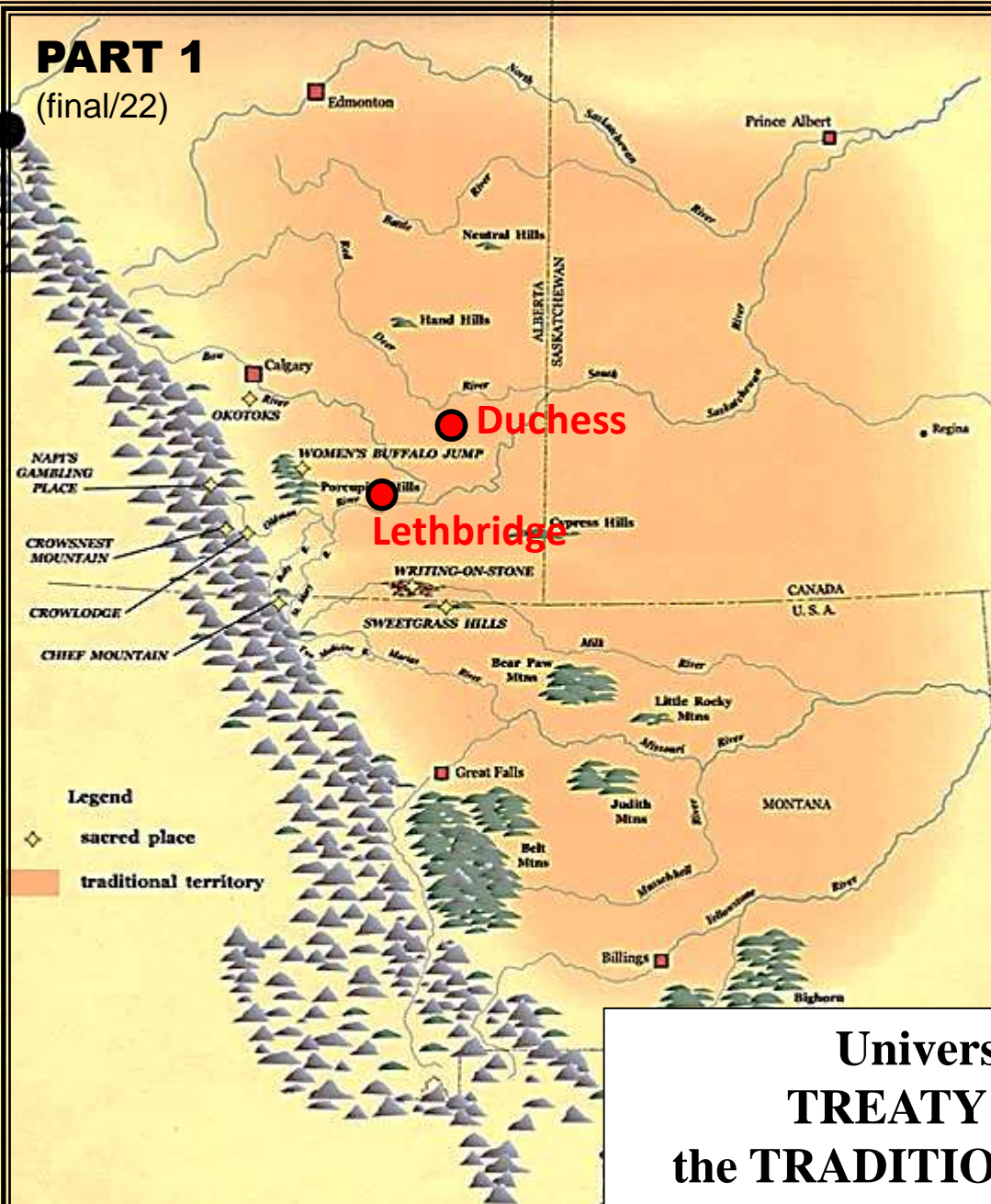


PART 1

(final/22)



**University of Lethbridge:
TREATY 7 TERRITORY and
the TRADITIONAL TERRITORY of the
NIITSITABI, NAKODA, and TSUUT'INA**

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Science, Two-Eyed Seeing, Co-Learning, and Cultural Humility

(Part 1: an overview of our journey)

Cheryl Bartlett, CM, PhD

Professor Emerita

- retired Professor of Biology
- former Tier 1 Canada Research
Chair in Integrative Science

Cape Breton University

Sydney, NS

14 March 2017

Women Scholars' Speaker Series

University of Lethbridge

Lethbridge, Alberta



SOMETIMES IT'S LIKE A HEAVY SLEDGE

Science, Two-Eyed Seeing, Co-Learning, and Cultural Humility

(Part 1: an overview of our journey)

PRESENTATION OUTLINE

- **Who? When? Why?**
- **What? How?**
 - **Integrative Science**
- **Two-Eyed Seeing**
 - **Essentials & Challenges**
 - ④ **Co-Learning + 3**
- **Cultural Humility**



**SOMETIMES IT'S LIKE A HEAVY SLEDGE
that we are trying to move – this sledge
represents our passions for ensuring the
ecological integrity of *Mawisikamukawey*.**



words of Elder Albert Marshall, Mi'kmaq Nation

**SOMETIMES IT'S LIKE A HEAVY SLEDGE
that we are trying to move – this sledge
represents our passions for ensuring the
ecological integrity of *Mawisikamukawey*.**



words of Elder Albert Marshall, Mi'kmaq Nation

**SOMETIMES IT'S LIKE A HEAVY SLEDGE
that we are trying to move – this sledge
represents our passions for ensuring the
ecological integrity of *Mawisikamukawey*.**



**We, the Elders, are
dragging that sledge
with all our might,
and we need others to
help us by pushing as
hard as you can on the
rear of the sledge.**

**But, it is we,
the Elders, who will
determine where it goes.**

words of Elder Albert Marshall, Mi'kmaq Nation

**OTHER TIMES THAT HEAVY SLEDGE
represents a passion we Elders hold
that western science can help address.**



**Then we, the Elders, will
help you with that sledge
... you drag, we push ...
while we all also constantly
exchange understandings
about where it is going
... and learn to abide by**

i'l'oqaptmu'k

**meaning “to revisit to renew,
to maintain movement in the
direction Spirit intended”.**

words of Elder Albert Marshall, Mi'kmaq Nation

“Heavy Sledge” work requires **Co-Learning**

This is what we truly believe, this is what reinforces our **Mi’kmaq spirituality**: that no one being is greater than the next, that we are part and parcel of the whole ... we are equal ... and that each one of us has a responsibility to the balance of the system.

(words of Mi’kmaq Elder Albert Marshall)

i’l’oqaptmu’k

meaning “to revisit to renew,
to maintain movement in the
direction **Spirit** intended”.

“Heavy Sledge” work requires **Co-Learning**

- ♥ **diverse people**
- ♥ **generous time**
- ♥ **continuity within
evolving
understandings**

i'l'oqaptmu'k

meaning “to revisit to renew,
to maintain movement in the
direction **Spirit** intended”.

Elders Albert & Murdena



me,
Cheryl Bartlett,
Sydney, NS

my Mom,
Florence Bartlett,
Brooks, AB

my friends, colleagues, and teachers,
Elders Albert and Murdena Marshall,
Eskasoni, NS; Mi'kmaq Nation

October 2010
Head-Smashed-In, AB



Elders and CRC team



various years,
various locations



Elders and Organizations in Unama'ki / Cape Breton, NS



Unama'ki: Land of the Fog
UINR Elders Group

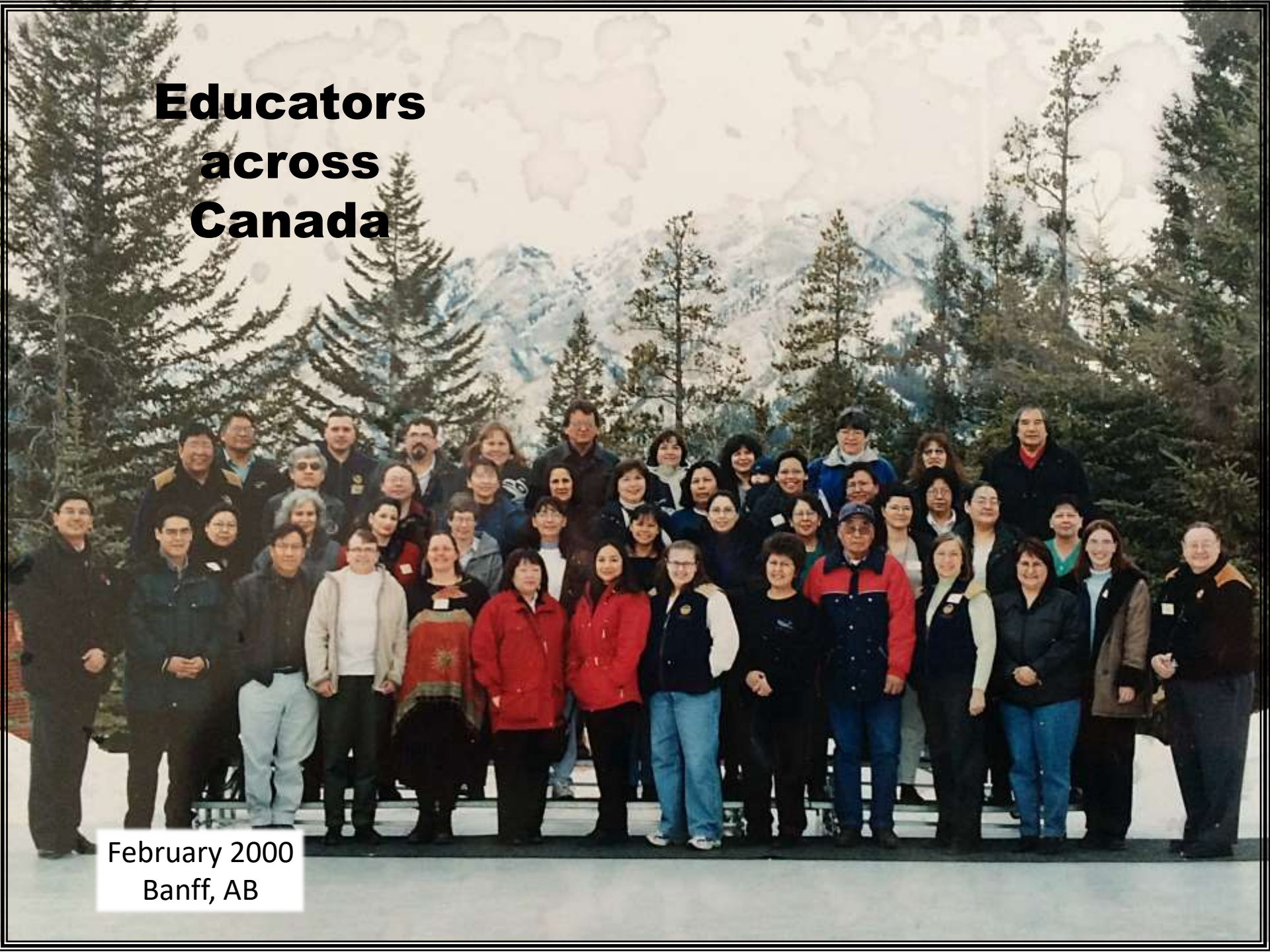
photo by Clifford Paul

Elders across Canada



August 2010
Millbrook First Nation, NS

Educators across Canada



February 2000
Banff, AB

Students in Integrative Science



various years,
various locations

Young People in Unama'ki / Cape Breton, NS



Summer 2001
Framboise Beach, NS

Young People in Unama'ki / Cape Breton, NS




Winter 2005
Membertou FN, NS

Artists & Poets



July 2009; August 2015; November 2016
Canning, NS; Japan; Millbrook FN, NS



Colleagues across Canada

Summer 2015
Lethbridge, AB

Colleagues across Canada



September 2016
Halifax, NS

Colleagues across Canada

December 2008
Victoria, BC



Colleagues across Canada



ᓄᓇᓂᓪ
ᓂᓴᓂᓴ

Government
of Nunavut

Nunavut
Kavamanga

ᐱᓐᓂᓴᓂᓴᓂᓴᓂᓴ

Department of
Environment

Avatiliqiyikkut



April 2009
Iqaluit, NU

Colleagues across Canada

September 2014
Peterborough, ON



Mawisikamukawey

September 2009
near Lundbreck Falls, AB



Mawisikamukawey

August 2007
north of Duchess
near Red Deer River, AB



Mawisikamukawey

October 2015

(June 1876)

Greasy Grass Ridge, MT

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Science, Two-Eyed Seeing, Co-Learning, and Cultural Humility

TALK OUTLINE

- Who? When? Why?
- What? How?
 - Integrative Science
- Two-Eyed Seeing
 - Essentials & Challenges
 - ④ Co-Learning + 3
- Cultural Humility

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Science, Two-Eyed Seeing, Co-Learning, and Cultural Humility

TALK OUTLINE

- Who? When? Why?
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 - Integrative Science
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 - Essentials & Challenges
 - ④ Co-Learning + 3

● **Cultural Humility**



We, Together

Learning & Practising → Cultural Humility

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Ta'n tujiw kijjitaqn
tela'tasik kepne'ktn
ketloqo kisiktpi'tasitew.

Only when knowledge is
conditioned by respect
can it be truly shared.



We, Together

Learning & Practising → Cultural Humility

SOMETIMES IT'S LIKE A HEAVY SLEDGE

NEED: meaningful, on-going,
respectful, multi-level,
participatory, and accountable
PSE institutional and individual
commitments to
**COMMUNITY
CONNECTIONS,
PARTICIPATION,
STEWARDSHIP**



We, Together

Learning & Practising → Cultural Humility

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Cultural Humility *(best known in health care arena)*

through on-going humility, becoming able to:

- engage in self-reflection and self-critique
within one's journey of being human, a lifelong learner, and a reflective practitioner
- understand and bring into check power imbalances
that exist in all dynamics of communication and relationship
- acknowledge gaps in one's own knowledge
including remaining open to new ideas and contradictory information and learning to see with the strengths in different culture's "ways of knowing, doing, and being"

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Elder Albert Marshall's words:

... this type of work is not easy and sometimes we need to understand that our most important job now is to plant seeds for the future and for the youth, knowing seeds germinate when the time is right

SOMETIMES IT'S LIKE A HEAVY SLEDGE

Science, Two-Eyed Seeing, Co-Learning, and Cultural Humility

TALK OUTLINE

- **Who? When? Why?**
- What? How?
 - Integrative Science
- Two-Eyed Seeing
 - Essentials & Challenges
 - ④ Co-Learning + 3
- Cultural Humility



