

Canadian Light Source: Learning Partnerships

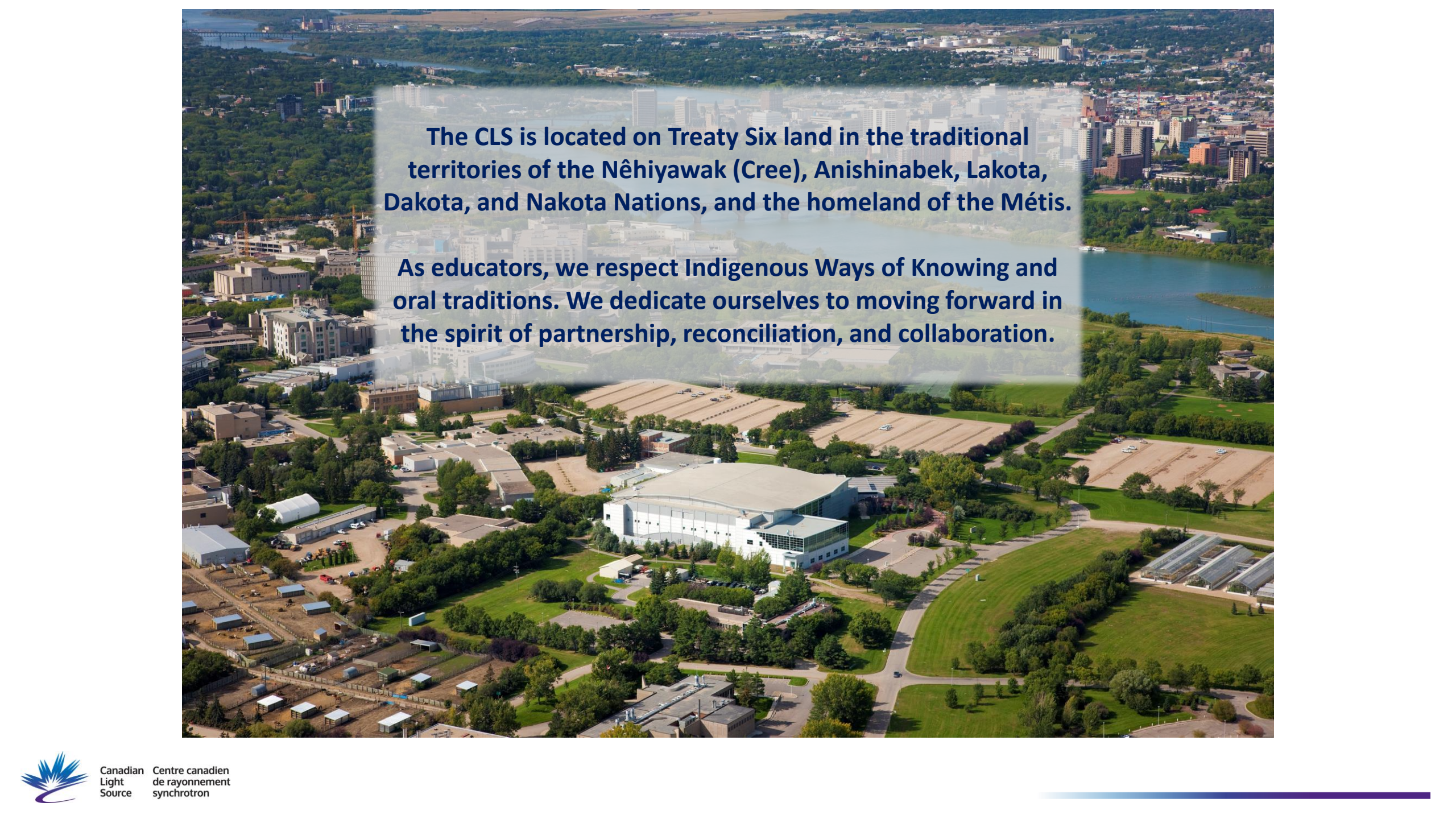
The Canadian Light Source lit up orange for the National Day for Truth and Reconciliation



Tracy Walker (she/her) and Dallas Pelly (he/him)
Canadian Light Source
Treaty 6 Territory & Traditional Homeland of the Métis
Saskatoon, SK



Canadian
Light
Source Centre canadien
de rayonnement
synchrotron



The CLS is located on Treaty Six land in the traditional territories of the Nêhiyawak (Cree), Anishinabek, Lakota, Dakota, and Nakota Nations, and the homeland of the Métis.

As educators, we respect Indigenous Ways of Knowing and oral traditions. We dedicate ourselves to moving forward in the spirit of partnership, reconciliation, and collaboration.



Tracy Walker - Who Am I?





Dallas Pelly - Who Am I?



