shared?
Local layer: What cultural context, permission and safety guidance must travel with the activity?

Explore how two or three pathways could strengthen the activity. Record one planning idea and one question. Do not assume a live fire activity in this online workshop.

Breakout 3 – Traditional cooking methods

Start with one existing CSIRO Traditional cooking methods activity and its attributed example.

STEM focus: heat, water, steam and changes in state that the example actually shows.

Possible pathways: Story Sharing, Deconstruct/Reconstruct, Non-Verbal, Symbols and Images, Land Links.

Map the process: preparation → heating → observable change → sharing or use. What will students notice, test, discuss or revisit?

National core: What science explanation and public example can be retained?
Local layer: Which practice, image or story needs permission and local context?

Explore how two or three selected pathways could strengthen this activity. Record one planning idea and one question for further consideration.

Breakout 4 – Traditional separation techniques

Start with one existing CSIRO Traditional separation techniques activity.

STEM focus: choose a method by the observable properties of a mixture, not by memorising a list. Use particle size, mass, density or solubility only where the chosen example supports it.

Possible pathways: Deconstruct/Reconstruct, Non-Verbal, Learning Maps, Symbols and Images, Land Links.

Compare an attributed example such as yandying, winnowing or filtration from the resource. What do learners observe first? How will they explain the method choice?

National core: What can be shared and credited?
Local layer: What needs a local decision or permission?

Explore how two or three selected pathways could strengthen this activity. Record one planning idea and one question, and keep the source attached.

Planning with the 8 Ways

Use these ideas to plan one existing CSIRO activity.
Start with a public, attributed source; local cultural knowledge needs local guidance.

STORY SHARING
Plan: Begin with a named voice in a Cultural Burning case. Students identify the science question it raises.
Ask: Whose story is heard, and how will its credit and Country stay visible?

LEARNING MAPS
Plan: For Cultural Burning, students map observed conditions, predicted plant response, evidence, and a revised explanation.
Ask: Which connections must they draw, not just label?

NON-VERBAL
Plan: Show an authorised Fire-starting clip. Students sketch movement and contact before learning the terms.
Ask: What can they notice or do before an explanation?

SYMBOLS AND IMAGES
Plan: Students draw a property-to-method diagram for a separation activity.
Ask: Which visual clarifies the science, and do cultural images need permission?

LAND LINKS
Plan: Name the Country of a public case and distinguish its local conditions from the general STEM idea.
Ask: What is particular to this place?

NON-LINEAR
Plan: After CSIRO seed-germination data, students revisit and revise their first prediction.
Ask: When will they revise an idea, and what evidence might change it?

DECONSTRUCT/RECONSTRUCT
Plan: Students study preparation, heating and water change in a cooking example, then restore people and purpose.
Ask: How will students reconnect the parts to the context?

COMMUNITY LINKS
Plan: Seek guidance for any local extension; use the attributed public case meanwhile.
Ask: Who guides adaptation, and what happens while permission is not in place?

Choose two or three Ways. For each, write the change to what students will do.

Delivery team: What would you say before the activity? What needs a local check?

Resource team: What stays in the national core? Which image, story or prompt needs permission, attribution or review?

One change we can make now; one question to take to the follow-up session.

Notes

Sources and next steps

Further reading

8 Ways of Learning — https://www.8ways.online/
Read the original descriptions and symbols for the eight pathways.

CSIRO Indigenous STEM Education Resources — https://www.csiro.au/en/education/Resource-Library/Indigenous-STEM-Education-Resources
Use the individual pages for Cultural Burning, Fire-starting, Traditional cooking methods and Traditional separation techniques.

Take into your planning
Record the exact CSIRO activity your group discussed and keep its source and attribution with your notes. Keep the creator's name, Country or community, cultural context and source with any story, image, artwork, video or practice. Check attribution, permission or licence requirements before reproducing or adapting material. Public availability alone does not grant permission.

For a local extension, seek guidance from the appropriate local Aboriginal and Torres Strait Islander people. Use the follow-up session to raise questions about cultural authority, local adaptation and Indigenous Cultural and Intellectual Property (ICIP).

Notes



Thank you!

Thank you for the care you have brought to this work. The next step is to further explore and test each planning idea with the people who create and deliver the resource, and with those who hold authority for any cultural knowledge it uses. Take your open questions into the follow-up session. Keep learning with Country, community and one another.

One resource can travel widely. Its cultural context, relationships and permissions cannot be assumed to travel with it.

B Cochrane

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