HELLO!
My name is:
Cheryl

 **southern Alberta**

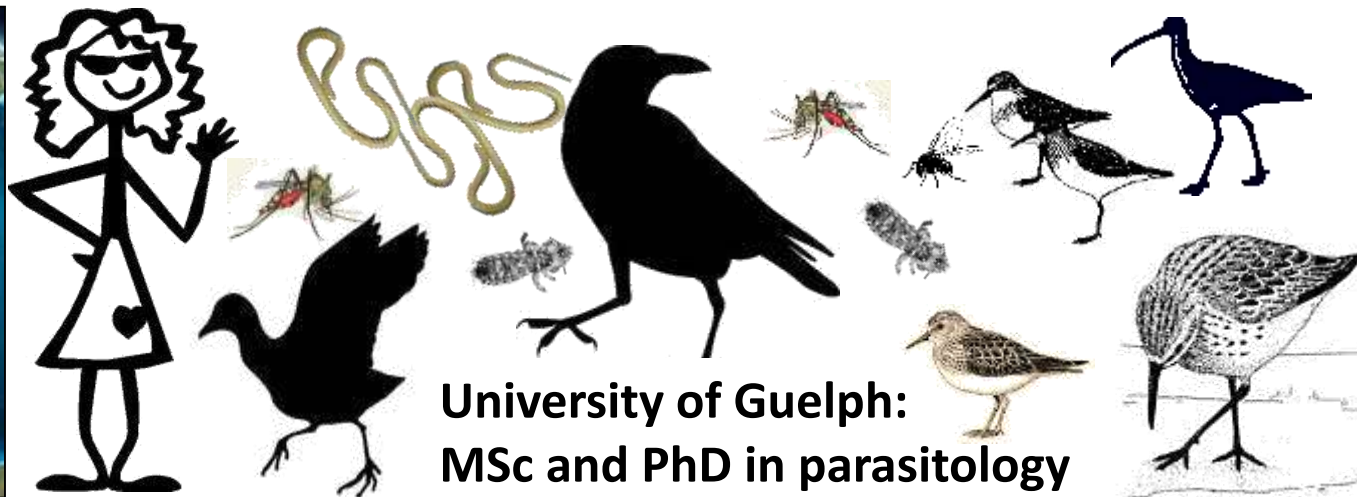


grew up in
Village of Duchess

(\approx 16 km S of Red Deer River near Hwy 36
or \approx 150 km NNE of Lethbridge)

short grass prairie
ecosystem

BSc Zoology
Univ. of Alberta
Edmonton, AB



University of Guelph:
MSc and PhD in parasitology

 southern Alberta

southern Ontario 





Laboratoire des Vers, France:
NSERC Post-Doctoral Fellowship

 southern Alberta



 Paris, France





Cape Breton University:
faculty position

 southern Alberta

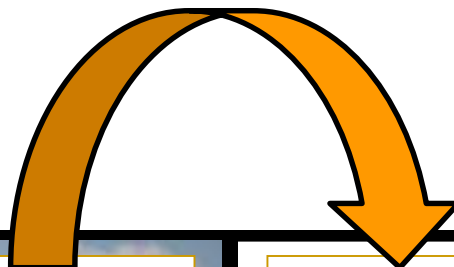


 Cape Breton, NS



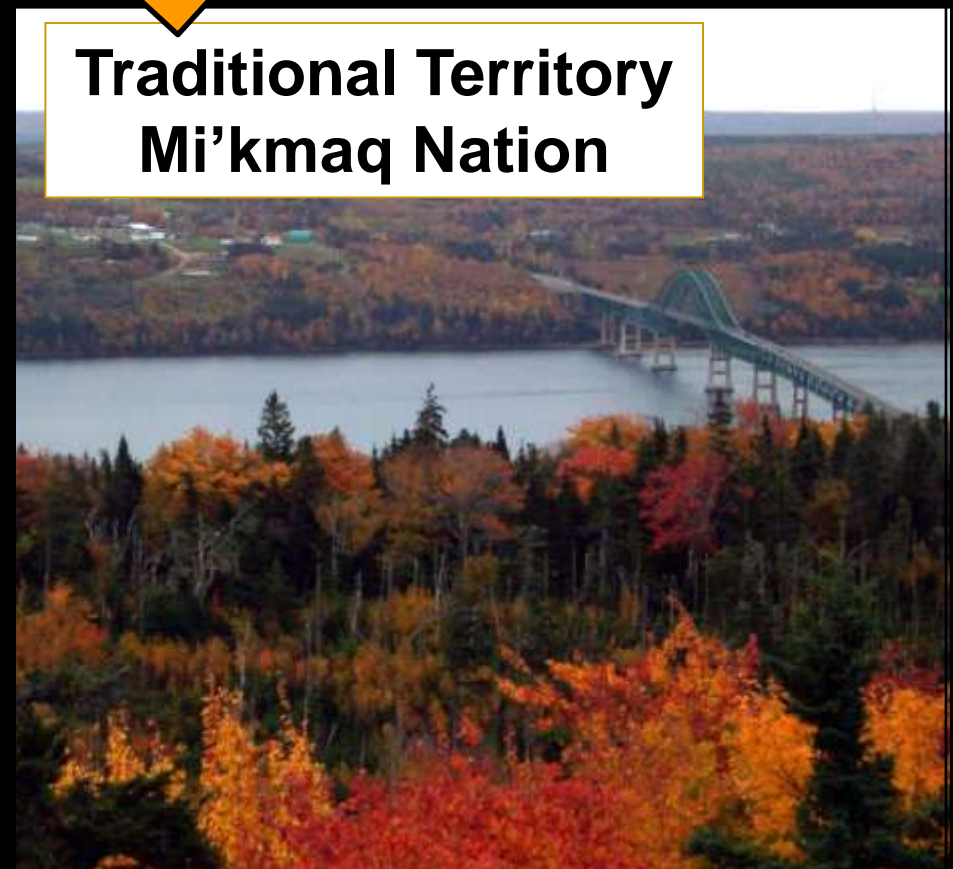
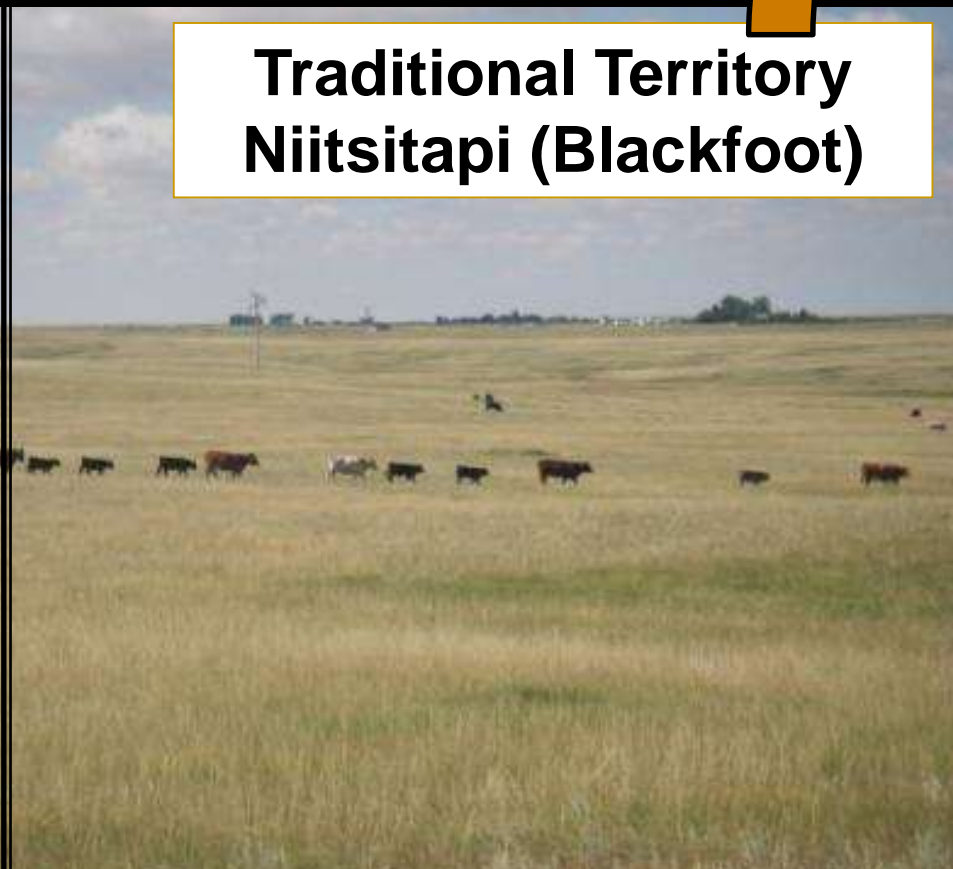