Dallas Pelly - Who Am I?



Acknowledgements

- Robert Blyth, David Muir, & CLS staff
- Mercedes Buye, Amanda Pfeiffer & Bernie Petit
- Teachers, teacher candidates, & students across Turtle Island
- NSERC PromoScience & CLS operating funds

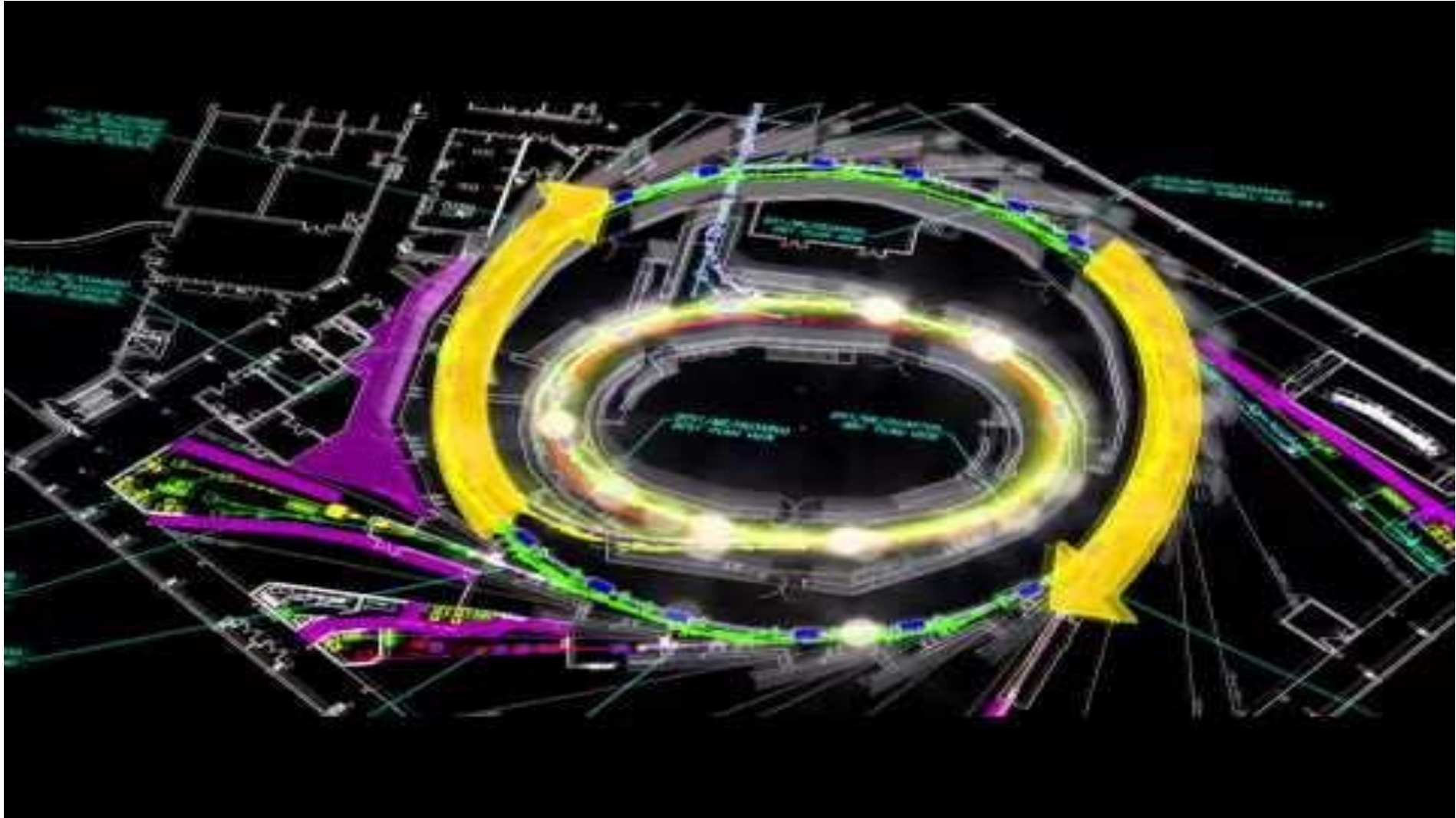


Session Layout

- Overview of the Canadian Light Source
- How we approach creating meaningful partnerships
- What do we do that might help you?

Canadian Light Source – What is a synchrotron?