artwork by: Gerald Gloade
Millbrook First Nation



**Traditional Territory
Niitsitapi (Blackfoot)**

**Traditional Territory
Mi'kmaq Nation**





artwork by: Gerald Gloade
Millbrook First Nation



Mainstream Science

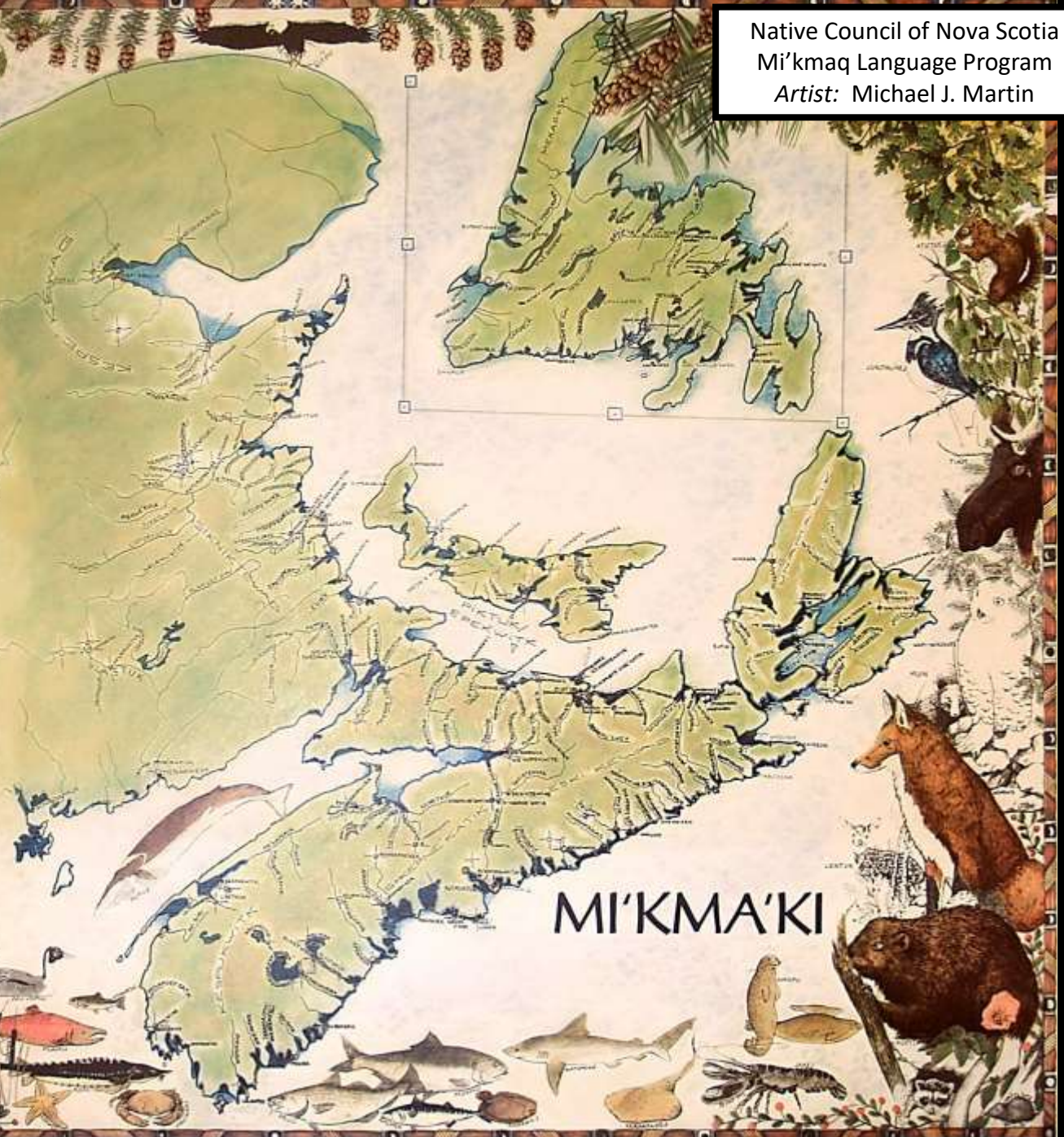
Indigenous Knowledge



photo credit: NRC

artist: Gerald Gloade

Native Council of Nova Scotia
Mi'kmaq Language Program
Artist: Michael J. Martin



Native Council of Nova Scotia
Mi'kmaq Language Program
Artist: Michael J. Martin

CAPE BRETON
UNIVERSITY

Island of
Cape Breton - Unama'ki

Eskasoni First Nation

Halifax

MI'KMA'KI



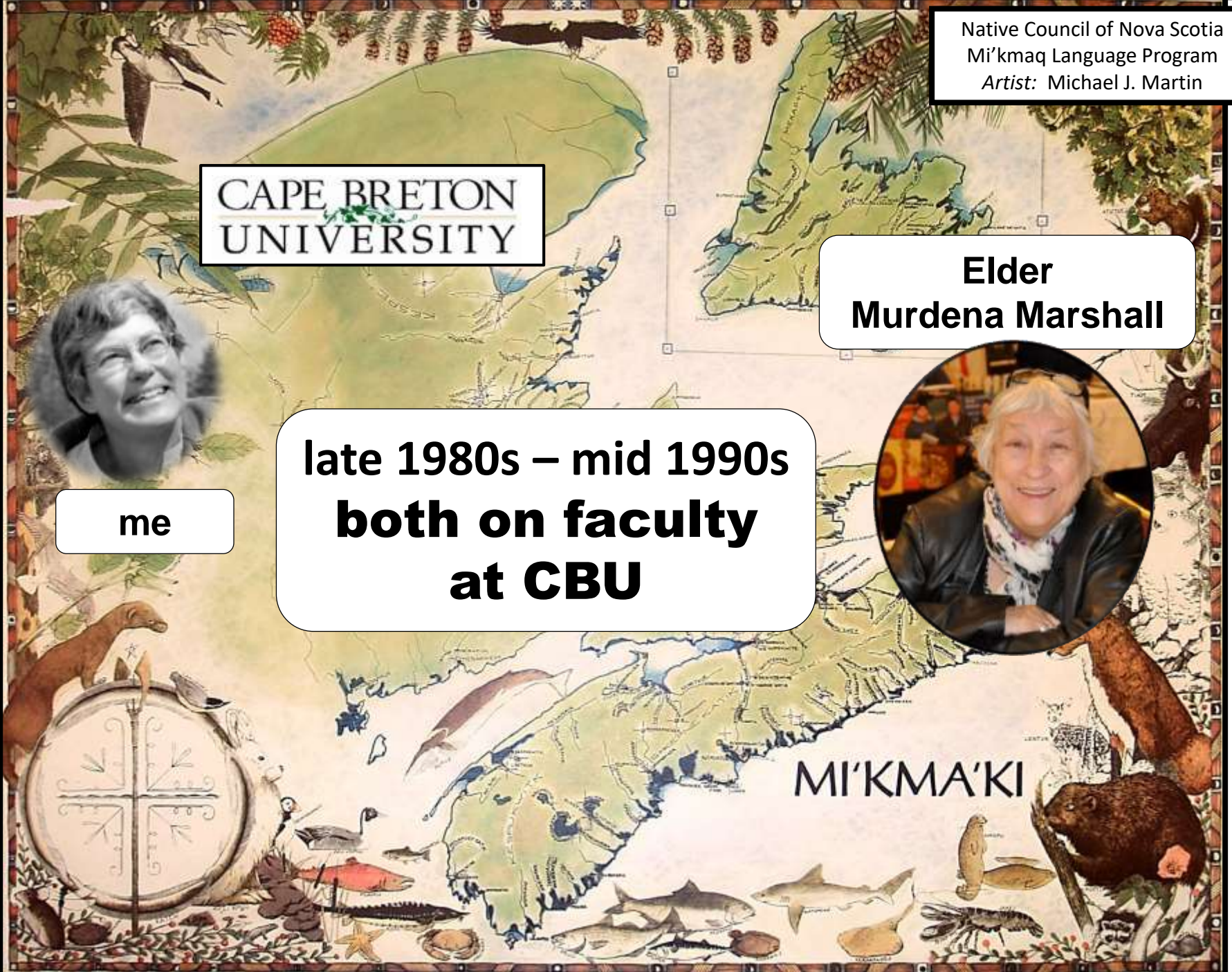
CAPE BRETON
UNIVERSITY

Elder
Murdena Marshall

me

late 1980s – mid 1990s
**both on faculty
at CBU**

MI'KMA'KI



Native Council of Nova Scotia
Mi'kmaq Language Program
Artist: Michael J. Martin

CAPE BRETON
UNIVERSITY

**1990s ... almost
no Aboriginal
students in
university (PSE)
sciences
(CBU & elsewhere)**



MI'KMA'KI

CAPE BRETON
UNIVERSITY

**1990s:
Murdena, what
needs to happen
to encourage
more Aboriginal
students to enter
PSE science?**

MI'KMA'KI

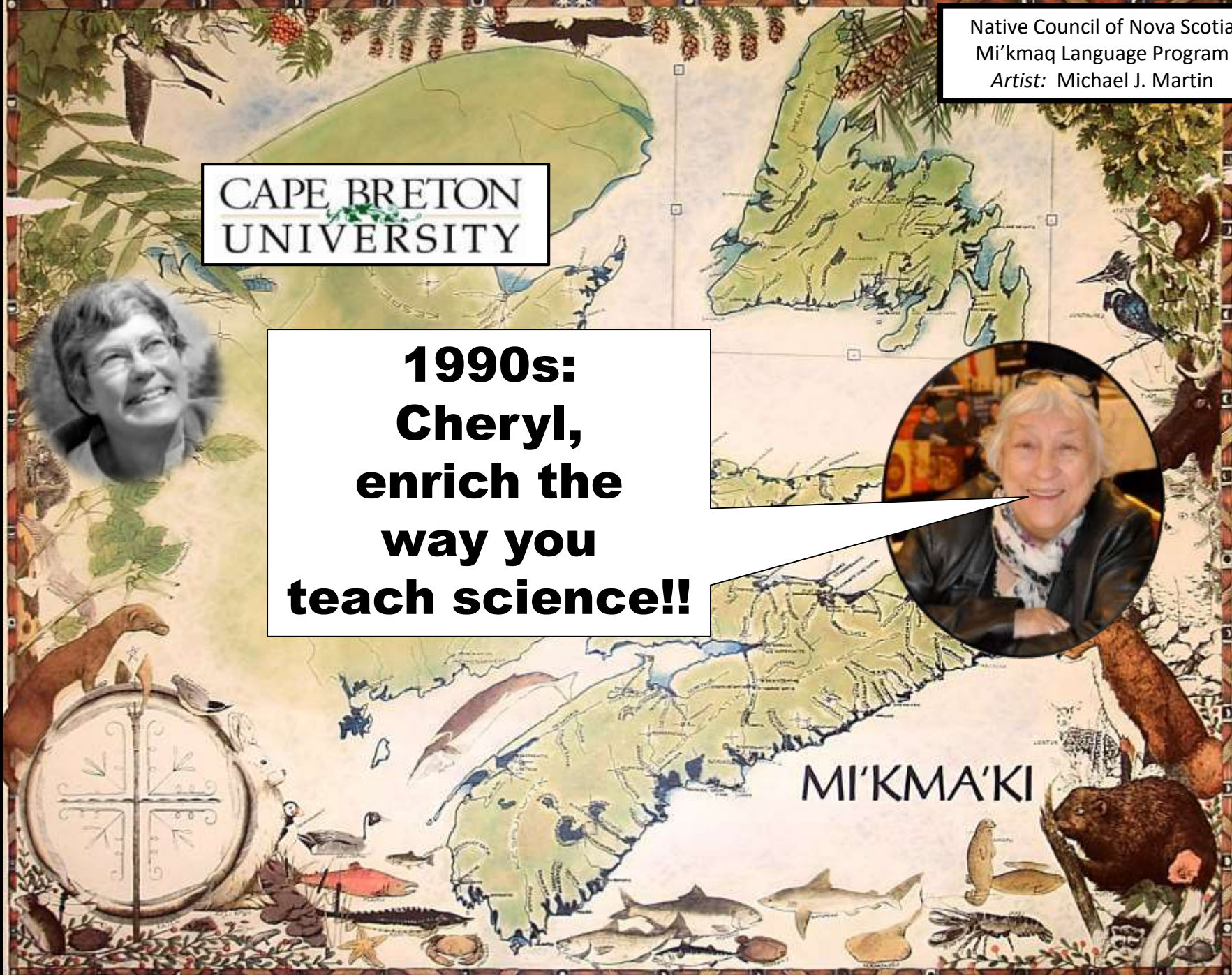


Native Council of Nova Scotia
Mi'kmaq Language Program
Artist: Michael J. Martin

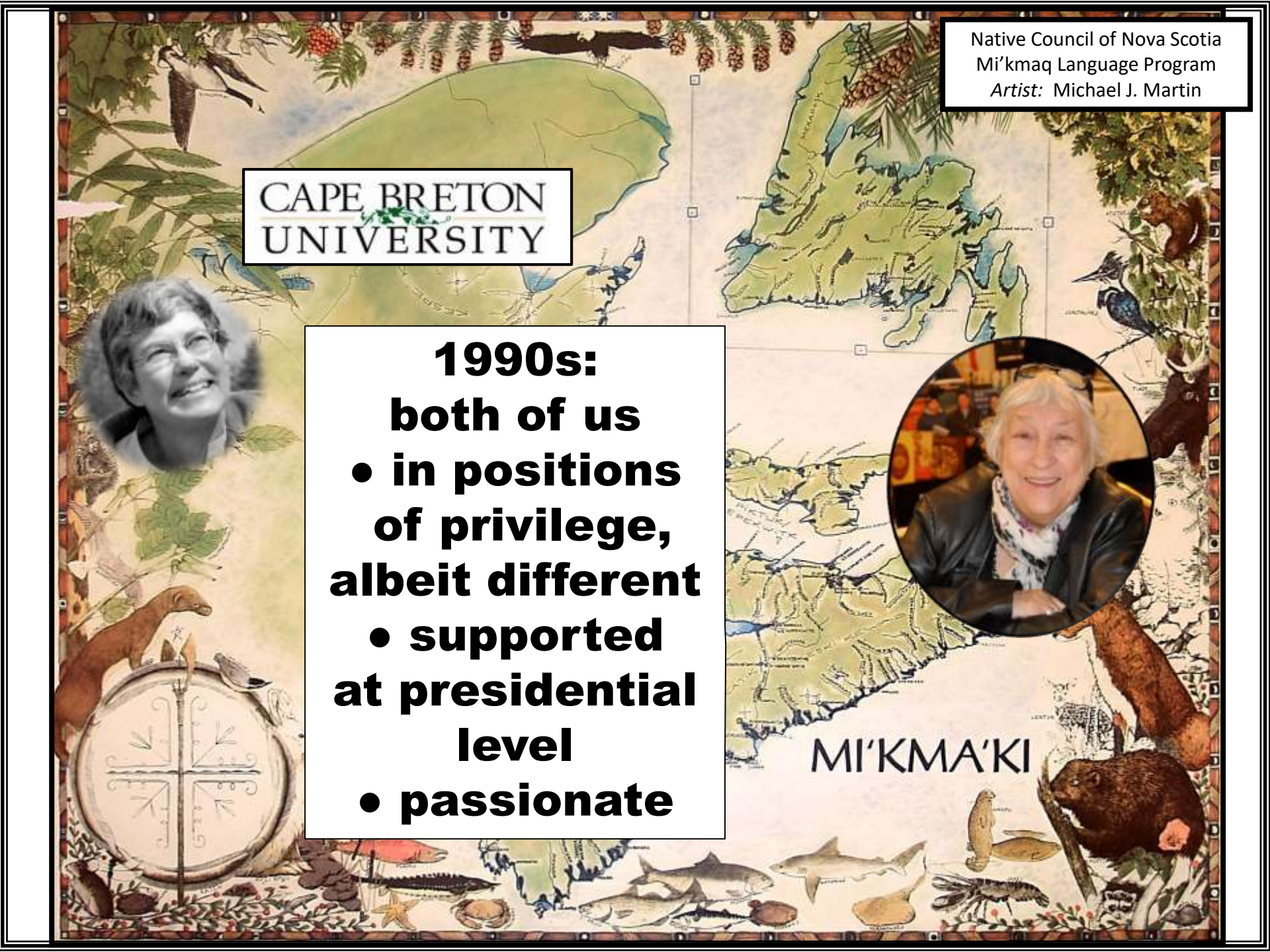
CAPE BRETON
UNIVERSITY

**1990s:
Cheryl,
enrich the
way you
teach science!!**

MI'KMA'KI



CAPE BRETON
UNIVERSITY

- 
- 1990s:**
- **both of us**
 - **in positions of privilege, albeit different**
 - **supported at presidential level**
 - **passionate**

MI'KMA'KI

OUTLINE

- Who? When? Why?
- **What? How?**
 - **Integrative Science**
- Two-Eyed Seeing
 - Essentials & Challenges
 - ④ Co-Learning + 3
- Cultural Humility



We, Together

proposal for a unique new degree program

Integrative Science



proposal for a unique new degree program

Integrative Science

our stories
our sciences

Indigenous

our worldviews

Western

“bringing our knowledges together”



Artist Basma Kavanagh

**April 2001: celebrating MPHEC approval of
Integrative Science program within BScCS
(after ≈ four years of internal and external examination of proposal)**



December 2001: cover story in “University Affairs” Integrative Science program within BScCS

University Affairs Affaires universitaires

\$3.75 DECEMBER 2001 / DÉCEMBRE 2001 - 3,75 \$



Bernice MacDonald



La professeure d'études mi'kmaq, Murdena Marshall (deuxième à partir de la gauche), avec Catherine Paul, Clifford Paul et Shauna Gould, étudiants de troisième année.

Synthesis of science and Native thought

A controversial science program at the University College of Cape Breton tries to integrate Western science with Mi'kmaq traditional knowledge. After just two years, aboriginal enrolment in science is soaring at UCCB.

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Degree Profile for:
Toqwa'tu'kl Kijijitaqnn /
Integrative Science

Bringing Knowledges Together
 ... from Western scientific and Aboriginal world views



Degree Core (48 credits)

- 1) _____ PCS 100: Analysis and Decision Making (6 credits)
- 2) _____ PCS 200: Applied Research (6 credits)
- 3) _____ PCS 300: Community Intervention (6 credits)
- 4) _____ science and technology perspectives (6 credits): Phil 222, or equivalent
- 5) _____ world views and values (3 credits): Phil 251, Phil 253, or equivalent
- 6) _____ Aboriginal perspectives (3 credits): Mikm at 100 or 200 level, or 361, or equivalent
- 7) _____ business perspectives (3 credits): Buss 111, Buss 231, or equivalent
- 8) _____ public communication (3 credits): Comm 103, Comm 105, or equivalent
- 9) _____ effective writing (6 credits): Engl 100, Engl 205 + Engl 207, or equivalent
- 10) _____ computer literacy (3 credits): Phil 115, Comp 102 or 111, Buss 181, or equivalent
- 11) _____ statistics (3 credits): Math 135, Math 335, Buss 182, Psych 201, or equivalent

Science Area of Concentration (42 credits)

- | | |
|--|--|
| <p>a) <u>University</u> (8 courses)</p> <ol style="list-style-type: none"> 1) 3 credits: MSIT 101 2) 3 credits: MSIT 103 3) 3 credits: MSIT 201 4) 3 credits: MSIT 203 5) 3 credits: MSIT 301 6) 3 credits: MSIT 303 7) 3 credits: MSIT 401 8) 3 credits: MSIT 401 | <p>b) <u>Technology</u> (6 courses)</p> <ol style="list-style-type: none"> 1 + 2) 6 credits: Chem 121 + 122 3 + 4) 6 credits: Math 131 + 132, or
Phys 100, or Phys 111 + 112 5 + 6) 6 credits (at least 3 credits must be at 300 level):
- Geol 111
- any PubH at 200 level or higher
- any Envi at 200 level or higher |
|--|--|

Student's Electives (30 credits)

- | | |
|---------------------|----------------------|
| 1) 3 credits: _____ | 6) 3 credits: _____ |
| 2) 3 credits: _____ | 7) 3 credits: _____ |
| 3) 3 credits: _____ | 8) 3 credits: _____ |
| 4) 3 credits: _____ | 9) 3 credits: _____ |
| 5) 3 credits: _____ | 10) 3 credits: _____ |

Work Placements (paid or voluntary, each at least 120 hours)

- 1) _____
- 2) _____

An overall average of 60% (in courses over your four years) is required for graduation.



Bernice MacDonald

La professeure d'études mi'kmaq, Murdena Marshall (deuxième à partir de la gauche), avec Catherine Paul, Clifford Paul et Shauna Gould, étudiants de troisième année.

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Degree Profile for:
Toqwa'tu'kl Kijijitaqnn /
Integrative Science

Bringing Knowledges Together
... from Western scientific and Aboriginal world views



1

core

2

concentration

3

electives

4

work placements

FOUR
parts
in the
overall
degree
program

- (credits)
- 1) 6 credits: Analysis and Decision Making (6 credits)
 - 2) 6 credits: Applied Research (6 credits)
 - 3) 6 credits: PUB 300: Community Intervention (6 credits)
 - 4) 6 credits: science and technology perspectives (6 credits): Phil 222, or equivalent
 - 5) 3 credits: world views and values (3 credits): Phil 251, Phil 253, or equivalent
 - 6) 3 credits: Aboriginal perspectives (3 credits): Mikm at 100 or 200 level, or 361, or equivalent
 - 7) 3 credits: business perspectives (3 credits): Buss 111, Buss 231, or equivalent
 - 8) 3 credits: public communication (3 credits): Comm 103, Comm 105, or equivalent
 - 9) 6 credits: English (6 credits): Engl 100, Engl 205 + Engl 207, or equivalent
 - 10) 6 credits: Business (6 credits): Buss 102 or 111, Buss 181, or equivalent
 - 11) 6 credits: Psychology (6 credits): Psys 182, Psych 201, or equivalent

- Student's Electives (30 credits)
- 1) 3 credits: MSIT 101
 - 2) 3 credits: MSIT 103
 - 3) 3 credits: MSIT 201
 - 4) 3 credits: MSIT 202

1 + 2) 6 credits: Chem 121 + 122

3 + 4) 6 credits: Math 131 + 132, or
Phys 100, or Phys 111 + 112

5 + 6) 6 credits (at least 3 credits must be at 300 level):
- Geol 111
- any PubH at 200 level or higher
- any Envi at 200 level or higher

6) 3 credits:

Work Placements (paid or voluntary, each at least 120 hours)

- 1) _____
- 2) _____

**An overall average of 60% (in courses
over your four years) is required for
graduation.**



BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Assembly of First Nations
Education, Jurisdiction, and Governance



*

Supporting First Nations Learners
Transitioning to Post-Secondary

Final Report
March 31, 2012

p 36

importance of embedding
community dimensions
throughout PSE programming
and
in support services
for First Nations learners

*"It is very important to think about our work as originating in the community because it is those kinds of processes that will take root and will effect long-term change for the overall social justice needs of our communities."*¹

*

<http://www.afn.ca/uploads/files/education2/postsecondarytransitionsreport.pdf>

S. Brenda Small, Negahneewin College

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Degree Profile for:
Toqwa'tu'kl Kijijitaqnn /
Integrative Science



Bringing Knowledges Together
... from Western scientific and Aboriginal world views

1

core

- 1) 3 credits: **SC 100: Analysis and Decision Making (6 credits)**
- 2) 3 credits: **SC 100: Applied Research (6 credits)**
- 3) 3 credits: **SC 300: Community Intervention (6 credits)**
- 4) 3 credits: **science and technology perspectives (6 credits): Phil 222, or equivalent**
- 5) 3 credits: **world views and values (3 credits): Phil 251, Phil 253, or equivalent**
- 6) 3 credits: **Aboriginal perspectives (3 credits): Mikm at 100 or 200 level, or 361, or equivalent**
- 7) 3 credits: **business perspectives (3 credits): Buss 111, Buss 231, or equivalent**
- 8) 3 credits: **public communication (3 credits): Comm 103, Comm 105, or equivalent**

2

concentration

3

electives

4

work placements

Work Placements (paid or voluntary, each at least 120 hours)

- 1) _____
- 2) _____

An overall average of 60% (in courses over your four years) is required for graduation.



in all parts of degree program

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Degree Profile for:
**Toqwa'tu'kl Kijjitaqnn /
Integrative Science**



Bringing Knowledges Together
... from Western scientific and Aboriginal world views

1

core

- 1) 00: Analysis and Decision Making (6 credits)
- 2) 00: Applied Research (6 credits)
- 3) 300: Community Intervention (6 credits)
- 4) science and technology perspectives (6 credits): Phil 222, or equivalent
- 5) world views and values (3 credits): Phil 251, Phil 253, or equivalent
- 6) Aboriginal perspectives (3 credits): Mikm at 100 or 200 level, or 361, or equivalent
- 7) business perspectives (3 credits): Buss 111, Buss 231, or equivalent
- 8) public communication (3 credits): Comm 103, Comm 105, or equivalent
- 9) effective writing (6 credits): Engl 100, Engl 205 + Engl 207, or equivalent
- 10) computer literacy (3 credits): Phil 115, Comp 102 or 111, Buss 181, or equivalent
- 11) statistics (3 credits): Math 135, Math 335, Buss 182, Psych 201, or equivalent

Science Area of Concentration (42 credits)

- a) University (8 courses)
 - 1) 3 credits: MSIT 101
 - 2) 3 credits: MSIT 103
 - 3) 3 credits: MSIT 201
 - 4) 3 credits: MSIT 203
 - 5) 3 credits: MSIT 301
 - 6) 3 credits: MSIT 303
 - 7) 3 credits: MSIT 401
 - 8) 3 credits: MSIT 401
- b) Technology (6 courses)
 - 1 + 2) 6 credits: Chem 121 + 122
 - 3 + 4) 6 credits: Math 131 + 132, or
Phys 100, or Phys 111 + 112
 - 5 + 6) 6 credits (at least 3 credits must be at 300 level):
 - Geol 111
 - any PubH at 200 level or higher
 - any Envi at 200 level or higher

Student's Electives (30 credits)

- 1) 3 credits: _____
- 6) 3 credits: _____

4

work placements

Work Placements (paid or voluntary, each at least 120 hours)

- 1) _____
- 2) _____

**An overall average of 60% (in courses
over your four years) is required for
graduation.**



**in group
project
courses
(3 full year)**

**in work
placements
(2, each 120 hr)**

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Degree Profile for:
Toqwa'tu'kl Kijijitaqnn /
Integrative Science



Bringing Knowledges Together
... from Western scientific and Aboriginal world views

1

core

- 00: Analysis and Decision Making (6 credits)
- 00: Applied Research (6 credits)
- 01: PubH 300: Community Intervention (6 credits)
- 4) science and technology perspectives (6 credits): Phil 222, or equivalent
- 5) world views and values (3 credits): Phil 251, Phil 253, or equivalent
- 6) Aboriginal perspectives (3 credits): Mikm at 100 or 200 level, or 361, or equivalent
- 7) business perspectives (3 credits): Buss 111, Buss 231, or equivalent
- 8) public communication (3 credits): Comm 103, Comm 105, or equivalent
- 9) ... (3 credits): East 100, East 205 + Engl 207, or equivalent
- 10) ... (3 credits): 102 or 111, Buss 181, or equivalent
- 11) ... (3 credits): Buss 182, Psych 201, or equivalent

2

concentration

3

electives

4

work placements

Total degree credits: 120



**science
in all
parts
of degree
program**

max. 105

min. 60

**science
credits**

BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

Indigenous & Western sciences together in MSIT (8 half year courses)

2

concentration

(courses)

1) 3 credits: MSIT 101
 2) 3 credits: MSIT 103
 3) 3 credits: MSIT 201
 4) 3 credits: MSIT 203
 5) 3 credits: MSIT 301
 6) 3 credits: MSIT 303
 7) 3 credits: MSIT 401
 8) 3 credits: MSIT 401

1 + 2) 6 credits: Chem 121 + 122

3 + 4) 6 credits: Math 131 + 132, Phys 100, or Phys

5 + 6) 6 credits (at least 3 credits must be - Geol 111 - any PubH at 200 - any Envi at 200)

Student's Electives (30 credits)

1) 3 credits: _____
 2) 3 credits: _____
 3) 3 credits: _____
 4) 3 credits: _____
 5) 3 credits: _____

6) 3 credits: _____
 7) 3 credits: _____
 8) 3 credits: _____
 9) 3 credits: _____
 10) 3 credits: _____

Work Placements (paid or voluntary, each at least 120 hours)

1) _____
 2) _____

An overall average of 60% (in courses over your four years) is required for graduation.



BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

**Indigenous & Western
sciences together in
MSIT
(8 half year courses)**

2

concentration

**PLUS
mainstream sciences
(chem, math/physics, environ)
(6 half year courses)**

An overall average of 60% (in courses over your four years) is required for graduation.



BScCS: a 4 yr SCIENCE degree

Bachelor of Science Community Studies

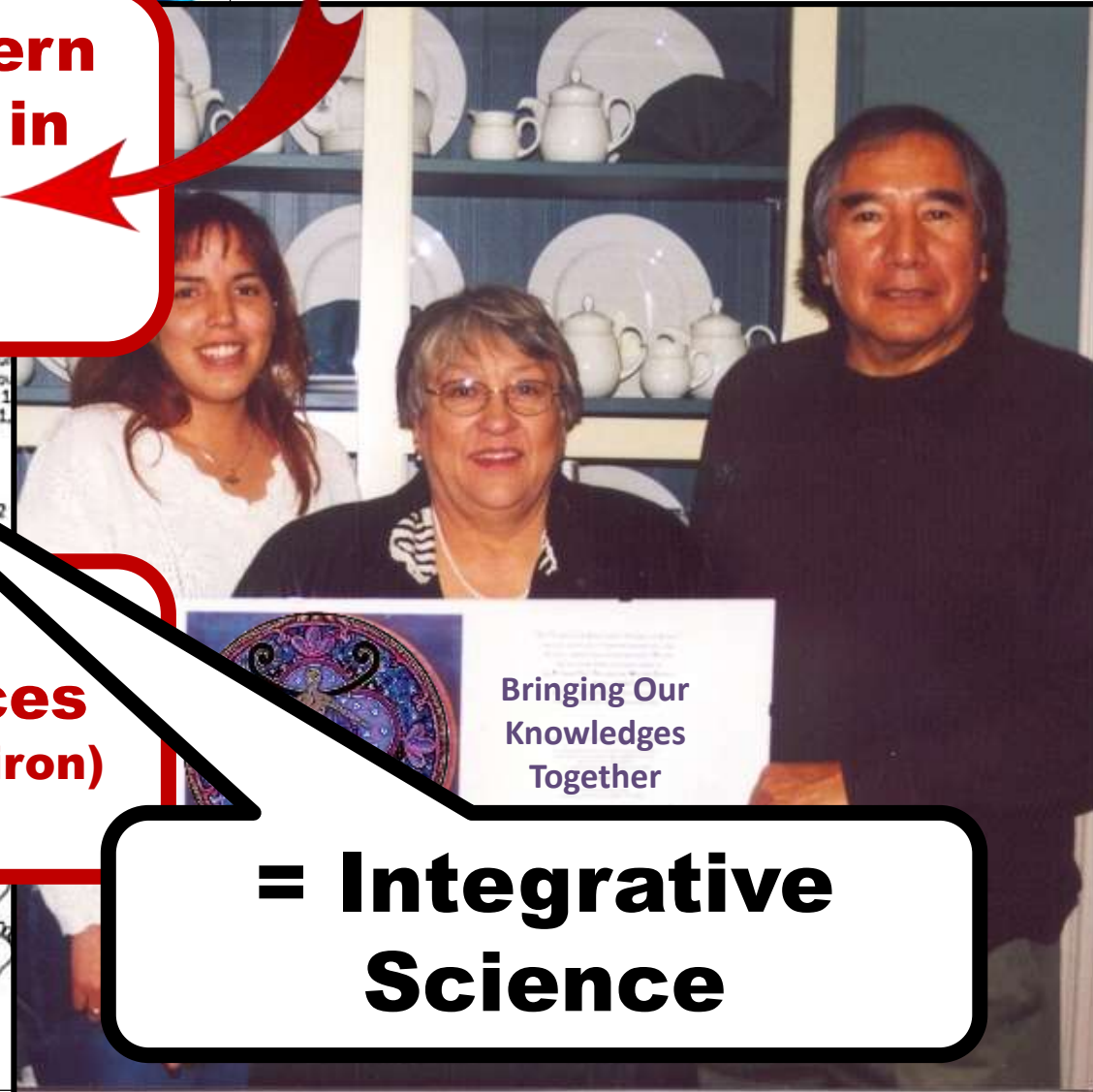
**Indigenous & Western
sciences together in
MSIT
(8 half year courses)**

2

concentration

**PLUS
mainstream sciences
(chem, math/physics, environ)
(6 half year courses)**

An overall average of 60% (in courses over your four years) is required for graduation.



**= Integrative
Science**

Integrative Science academic program within 4 year degree Bachelor of Science Community Studies



Integrative Science academic program within 4 year degree Bachelor of Science Community Studies

What happened?

1999-2004: 1st year intake strong (*recruitment via MSAP within MCI*)

2002: Tier 1 Canada Research Chair in Integrative Science awarded

2003: first degree graduates

2005-2006: 1st year intake wobbling; more degree graduates

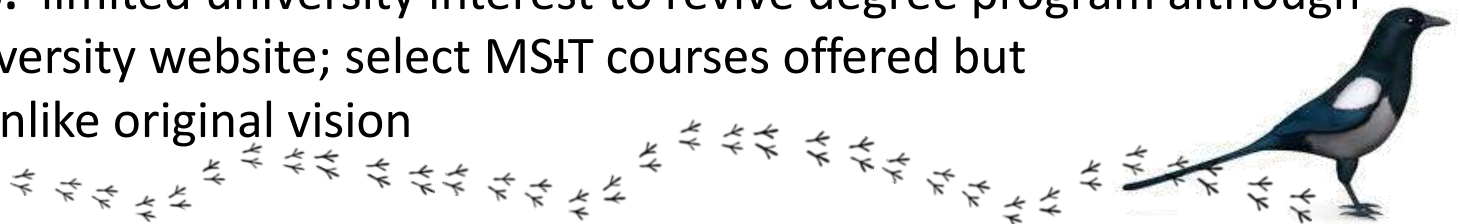
2007-2008: 1st year intake collapsing; some degree graduates

2009-2010: no intake; last degree graduates; program ceases to function; select 1st year MS&T courses offered for BA access students

2011-2013: limited university interest to revive degree program although still on university website; select MS&T courses offered but curricula unlike original vision

2013:

2014-2017: degree program defunct although still on university website; select 1st year MS&T courses offered to BA access students but curricula unlike original vision



Integrative Science academic program

within 4 year degree Bachelor of Science Community Studies

How many graduates?

during period 1999-2010 (total intake \approx 100-120)

- graduated with 4 yr BScCS – Integrative Science: 13
- started in Integrative Science, graduated with other science degree (Biology, Nursing, BTechPH): 12*
* includes some also with BScCS
- worked in Integrative Science as research assistant, graduated with other science degree: 2
- started in Integrative Science, graduated with BA: maybe 15-20 (no formal tracking)

TOTAL: \approx 40-45 all programs

(includes some double degree graduates)

Integrative Science academic program

within 4 year degree Bachelor of Science Community Studies

What else happened?

Various students:

- participated in community workshops
- presented at and/or attended local, national, and international conferences
- did outreach puppetry with elementary students in Mi'kmaq community schools
- worked as summer research assistants
- worked with community organizations
- worked as MSIT laboratory teaching assistants
- worked with Elders
- planted and maintained a medicinal plant garden
- earned scholarships (NSERC-USRA, other)

**Integrative Science academic program
within 4 year degree Bachelor of Science Community Studies**

What else happened?

During 2001-2006

**eleven (11) students secured an
NSERC-USRA**

**(Natural Science & Engineering Research Council -
Undergraduate Summer Research Award);
and two (2) of these students qualified twice.**



NSERC
CRSNG

Integrative Science academic program **within 4 year degree Bachelor of Science Community Studies**

What else happened?

2008 Integrative Science program
conferred national award of recognition



CANADIAN COUNCIL
ON LEARNING

CONSEIL CANADIEN
SUR L'APPRENTISSAGE

ABORIGINAL LEARNING KNOWLEDGE CENTRE

Integrative Science academic program within 4 year degree Bachelor of Science Community Studies



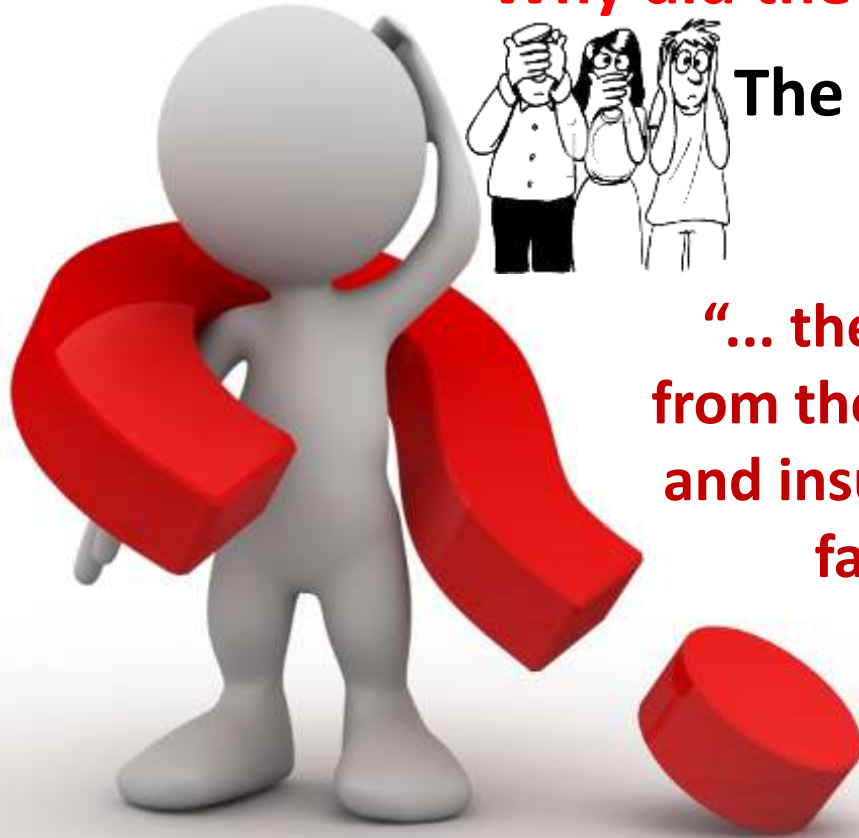
**Why did an
innovative
and
apparently
successful
program
fall apart?**

Integrative Science academic program within 4 year degree Bachelor of Science Community Studies

Why did the academic program fall apart?



The University never really asked.



****In my opinion:***

“... the program met diverse challenges from the outset including inconsistencies and insufficiencies at the administrative, faculty, budgetary and recruitment levels” ... which, unaddressed, eventually became overwhelming.

*** from: “*In my opinion*” by C. Bartlett:
The gift of multiple perspectives in scholarship
(March 2012 issue of *University Affairs*)**

~~Integrative Science academic program~~



**redirect
CRC energies**

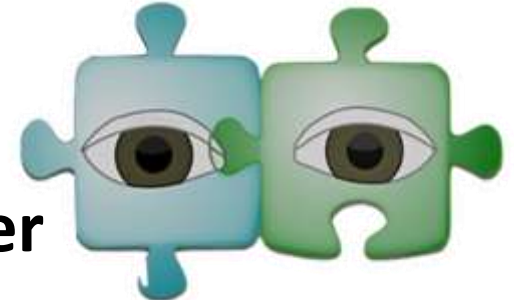
to:

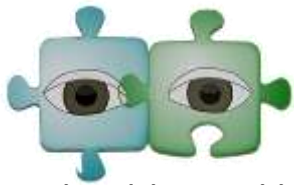
**EXTENSIVE & DIVERSE
ORAL DISSEMINATION
and CO-LEARNING**

(locally, nationally, internationally)

1) Integrative Science: new approach for science education, research, application, and community/youth outreach

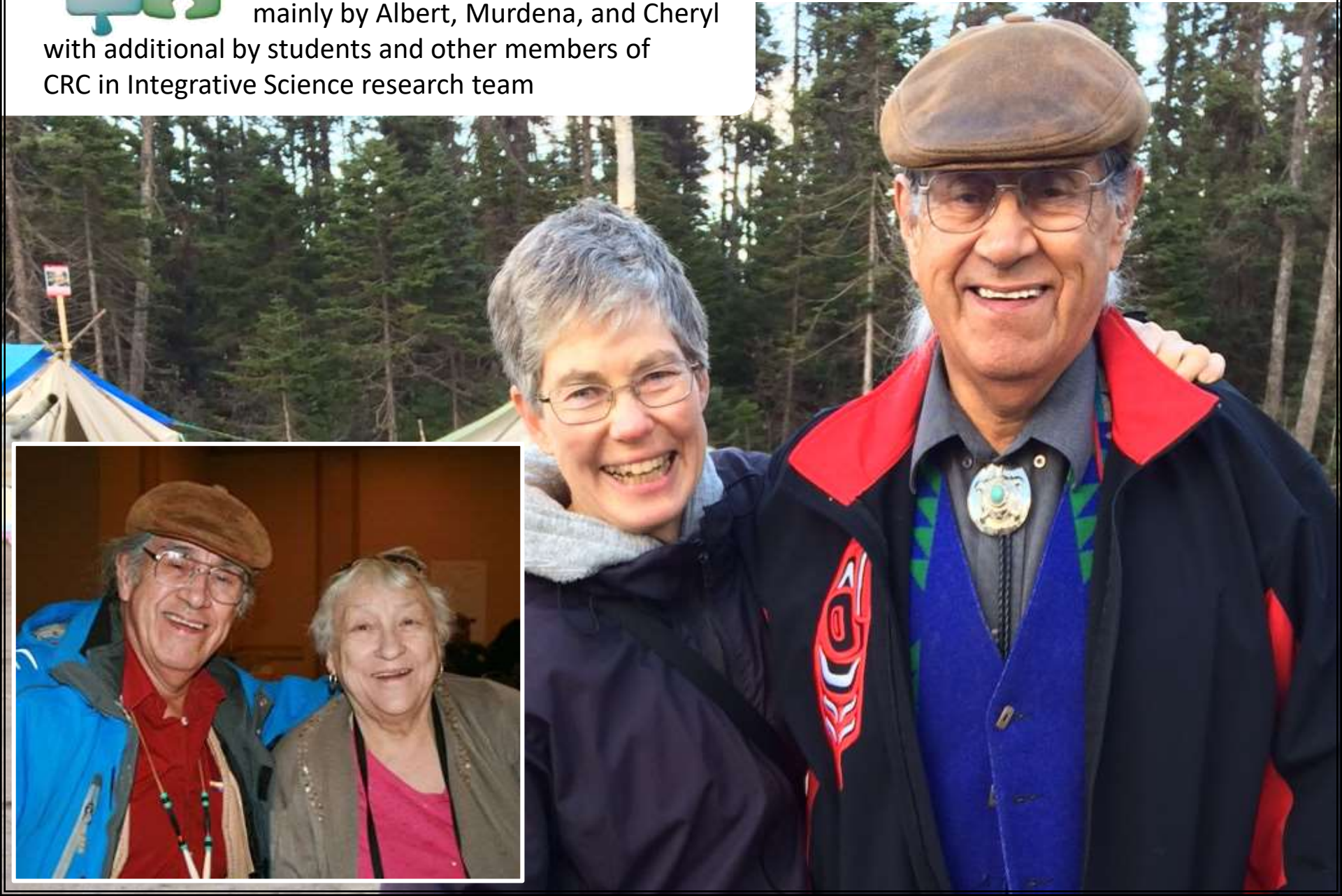
2) Two-Eyed Seeing: guiding principle for Integrative Science and/or any other cross/inter/trans-cultural collaboration