CLS Research Examples:

Shine “more” photons on anything – probe in more details and with higher sensitivity

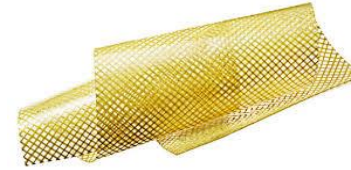
Device Fabrication



Pharmaceuticals



New Materials Development



Medical Imaging



Minerals & Mining



The “swiss army knife” of scientific research

Surfaces & Coatings



Agriculture



Aerospace



Cell Structures & Disease



Goals of CLS Education Programming

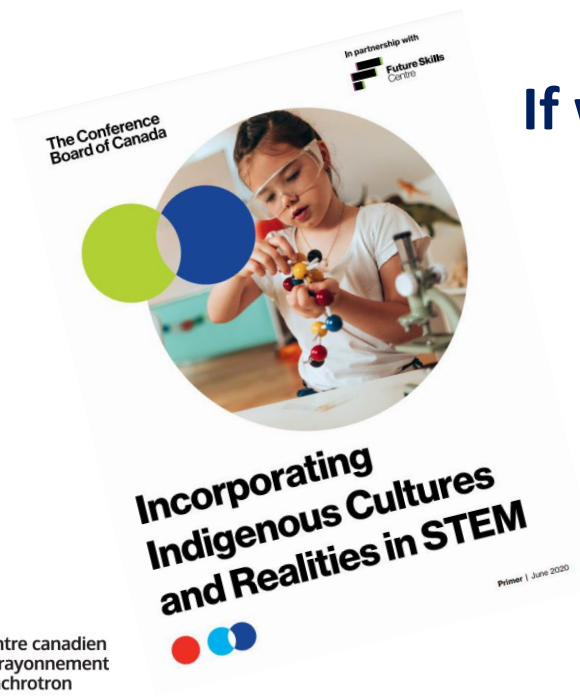
1. Influence how Science is taught: with inquiry, research integration, and creating space for Indigenous perspectives
2. Expand who sees themselves in science
3. Demonstrate how Indigenous and mainstream science worldviews can work together respectively



Indigenous Representation in STEM

Indigenous people make up 4 per cent of adults in Canada. But less than 2 per cent of people working in science, technology, engineering, and mathematics (STEM) occupations are Indigenous (Statistics Canada 2016 Census).

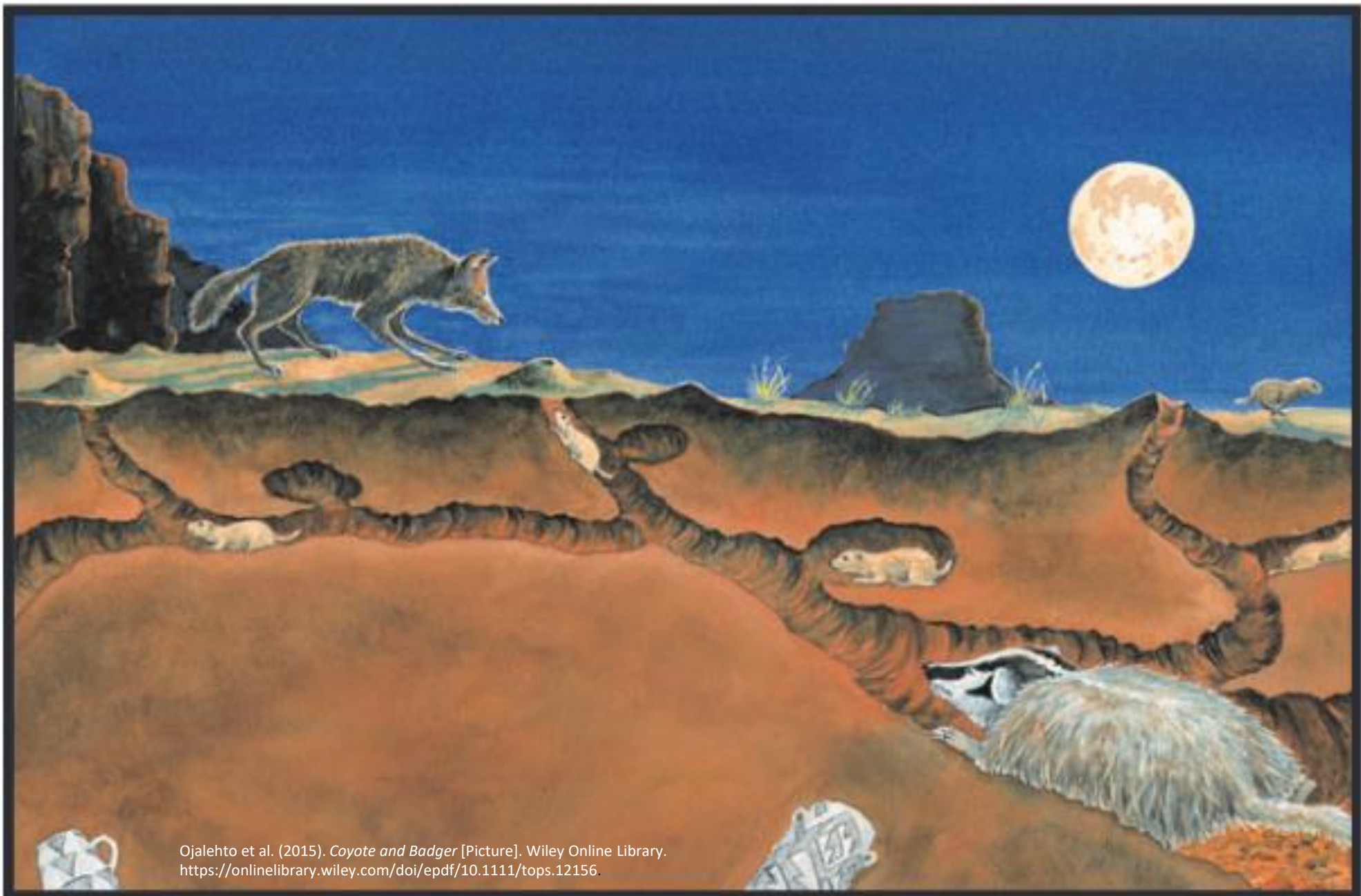
And people in STEM occupations—such as engineers, doctors, and scientists—have political as well as economic influence, and can play strong leadership roles.



If we are going to address the current issues and crises in the world, we need strong leaders with varied perspectives.

<https://youthrex.com/wp-content/uploads/2021/07/Incorporating-Indigenous-Cultures-and-Realities-in-STEM.pdf>



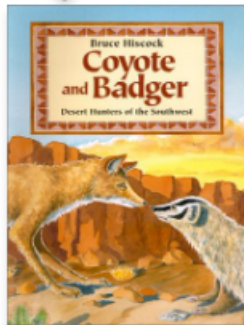


Ojalehto et al. (2015). *Coyote and Badger* [Picture]. Wiley Online Library.
<https://onlinelibrary.wiley.com/doi/epdf/10.1111/tops.12156>.



If Indigenous Peoples Stand with the Sciences, Will Scientists Stand with Us?

Bethany I. ojalehto, Douglas L. Medin, William S. Horton, Salino G. Garcia, Estefano G. Kays



Want to Read

Rate this book



Coyote and Badger

by Bruce Hiscock

★★★★★ 4.06 ·  Rating details · 17 ratings · 6 reviews

Hard times have come to the desert. Coyote is hungry. The old hunter has not caught a decent meal in days. Badger is hungry, too. She is having trouble finding food for her pups because the springtime rains have not come. By chance, Coyote and Badger meet. The legendary and mysterious bond between the two animals takes over and they begin hunting together. Coyote and Badger make a fearsome team, but the desert has many surprises in store for them. Set in New Mexico's Chaco Canyon, amid the Anasazi ruins, this natural history story tells of predators and their struggle to survive. With elegant words and luminous watercolors, Bruce Hiscock takes us to the desert, where we follow two fascinating animals through the scorching days and starry nights. [\(less\)](#)

<https://www.amacad.org/publication/if-indigenous-peoples-stand-sciences-will-scientists-stand-us>

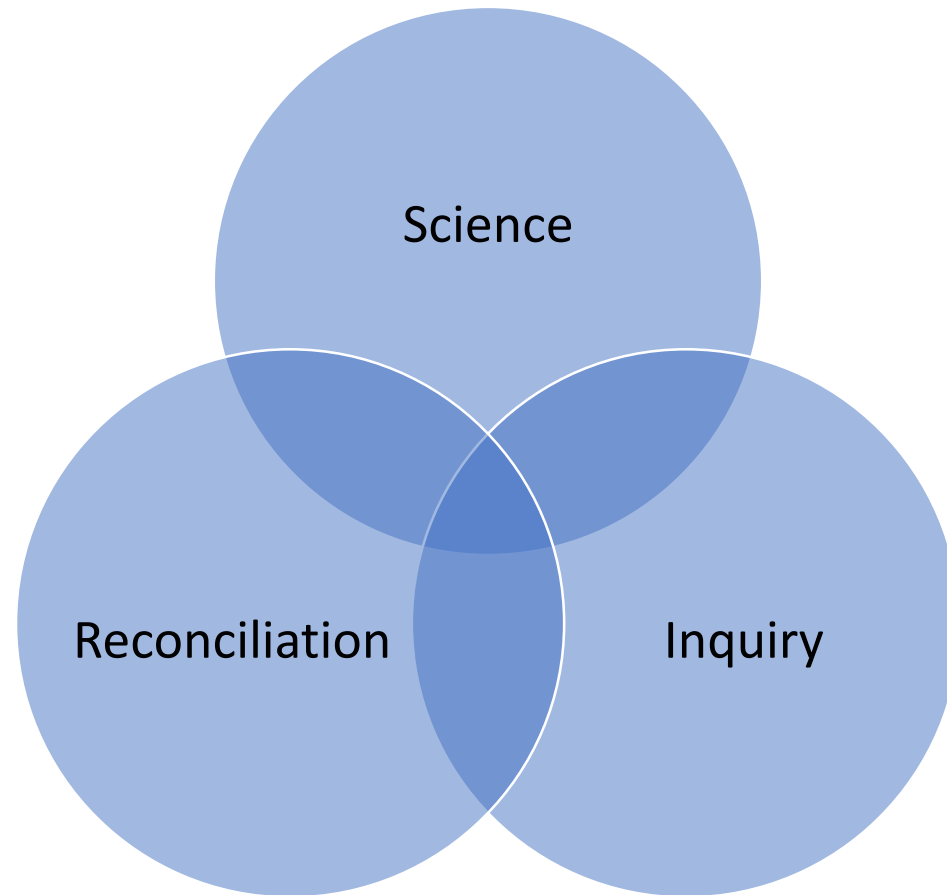
Indigenous sciences are foundationally based in:

- Relationship
- Reciprocity
- Responsibility

“Indigenous sciences, sometimes in partnership with Western science, have led to new discoveries and insights into human learning and development.”



How do we do science inquiry in a reconciliation context?





Rock: carries the knowledge of the world



Biggest takeaways:

While participating in a Soil focused LISSE presentation that included the testing of trace elements within the samples, I connected my Indigenous Knowledge that was passed to me through Traditional Ways of Knowing with XRF data produced on IDEAS.

While it is important not to focus on validation, this connection brought about a feeling of pride in the knowledge of my ancestors, and that they are in fact scientists.



A feather: openness, understanding, and willingness to learn

Start here

Acknowledgements:
The Elders/ancestors that continuously guide me through my journey to reculturate our youth.

What I learnt:

I was fortunate to be surrounded by a supportive community that invited me into absolutely anything I found an interest in. My learning experience included a wide variety of hands-on as well as virtual experiences. I had an opportunity to shadow and participate in a variety of mediums, in person as well as on-line presentations.

- Sample prep
- How to read XRF data
- The effort that goes into workshops
- How to maintain focus
- Editing skills
- What teamwork looks like
- Hands-on crystalizes knowledge
- Importance of community

I was challenged to quit validating why Indigenous perspectives should be included.

Comfort is a determiner of the level of participation with various types of learners. If a student was able to make a meaningful connection within a foreign space, that can increase a student's confidence. Recognizing my instant reaction of seeking validation encourages me to continue to focus my work while at the CLS to gravitate around creating resources for students that are meaningful. Resources that stem from the Saskatchewan Science Curriculum and are compatible with my ancestors as a way of integrating our science in a culturally safe way.

Outcomes of your work experience/challenges:

The biggest challenge was rewiring my automated response of seeking validation for my work. As a student of science in the 1990's and again in 2017, with the addition of psychology, I was able to understand how the history of my ancestors has affected me and this understanding is what fuels my ambitions to represent our Indigenous perspectives.

At CLS:

- Took part in workshops
- Developed a guide on how to engage in indigenous research in a culturally safe way
- contributed by sharing Indigenous connections and how to connect with Indigenous students.
- Created resources that educators use to can present the periodic table that students connect with
- Assisted in LISSE dissemination at 2 of the local high schools

Introduction of Self:

Niya-nitsikason Janice Osecap ekwa Niya ohci Moosomin First Nation. I recently convocated from the Indian Teacher Education Program (ITEP) at the College Education, here on Treaty Six territory the University of Saskatchewan occupies.

The concentration of my studies while in University have circulated around becoming competent in science, as well as psychology so I can understand and contribute by making meaningful resources for educators who want to engage in Indigenous sciences. This summer I was fortunate enough to secure a summer internship with the Canadian Light Source education team that had a coinciding goal of normalizing the presence of Indigenous inclusion in science.

While many may not understand the importance of this and how it relates to the science community, it is an effort that focuses on student confidence rather than student competency. Participating in science is a difficult task within itself which can be magnified when feeling displaced in a secular community that removes culture, race, and spiritualism. My projects focused on supporting educators in terms of resources they may be able to use in their respective classrooms

Acknowledgements:

The Education Team At CLS for continued support and guidance throughout my summer experience. Tracy Walker, Bernie Petit, Amanda Pfeiffer, Noah Dyck, David Muir, and Robert Blythe.