100's of presentations – diverse audiences

mainly by Albert, Murdena, and Cheryl
with additional by students and other members of
CRC in Integrative Science research team



Local Collaborative Planning



Oct 2004 Conference – CEPI
Wagmatcook, NS



Local Collaborative Planning



Nov 2016 Conference – CEPI
Wagmatcook, NS



Provincial Government



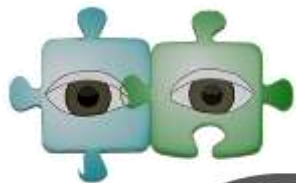
Feb 2010 – NS Gov't
Learning Seminar on MEK, Halifax, NS



Regional Gatherings



March 2011 Conference – Atlantic Elders and university personnel, Moncton, NB



National Collaborating Centres

National Collaborating Centres for Public Health



Centres de collaboration nationale en santé publique



Aboriginal
Health



Determinants
of Health



Environmental
Health



Healthy
Public Policy

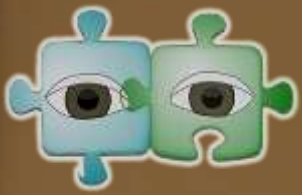


Infectious
Diseases

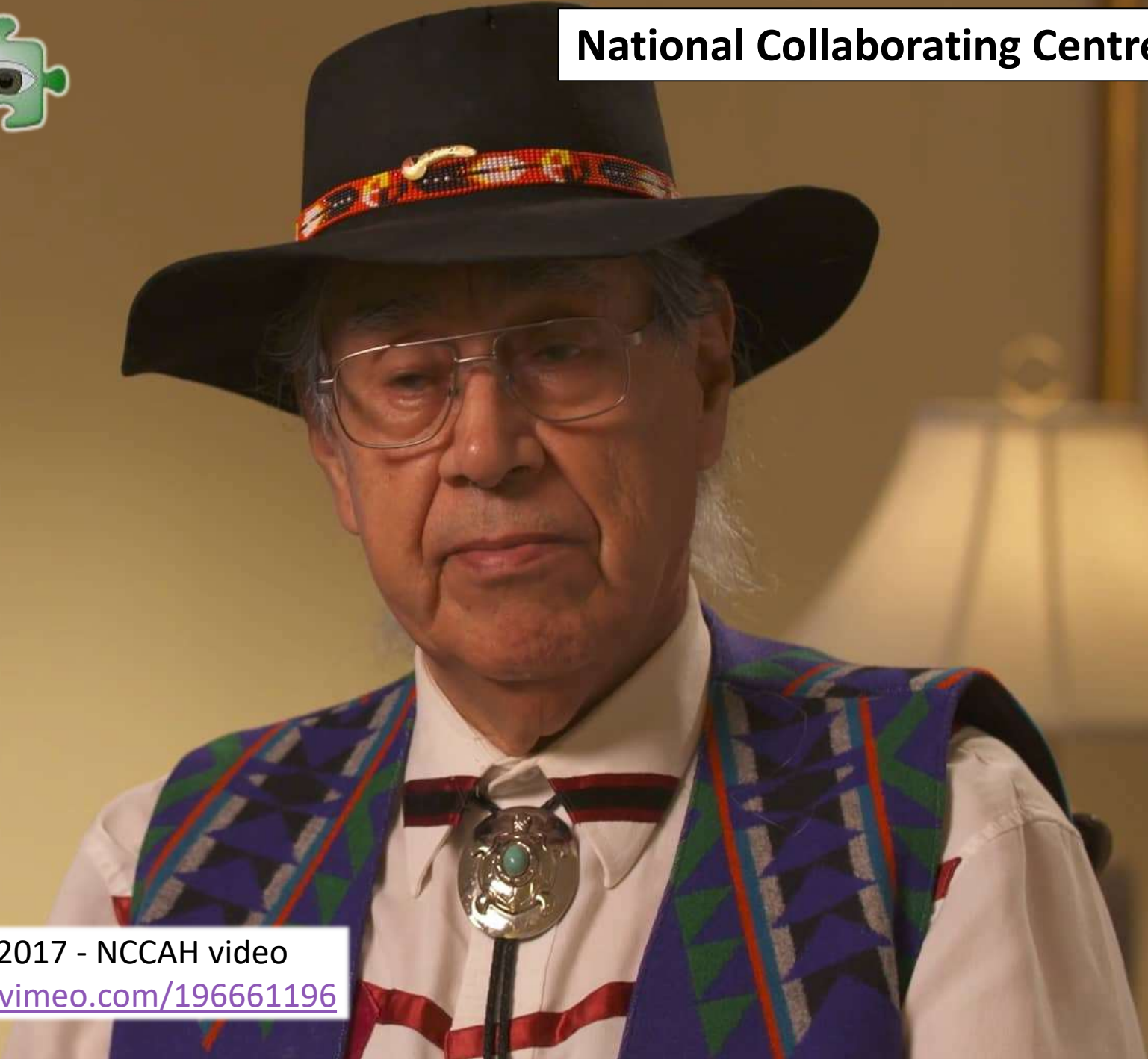


Methods
& Tools

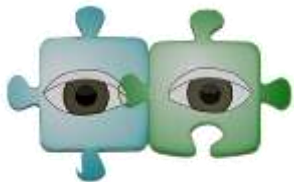
several years, various meetings,
numerous locations



National Collaborating Centres



Feb 2017 - NCCAH video
<https://vimeo.com/196661196>



Federal Government



Environnement Canada Environment Canada



Health Canada Santé Canada



Pêches et Océans Canada Fisheries and Oceans Canada



Parks Canada Parcs Canada



Public Health Agency of Canada

Agence de la santé publique du Canada

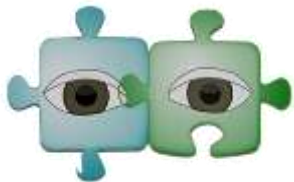
Canada

various years, several meetings, diverse locations



Federal Government

Nov 2008 Conference – SARA Workshop
for Eel Management, Ottawa, ON



Federal Government



Feb 2013 – Snow Crab Management
Meeting, DFO & APCFNC, Moncton, NB



CIHR



Oct 2012 - CIHR Pathways Inaugural Planning Meeting
Ottawa, ON



Police



Summer 2005 Meeting – RCMP
CBU, Sydney, NS



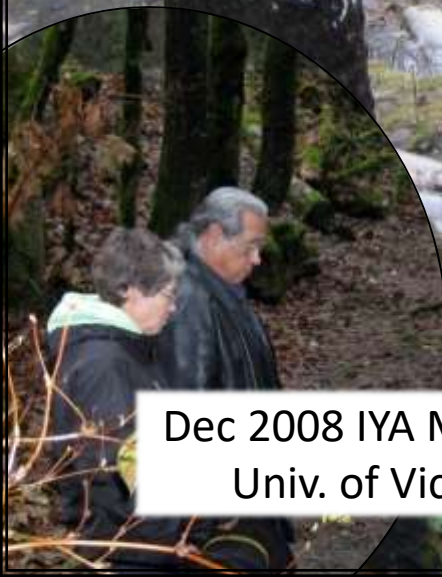
Knowledge Holders - north



April 2009 Workshop – Knowledge Holders
Iqaluit, NU



Knowledge Holders – west



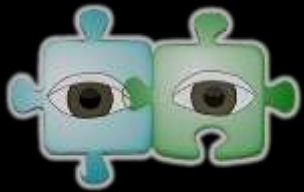
Dec 2008 IYA Meeting – community
Univ. of Victoria, Victoria, BC



Knowledge Holders – west



Oct 2010 Gathering – Medicine People & Students
Univ. of Alberta, Edmonton, AB



Knowledge Holders - central



Feb 2012 Community Meetings
Chapleau Cree First Nation, ON



METEPENAGIAG HERITAGE PARK

We warmly welcome you to our community.
In ancient times our ancestors established
Metepenagiag at the junction of the Northwest
and Little Southwest Miramichi Rivers. It is
the oldest continuously inhabited village
in New Brunswick.

Come experience centuries of Mi'kmaq history
and sample our rich cultural heritage.
Have a pleasant visit!

Aug 2009 Meeting – MDCC Elders
and community, Metepenagiag, NB

Knowledge Holders – east



Knowledge Holders – east



Atlantic Policy Congress
Of First Nations Chiefs Secretariat
www.apcfn.ca

March 2012 Meeting re Elders' Recommendations on ATK
AAEDIRP / APCFNC, Dalhousie Univ, Halifax, NS

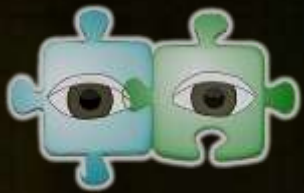
Artist Gerald Gloade; Millbrook First Nation



International Conferences

Dec 2005 Conference – WIPCE
New Zealand





International Conferences



Oct 2007 Conference – EPO (Astronomy)
Greece



Universities

SFU

**FACULTY OF
EDUCATION**

Feb 2009 – Education Conference
Simon Fraser University
Vancouver, BC



Universities



Oct 2010 & Feb 2014 - Presentations
University of Alberta, Camrose, AB
(*Battle River*)



Universities



May 2009 Meetings –
Opaskwayak Cree Nation and
University College of the North,
The Pas, MB



April 2014 – Presentation
Mi'kmaq-Wolastoqey Centre
Univ of New Brunswick, Fredericton, NB

Universities



Mi'kmaw Elder Albert Marshall



Eskasoni First Nations, Mi'kma'ki (Nova Scotia)
Honorary Doctorate Cape Breton University



Mi'kmaw Language, Culture and Healing
Integrative Science * Co-Learning * Etuaptmunk or Two-Eyed Seeing



UNIVERSITY OF
TORONTO



Queen's
UNIVERSITY

TRENT
UNIVERSITY

SAINT MARY'S
UNIVERSITY SINCE 1802

One University. One World. Yours.



DALHOUSIE
UNIVERSITY

MOUNT
SAINT VINCENT
UNIVERSITY



various years – Visiting Elder
various events
various locations



Youth Camps

actüa™

Youth · STEM · Innovation
Jeunesse · STIM · Innovation

June 2008 – National Planning Conference
Ottawa, ON

Youth Camps



July 2015 – Community Youth Camp
Listuguj First Nation, QC



Schools

various years, diverse locations,
First Nation Schools, Public Schools



Research



A T L A N T I C

ABORIGINAL

Health Research Program

several years

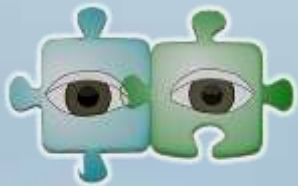
CIHR-IAPH: ACADRE/NEAHR Programs

(Dr. Fred Wien, Dalhousie U)

Halifax, NS



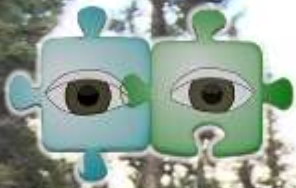
June 2014
CWN Project National Gathering
(Dr. Heather Castleden, Queen's U)
Ottawa, ON



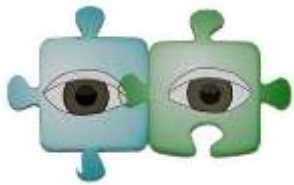
Summer 2013
SSHRC Project Community Meeting
(*Dr. Lucia Fanning, Dalhousie U: Fish-WIKS*)
Unama'ki – Cape Breton, NS



March 2017
CIHR Indigenous Mentorship Network Proposal
(Dr. Debbie Martin, Dalhousie University)
Elders Meeting, Millbrook First Nation, NS



October 2016
CIHR Indigenous Mentorship Network Proposal
(Dr. Debbie Martin, Dalhousie University)
Regional Meeting, Happy Valley – Goose Bay, NL



100's of presentations info online: integrativescience.ca



INSTITUTE FOR INTEGRATIVE SCIENCE & HEALTH

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Bringing together Indigenous ways of knowing and Western scientific knowledge



The acquisition of scientific knowledge is essential to human survival – it is a practical engagement with the real world – and the scientific pursuit of knowledge must, therefore, be as old as the consciousness of our human species.

The team at the Institute for Integrative Science & Health (IISH) defines "Integrative Science" as bringing together Indigenous and Western scientific knowledges and ways of knowing. And, we view science in a broadened and culturally inclusive way which is: science = dynamic, pattern-based knowledge shared through stories about our interactions with and within nature.

The Guiding Principle for our co-learning journey of different knowledges and cultures working together is **Two-Eyed Seeing**. Lots of other people across Canada and internationally have heard about Two-Eyed Seeing and are using it!

Activities

Two-Eyed Seeing



Two-Eyed Seeing is the main Guiding Principle for Integrative Science. It was brought forward by Mi'kmaw Elder Albert Marshall. *Read more about Two-Eyed Seeing and our other Guiding Principles.*

Our Vision



Our vision for Integrative Science is depicted in a painting by artist *Basma Kavanagh*. *Read more about our vision and Basma's painting.*

“WE, TOGETHER”

has been our main message

NEED: meaningful, on-going,
respectful, multi-level,
participatory, and accountable
PSE institutional & individual
commitments to
**COMMUNITY
CONNECTIONS,
PARTICIPATION,
STEWARDSHIP**



“WE, TOGETHER”

has an overall guiding principle

OUTLINE

- Who? When? Why?
- What? How?
 - Integrative Science
- **Two-Eyed Seeing**
 - Essentials & Challenges
 - ④ Co-Learning + 3
- Cultural Humility



“WE, TOGETHER”

has an overall guiding principle

brought forward about
two decades ago by
Elder Albert Marshall

OUTLINE

- Who? When? Why?
- What? How?
→ Integrative Science

- **Two-Eyed Seeing**
→ **Essentials & Challenges**

④ **Co-Learning + 3**

- Cultural Humility

based on years of work
(e.g. previously demonstrated)
... **first assembled as
a four-part whole**
in Fall 2016

(for CIHR proposal
development)



a **GUIDING PRINCIPLE** **ETUAPTUMUK – TWO-EYED SEEING**

for Integrative Science

(or any other cross-/trans-/inter-cultural collaboration)

LEARN ... to see from one eye with the best in the Indigenous ways of knowing, and from the other eye with the best in the Western (or mainstream) ways of knowing

... and LEARN to use both these eyes together for the benefit of all.