A feather on my head: honoring my relations/ knowledges by always being a student in training



Braid of sweetgrass: me, science, and culture



Engaging with the Periodic Table: Indigenous Perspectives

**Currently: Science can be
overwhelming**

Students are looking
into the science
community and having
a hard time seeing
themselves in those
spaces.

Story mode

Creating
connections

Language
Ties



										18 Ar Argon 39.948						
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955912	22 Ti Titanium 47.867	24 Cr Chromium 51.9961	25 Mn Manganese 54.938045	26 Fe Iron 55.845	27 Co Cobalt 58.933195	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.63	33 As Arsenic 74.9216	34 Se Selenium 78.96	35 Br Bromine 79.904	



Language Ties:

pipikwahcaw pee-peek-wah-tso (Cree/Neheyawak): Soil/dirt

Creation Story/Story/History:

Creation Story : Legend of Turtle Island

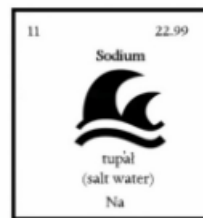
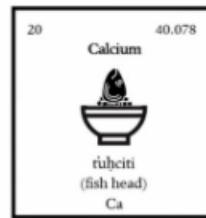
This story takes us back to how the world was rebuilt, when a slew of courageous animals dove to get the one thing needed; earth/soil

Connection(s):

Traditional Medicine: Eating dirt was associated with building up immunity.

Ceremonial: Soil/dirt is an important part of our ceremonies in many ways, but one example is that when we are picking our medicines, the soil is representative of our Mother Nature.

Potassium is an essential nutrient for most living things and is abundant in rocks and soil.



NSERC Article

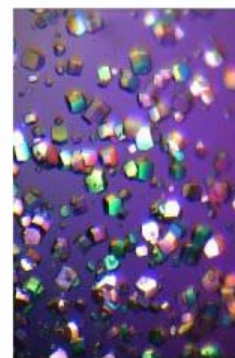
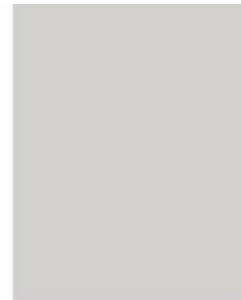


La Ronge student Mila Kuppenbender



THE SCIENCE OF BANNOCK

.....
With Traditional Knowledge
and Science Perspectives




Canadian
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Source Centre canadien
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Thanks Bernie. You brought together amazing things at the CLS. I always wanted to go in there. But what actually happened for the students was beyond what I could have imagined. It's beautiful to see you, Tracy, and Rob paddle and guide that canoe through the rapids.

*Gambina Kathy Wahpepah & Gambina Tim Eashappie,
Nakota Elders from Carry the Kettle First Nation*

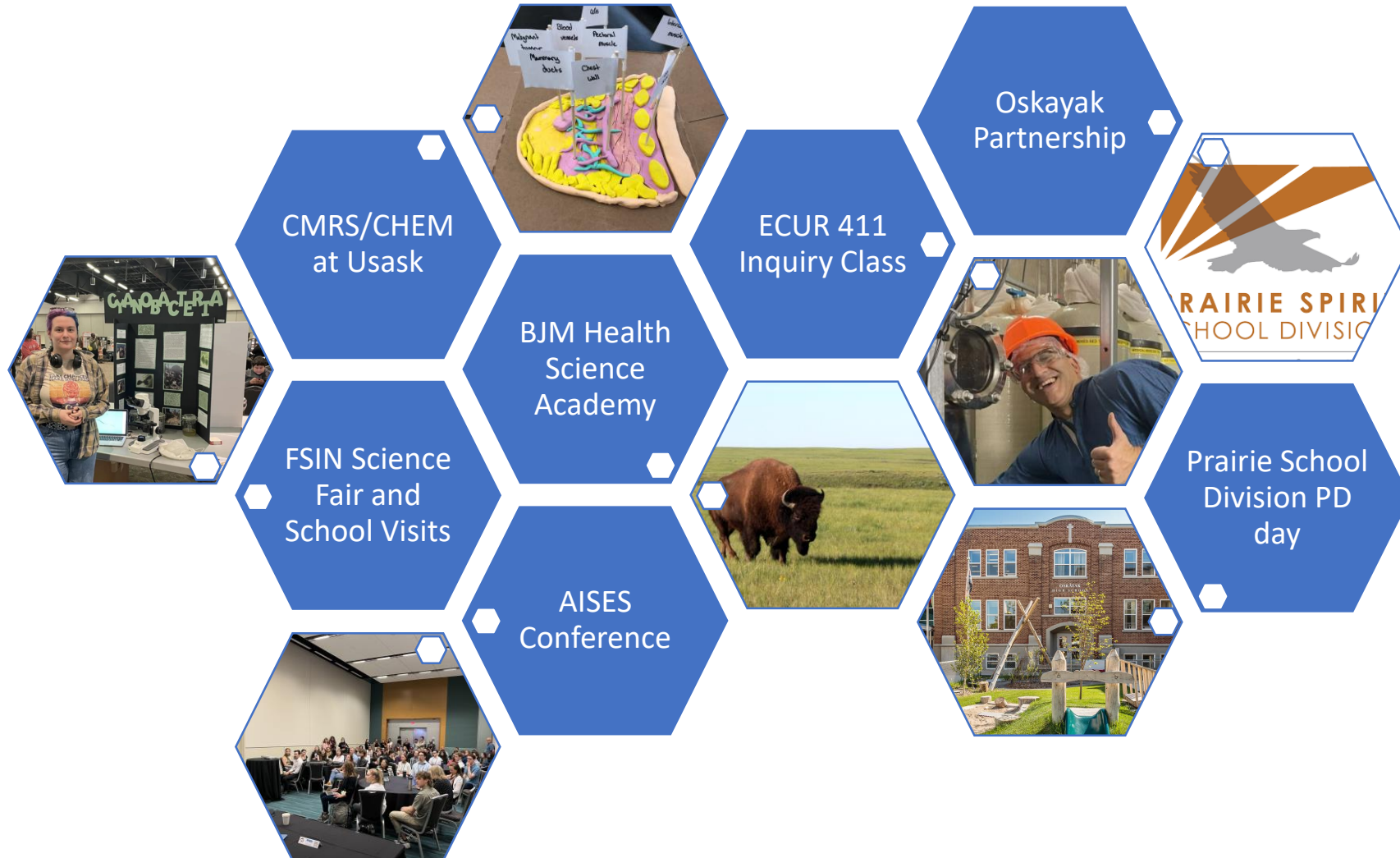
Carry the Kettle First Nation

Community involvement with Elders, Teachers, and Students





What are some keys to effective partnerships?



Oskayak Partnership



Started with
Teachers Workshop

Classroom
Participation in Lisse
Program

School partnership
developing



FSIN Science Fair & School Visits



Ava Haynes
Grade 11 students from
Clearwater River Dene School

Cyanobacteria

“I have big plans,” says Haynes. “It’s not just a passing interest. I want to be able to not only pursue my goals, but help people with them.”



ECUR 411 Inquiry Class



Prairie Spirit School Division Professional Development day at CLS

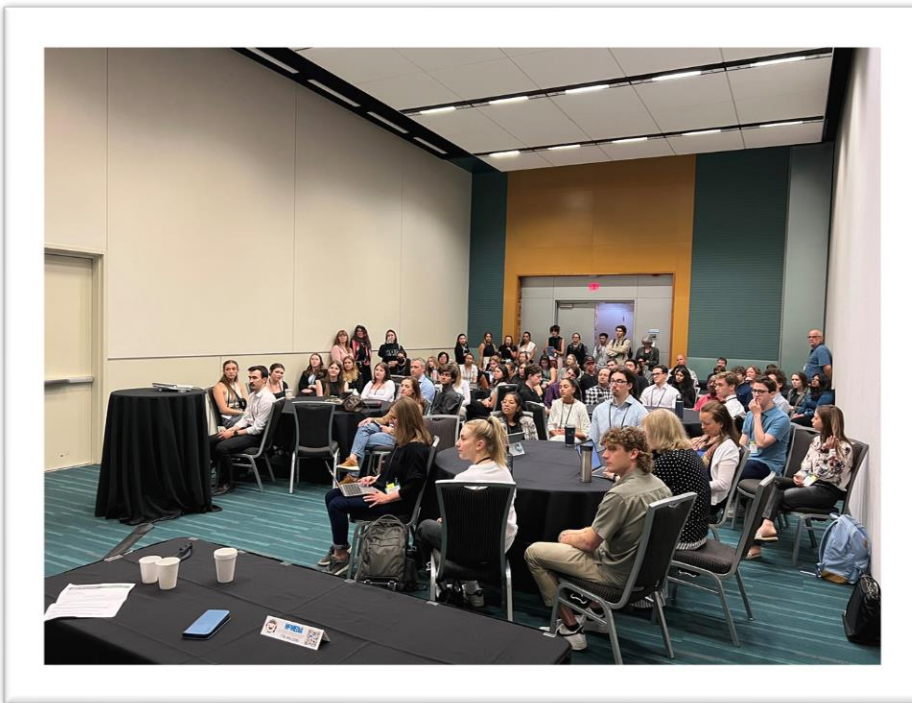


Bishop James Mahoney High School Health Science Academy



AISES Conference

AISES gives Canadian Indigenous STEM students and professionals an opportunity to gather, connect, and create long-lasting relationships within Canada through national gatherings, and across the continent at AISES regional and national gatherings