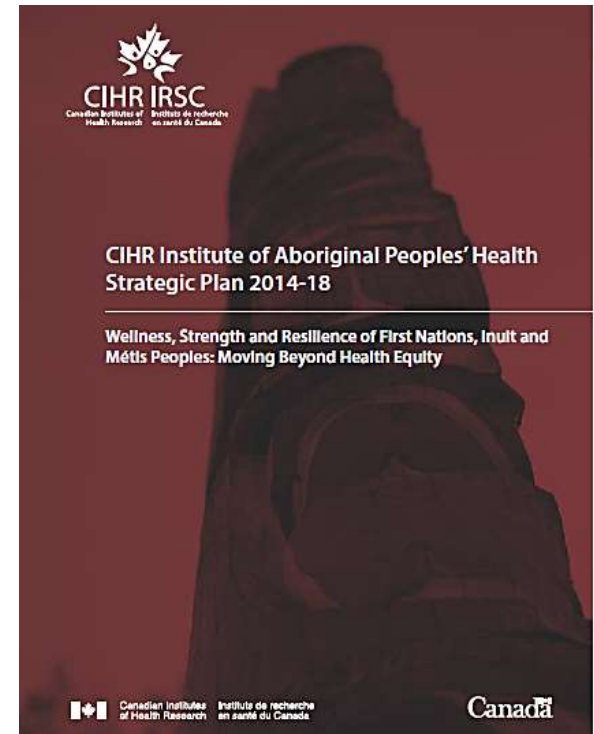
(words of Mi'kmaw Elder Albert Marshall who brought Two-Eyed Seeing forward many years ago)



a **GUIDING PRINCIPLE** **ETUAPTUMUK – TWO-EYED SEEING**



IAPH **Institute of** **Aboriginal** **Peoples'** **Health**



has adapted TWO-EYED SEEING
2011: in IAPH vision
2014-2018: in IAPH strategic plan

<http://www.cihr-irsc.gc.ca/e/49589.html>

a GUIDING PRINCIPLE

ETUAPTUMUK – TWO-EYED SEEING

Strategic Direction 2:

IAPH Strategic Plan 2014-2018

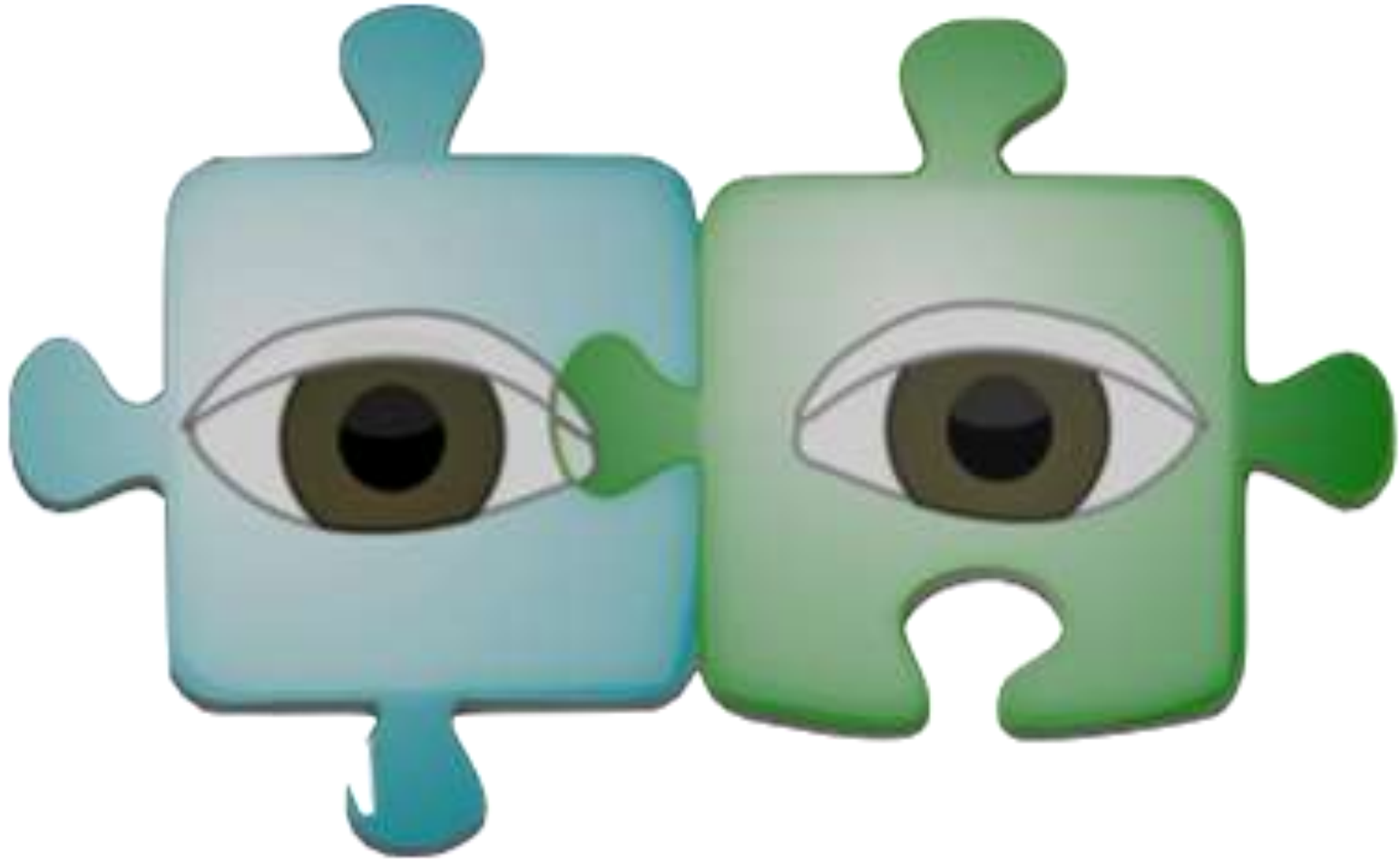
Transforming First Nations, Inuit and Métis Health through Indigenous Ways of Knowing and Two-Eyed Seeing

The concepts informing IAPH's Indigenous Ways of Knowing and Two-Eyed Seeing opportunities are guiding principles of IAPH's vision and mandate. Peer-reviewed funded studies have incorporated and qualified the benefits of Two-Eyed Seeing and continues to advance Indigenous Ways of Knowing in research. The CIHR has community-specific and common Indigenous health research. The CIHR has endorsed of the March 2013 National Colloquium on Indigenous Health Research.

Two-Eyed Seeing⁶ in research specifically refers to research that engages First Nations, Inuit and Métis knowledge, analysis, data management and implementation, strengths, Two-Eyed Seeing in research and implementation, safety and control for First Nations, Inuit and Métis, and incorporation of Indigenous knowledge, balance between Western and Indigenous knowledge, and a balance between Western and Indigenous knowledge, and incorporation of Indigenous knowledge, methodologies, analysis and subse

The whole of the CIHR-IAPH strategic plan embeds Two-Eyed Seeing. Page 26 indicates it has been qualified by research and incorporated as a strategic direction.

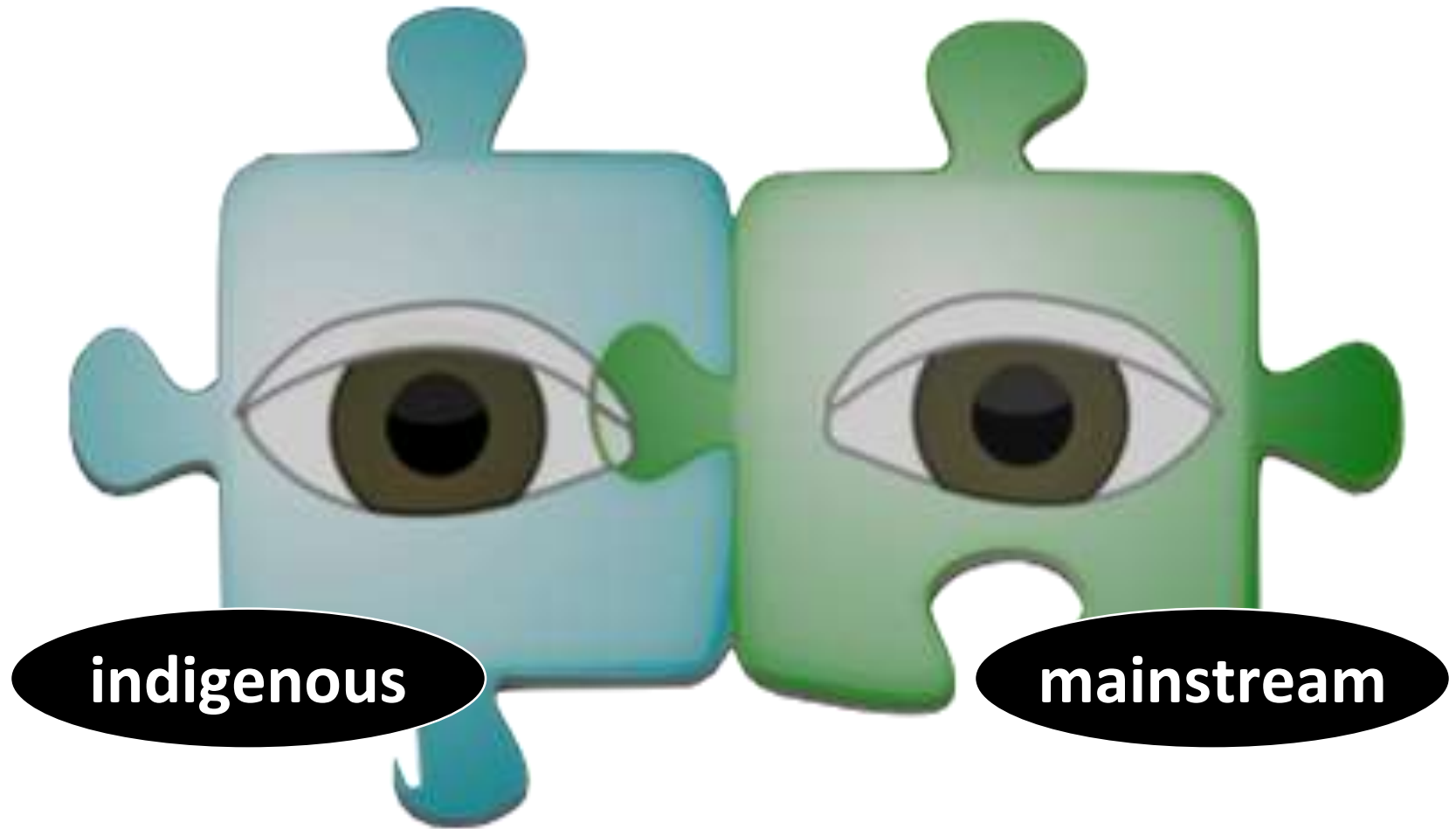
a GUIDING PRINCIPLE
ETUAPTUMUK - TWO-EYED SEEING