Classical Medieval and Renaissance Studies

CMRS 398: Using Big Science for the Study of Material Culture -- poster presentation



CMRS & CHEMISTRY 398
USING BIG SCIENCE FOR
THE STUDY OF
MATERIAL CULTURE

SEMINAR & POSTER PRESENTATIONS

Thursday November 1st | 2:00 PM
Student Seminars at the Canadian Light Source Room 2068

Thursday December 6th | 2:30 PM
Poster Presentation & Reception at the Museum of Antiquities

 UNIVERSITY OF SASKATCHEWAN
College of
Arts and Science
ARTSANDSCIENCE.USASK.CA

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Mistik Askiwin Dendrochronology (MAD) Lab

- Colin Laroque (Professor)
 - Chloe Canning
(Undergrad
Research Assistant)



Canadian Light Source

- Tracy Walker, Mercedes Buye, Dallas Pelly & Anna-Maria Boechler (Education team)
- David Muir (IDEAS Beamline Scientist)
- Robert Blyth (Science Projects Manager)

Teacher and Student participants

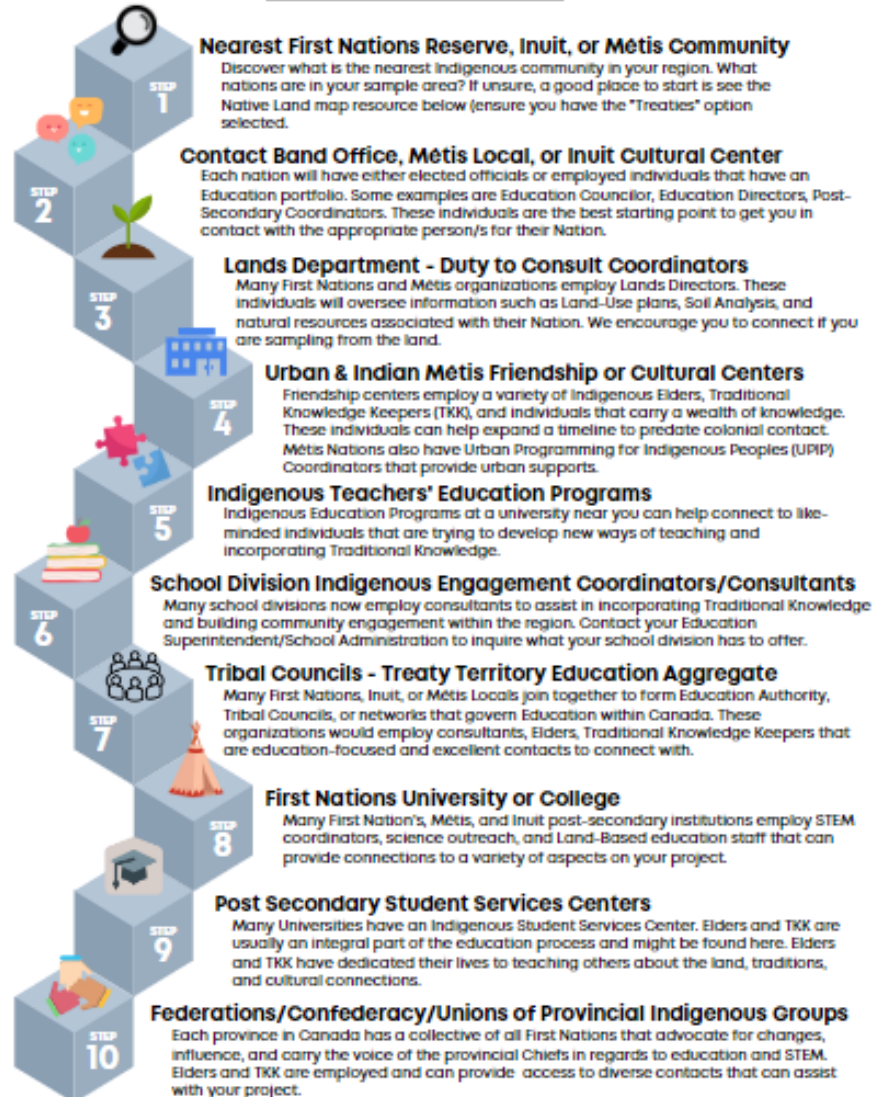
Almost 350 students in grades 6-12 in five provinces, three Treaty territories, & two reserve schools – so far!





How Can You Start?

Where to Start with Indigenous Engagement



CLS Resources Document



Miigwitch
Nanaskomaan
Thank You
Merci
Ekosi
Moostus