icon encouraged by Elder Albert Marshall

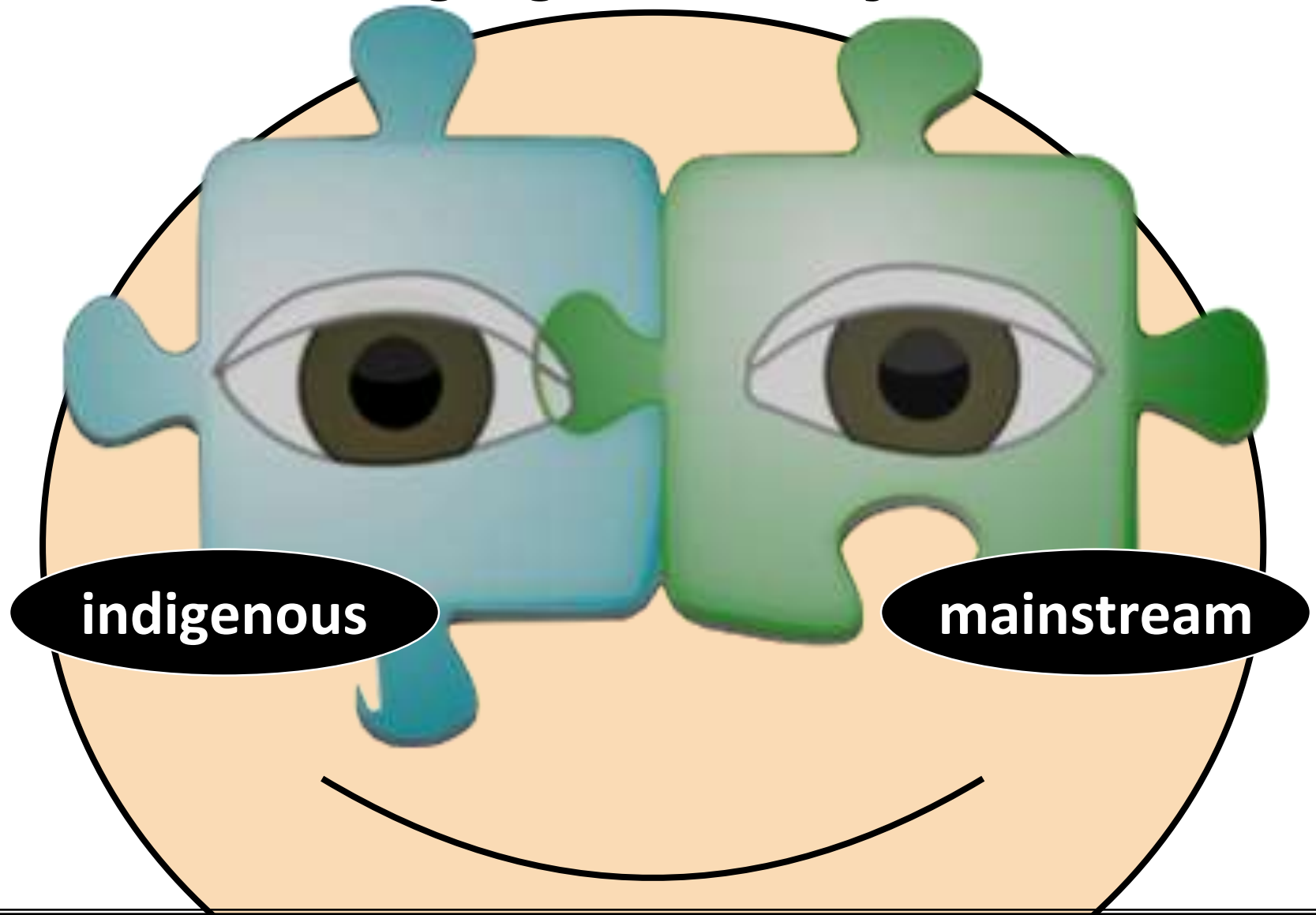
a **GUIDING PRINCIPLE**

ETUAPTUMUK - TWO-EYED SEEING

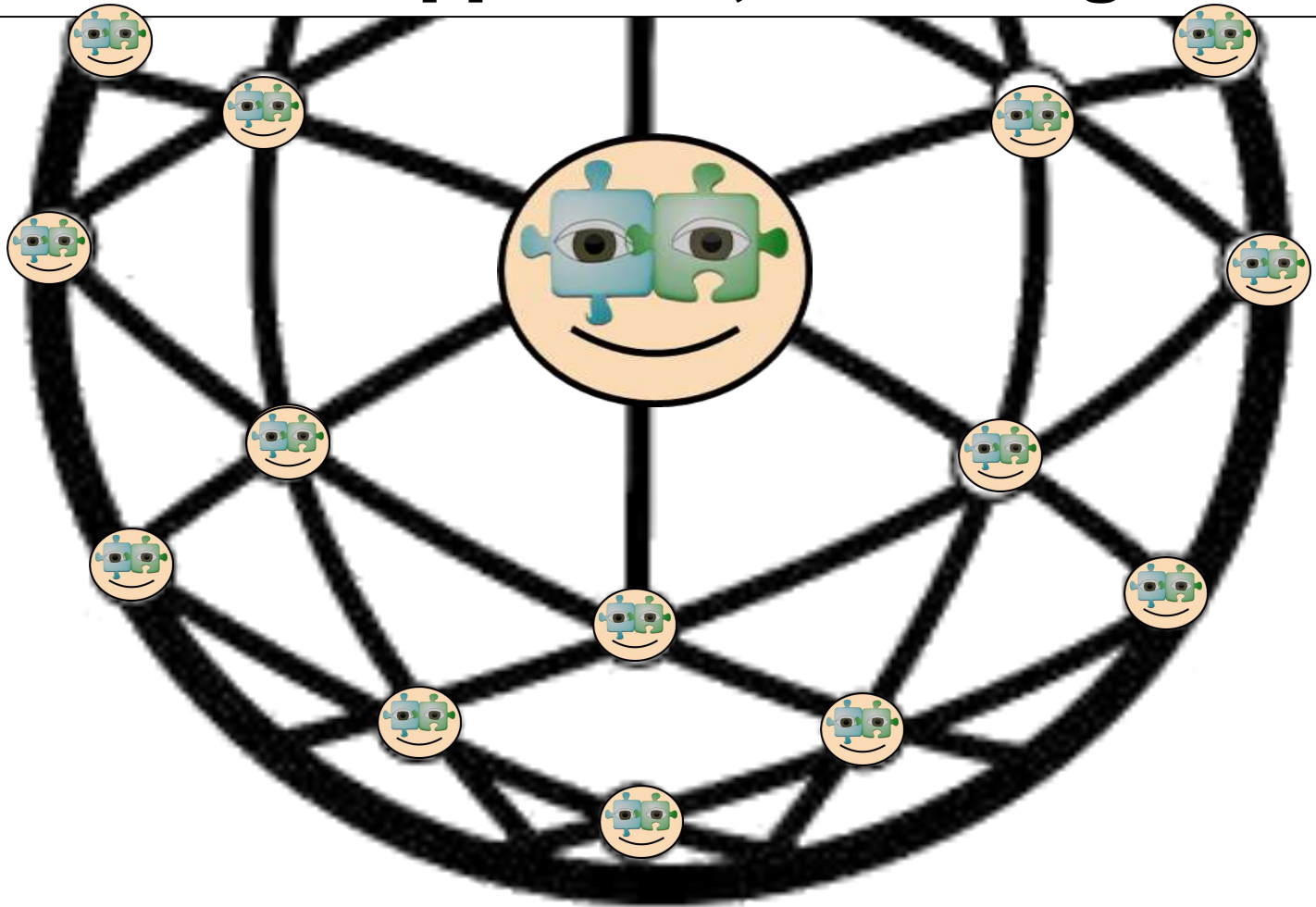


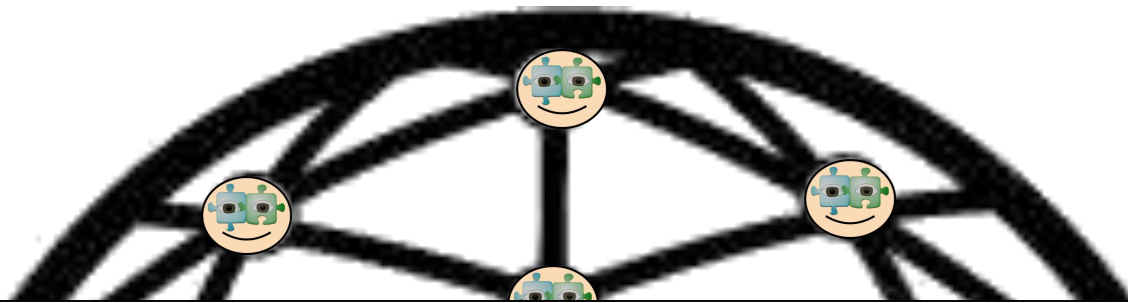
a **GUIDING PRINCIPLE**

- for our minds, souls, Spirits ... not a “mechanism”
- herein: highlight a few key essentials



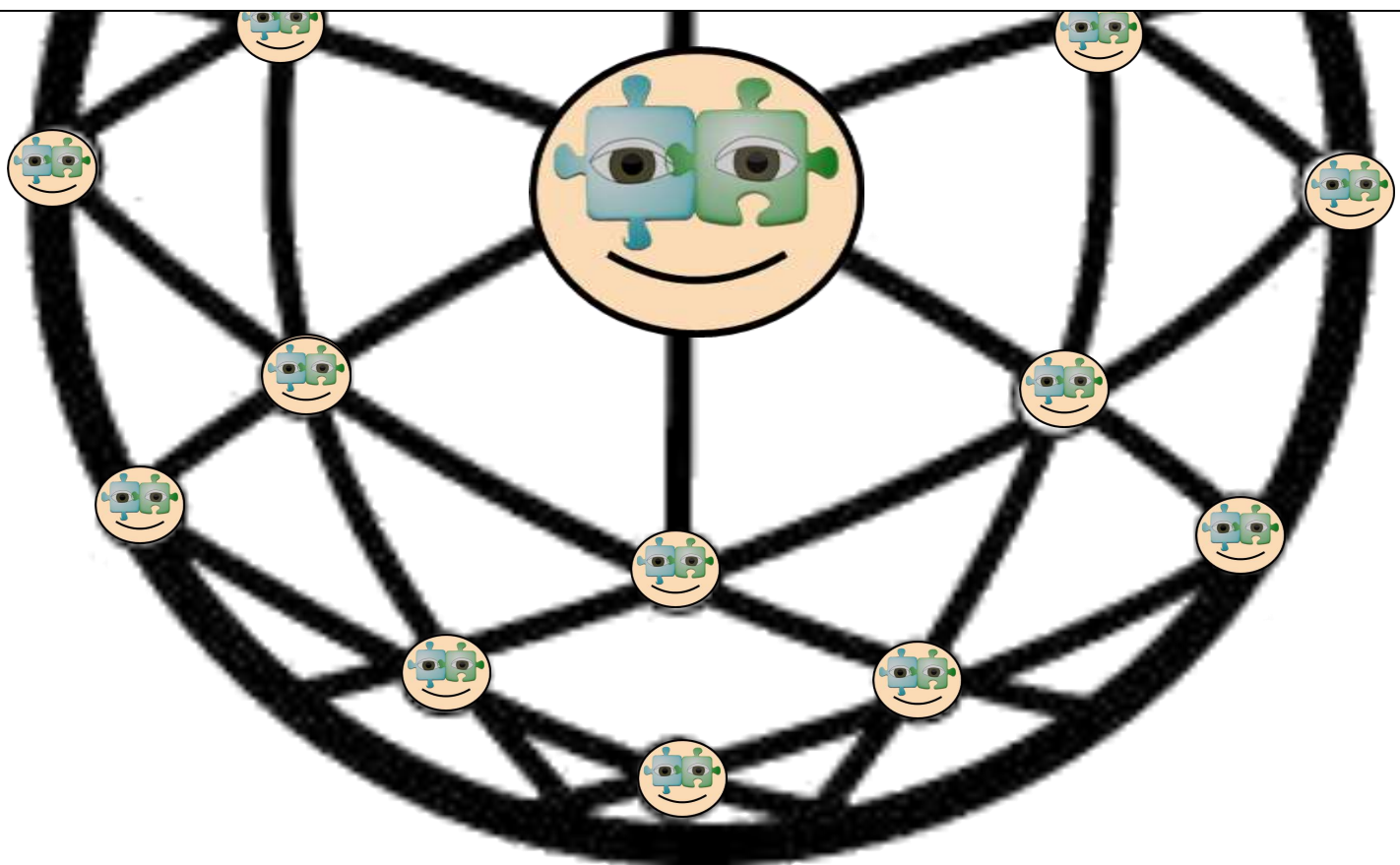
TES NEEDS: a supportive, nurturing network

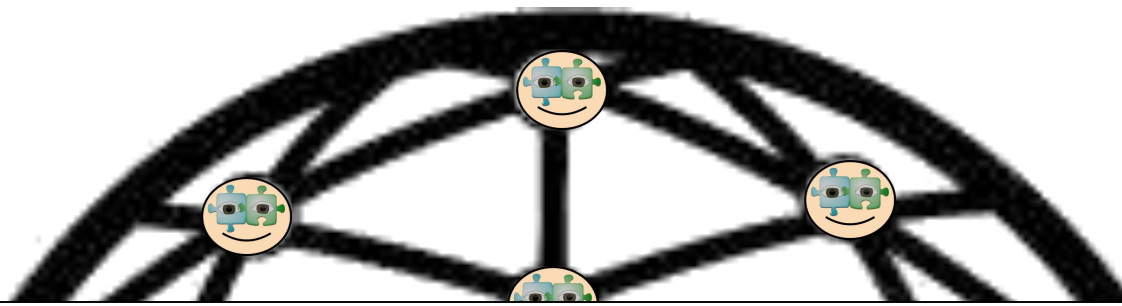




TES NEEDS: a supportive, nurturing network

Elders might prefer to say: LOVE





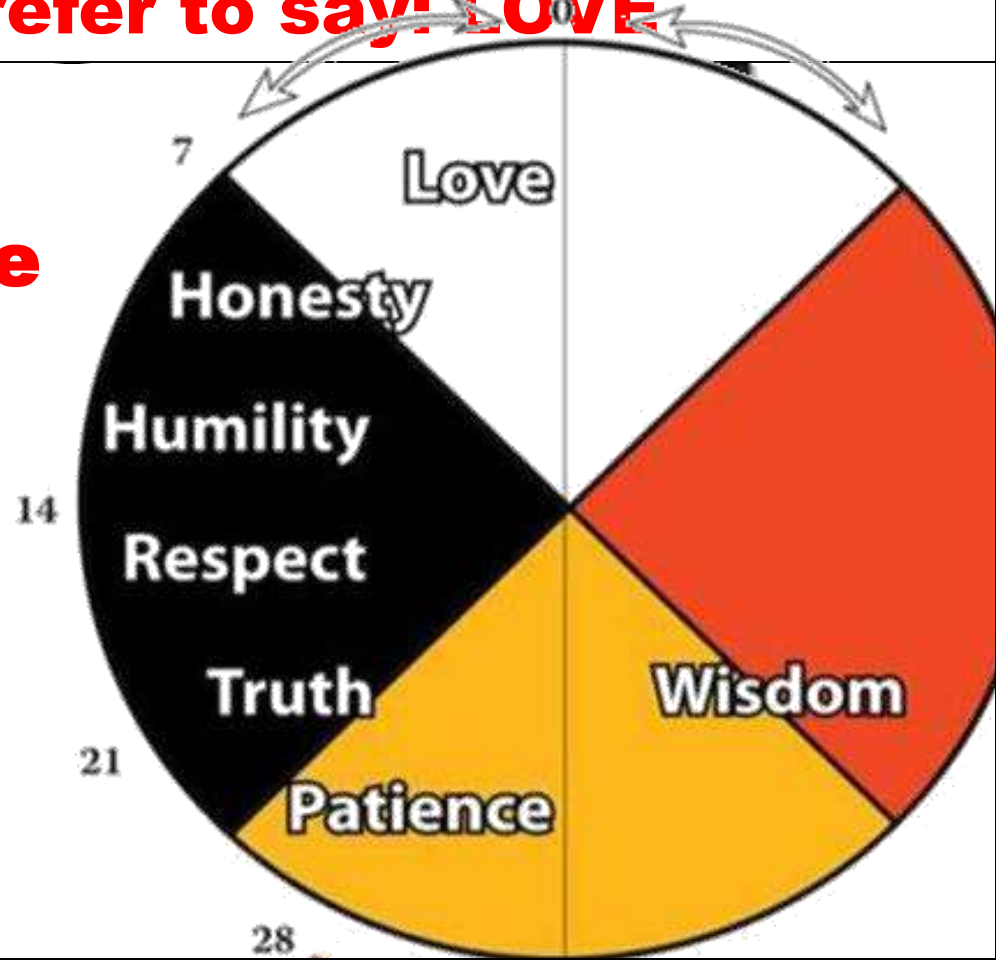
TES NEEDS: a supportive, nurturing network

Elders might prefer to say: LOVE

**Seven Sacred
Mi'kmaq Gifts of Life
... Teachings of**



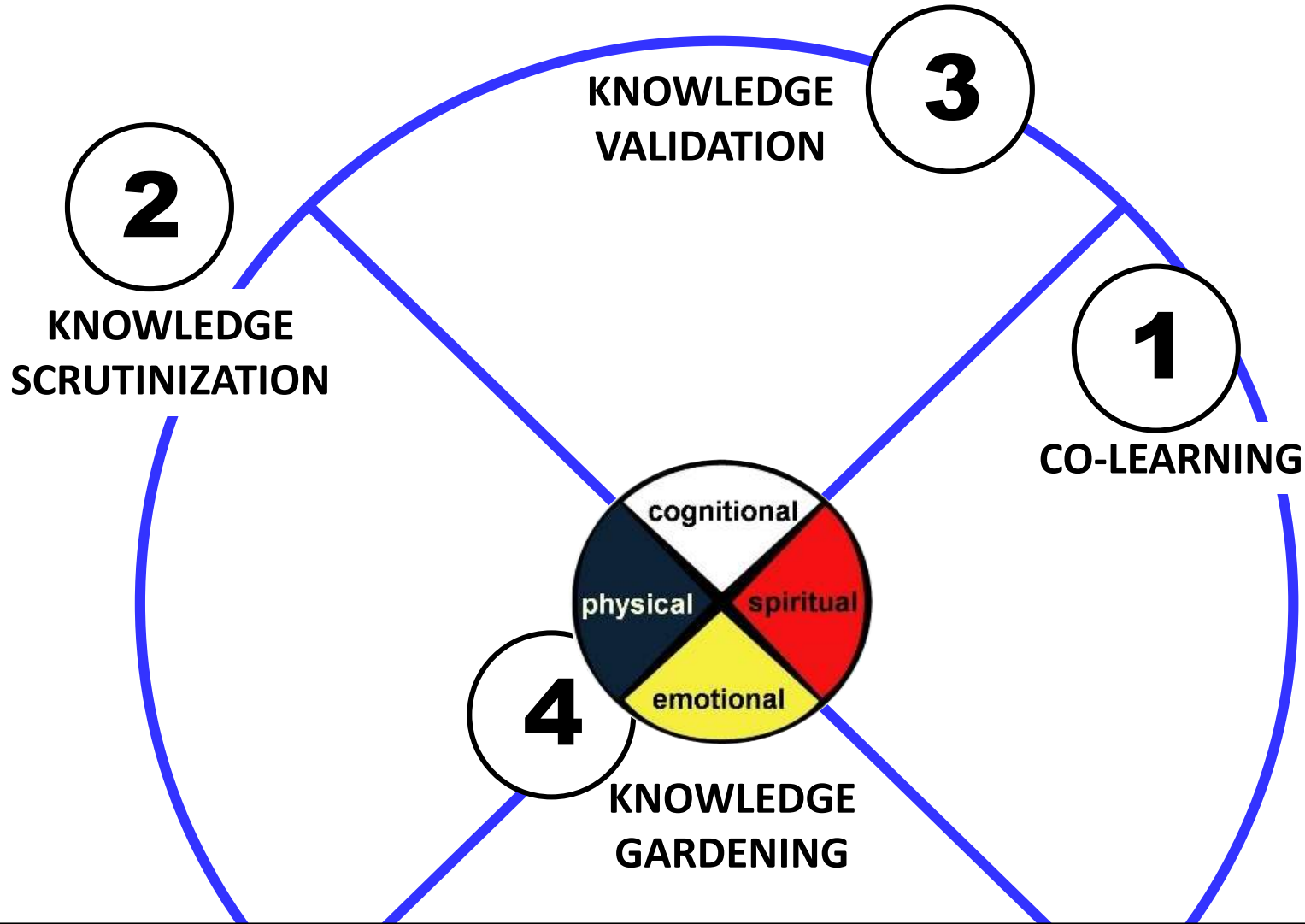
**Elder
Murdena
Marshall**



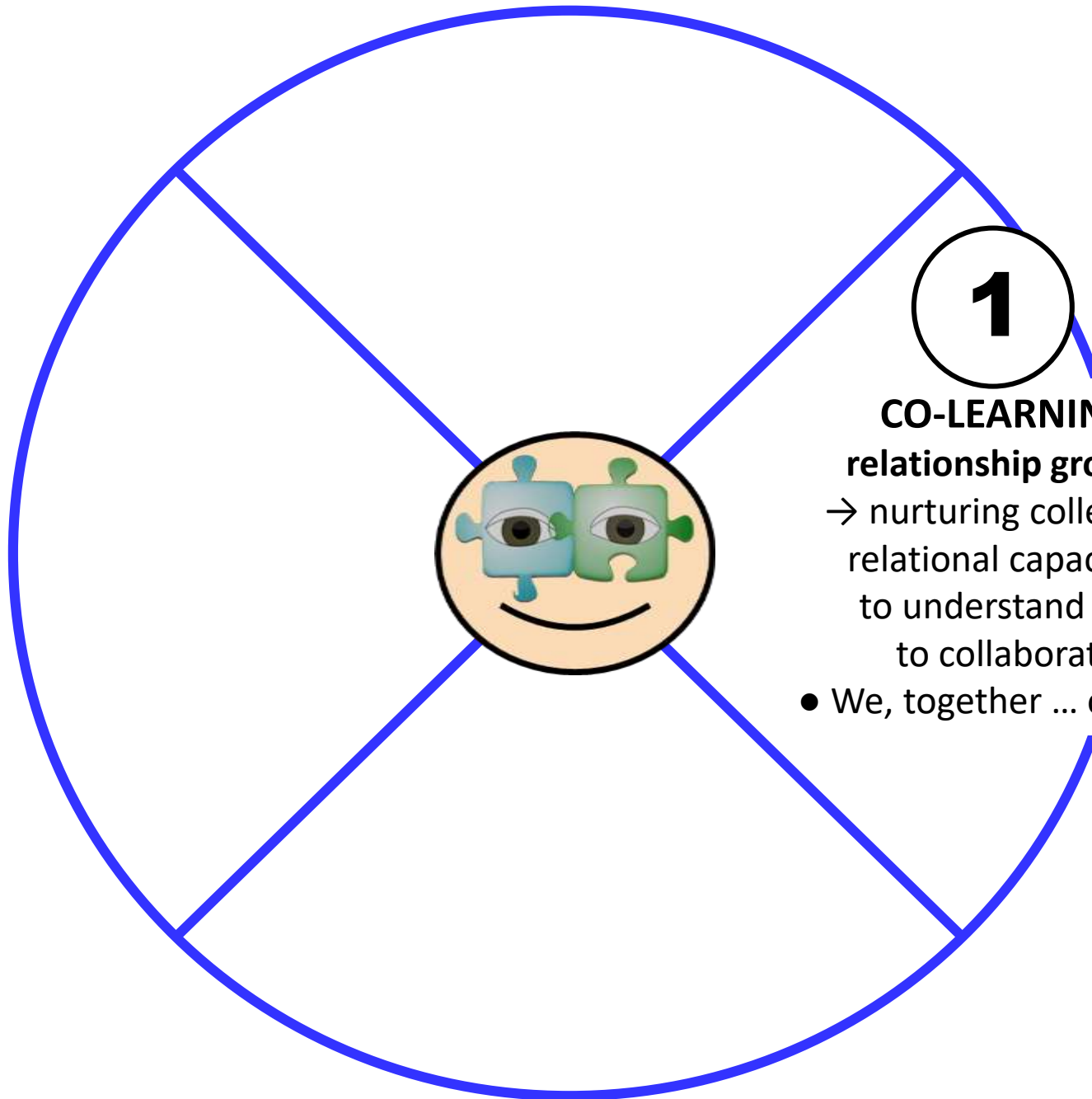
TES NEEDS: a supportive, nurturing network



**that recognizes and embeds key essentials
and addresses the challenges these bring**



that recognizes and embeds key essentials and addresses the challenges these bring



1

CO-LEARNING

relationship growth

→ nurturing collective,
relational capacities
to understand and
to collaborate

- We, together ... ongoing

Why?

**new hope for
nurturing better
relationships
thanks to the**

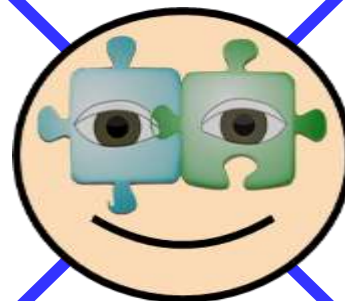
TRC

calls to action

plus

**UN Declaration
on the Rights
of Indigenous
Peoples**

*adopted by
Canada*

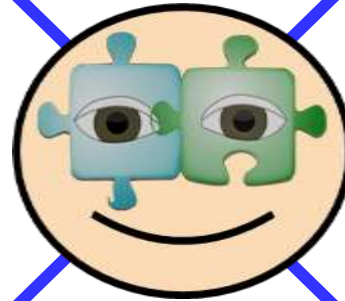


1

CO-LEARNING

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1

CO-LEARNING

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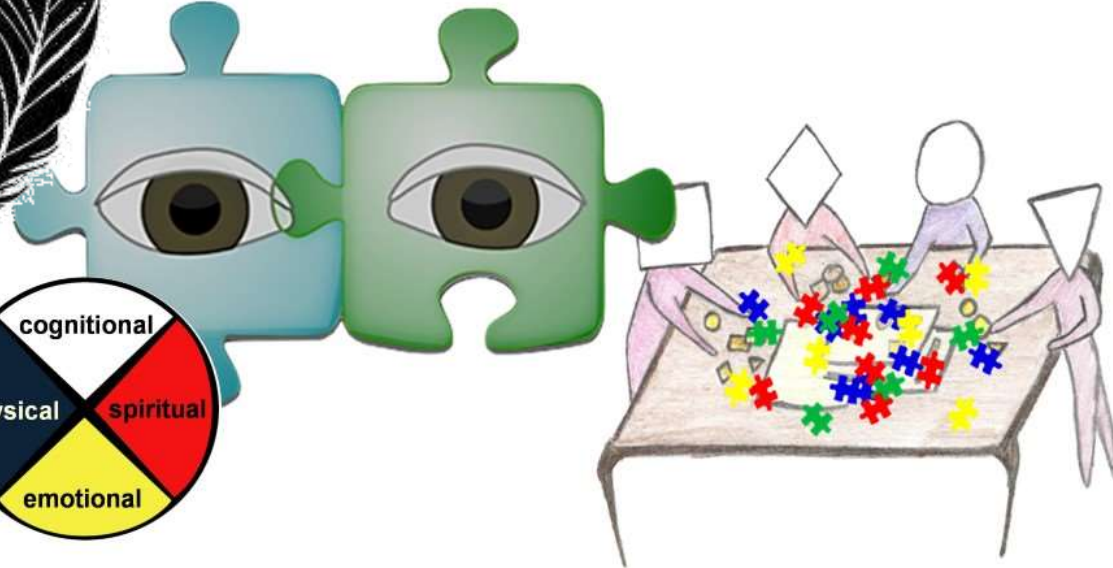
- We, together ... ongoing

**How do we re-awaken Spirit?
How do we create opportunities
for our Spirits to start collaborating?**

words of Elder Albert Marshall

The essence of **CO-LEARNING** is that the
SPIRIT OF COLLABORATION
has been energized for:

“We, Together ... ongoing”



1


CO-LEARNING

relationship growth
→ nurturing collective,
relational capacities
to understand and
to collaborate

- We, together ... ongoing

How do we re-awaken Spirit?
How do we create opportunities
for our Spirits to start collaborating?

words of Elder Albert Marshall



- Co-Learning does not need “evaluation” ... but rather we need to understand that the essence of Co-Learning is *i'l'oqaptmu'k* meaning “to revisit for renewal to maintain movement in the direction Spirit intended”.

- Traditionally, we would not have to say “co-learning” because that is how the relationship naturally functioned. “Nurturing”, on the other hand, is done in a mindful way ... anything that is alive has to be nurtured with love and compassion.

- **How do we invoke the Spirit of Co-Learning at universities?**

1

CO-LEARNING

relationship growth

→ nurturing collective, relational capacities to understand and to collaborate

- We, together ... ongoing



words of academia

Science
A

Disciplinary research within
academia

Science
A

Science
B

Interdisciplinary (multidisciplinary)
research within academia

Science
A

Science
B

IK

TRC

new
sciences

Transdisciplinary research goes
beyond academia and involves
stakeholders from policy, civil
society etc.

1

CO-LEARNING

relationship growth
→ nurturing collective,
relational capacities
to understand and
to collaborate

- We, together ... ongoing



**NEED: new understandings,
encouragement and support for
trans-disciplinary, inter-cultural,
and community-based work ...
including generous TIME to
grow meaningful relationships.**

2

KNOWLEDGE

SCRUTINIZATION

domains, ways, substance

→ nurturing

educational capacities

to “see the best” ...

to “see the strengths” ...

in each and different

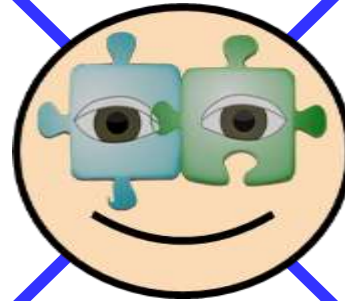
knowledges and

ways of knowing

... and to use them for

the benefit of all

- We, together ... ongoing



2

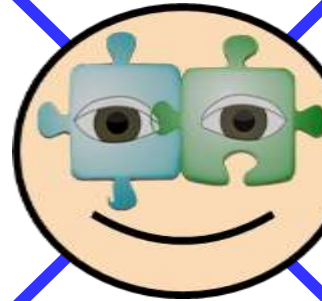
KNOWLEDGE SCRUTINIZATION

domains, ways, substance
→ nurturing
educational capacities
to “see the best” ...
to “see the strengths” ...
in each and different
knowledges and
ways of knowing
... and to use them for
the benefit of all

- We, together ... ongoing



to grow
shared
understandings



Why?



Otherwise, there
can be profound
barriers of
PESSIMISM
to **FEAR**
that humans
have difficulty
crossing, when
faced with
something
new, unknown
or different.

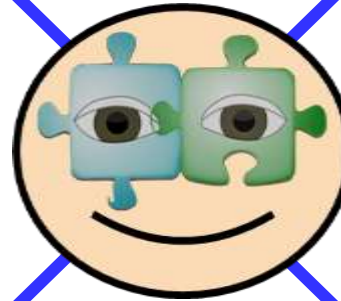
2

to grow
shared
understandings

KNOWLEDGE
SCRUTINIZATION

domains, ways, substance
→ nurturing
educational capacities
to “see the best” ...
to “see the strengths” ...
in each and different
knowledges and
ways of knowing
... and to use them for
the benefit of all

- We, together ... ongoing



**How can we guard against
negativism in this scrutiny?
How do we move to collectivism,
rather than more individualism?**

2

KNOW
SCRUTIN
domains, way
→ nur
educational
to “see th
to “see the s
in each and different
knowledges and
ways of knowing
... and to use them for
the benefit of all
● We, together ... ongoing

Highlighting Elder Albert’s words: “We, Together”

- ❖ Our knowledges and ways of knowing ... Indigenous and mainstream: we need to learn to see with the strengths of each and we need to learn to use them together, for the benefit of all people and the ecological integrity of the Earth.
- ❖ We need to embark on a co-learning journey in which our two paradigms will be put on the table to be scrutinized.
- ❖ We need to honestly be able to say that the essence, the spirit of our two ways, has been respected as we work to balance the energies of those ways.



How can we help critics understand and accept, rather than fear?

2

KNOW
SCRUTIN
domains, way
→ nur
educational
to “see th
to “see the s
in each and
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ways of k
... and to us
the bene
● We, togeth

Highlighting Elder Albert’s words: “We, Together”

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- ❖ We need to embark on a co-learning journey in which our two paradigms will be put on the table to be scrutinized.
- ❖ We need to honestly be able to say that the essence, the spirit of our two ways, has been respected as we work to balance the energies of those ways.

Compare Albert’s words to Jeffrey Simpson’s

(Globe & Mail; 21 Feb 2014; “Money alone cannot fix Aboriginal education”)
re First Nations Control of First Nations Education Act agreement signed in early February:

“... the big loser will be ~~students~~, whose knowledge of basic science, math and other subjects will be so infused with cultural appropriateness by these theorists as to handicap them, rather than assist them, in wider Canadian society.”

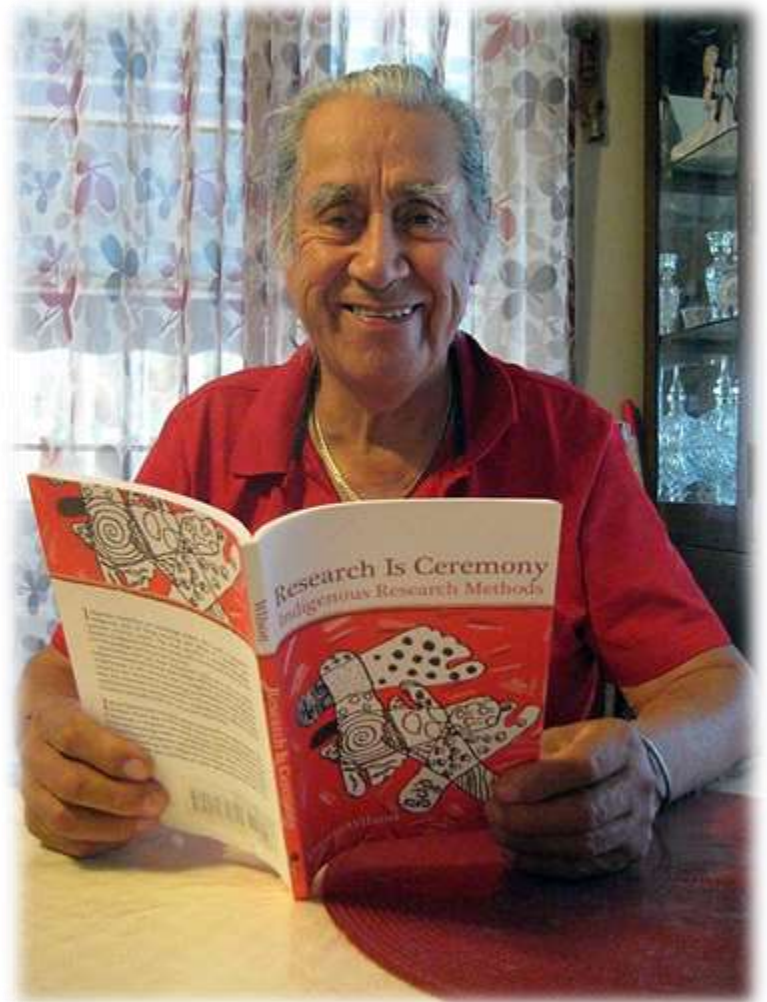


How can we help critics understand and accept, rather than fear?

2

KNOWLEDGE SCRUTINIZATION: put our two paradigms on the table to be scrutinized ...
(words of Elder Albert Marshall)

Upon reading Wilson's book and then discussing with Elder Murdena, Elder Albert brought forward key conceptual understandings within Mi'kmaq Traditional Knowledge, as they are expressed in the language. He suggests all First Nations' languages contain similar understandings because of **the importance of the relationship between the storyteller and the one receiving the knowledge.**



2

KNOWLEDGE SCRUTINIZATION: put our two paradigms on the table to be scrutinized ...
(words of Elder Albert Marshall)

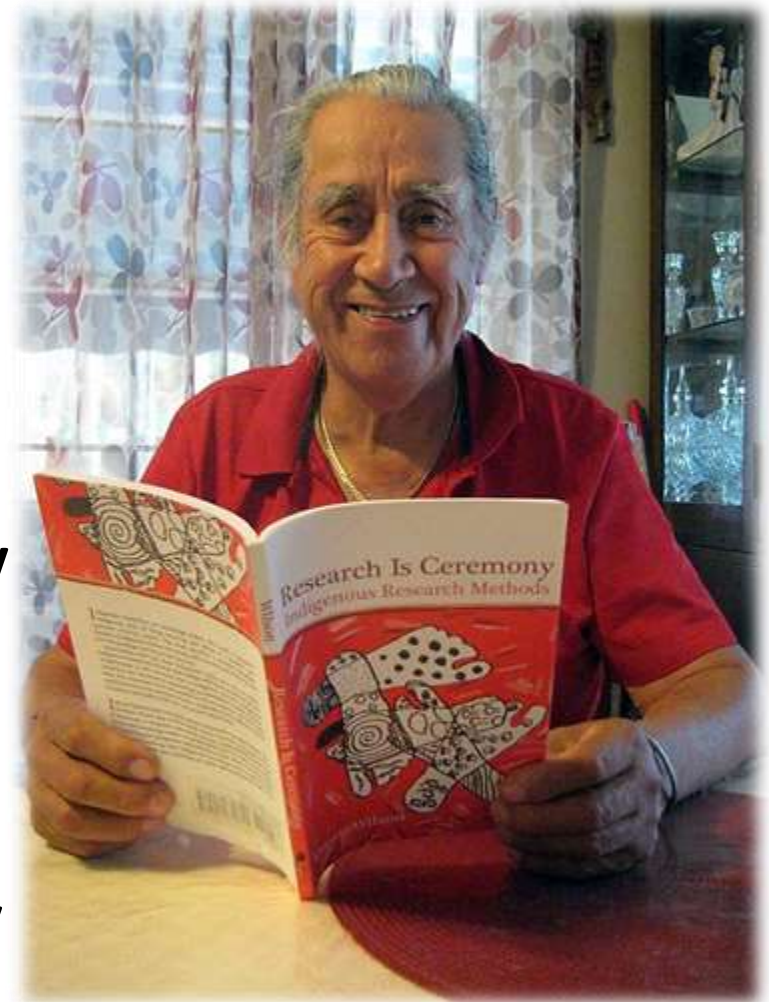
KNOWLEDGE SYSTEMS

epistemology

ontology

methodology

axiology



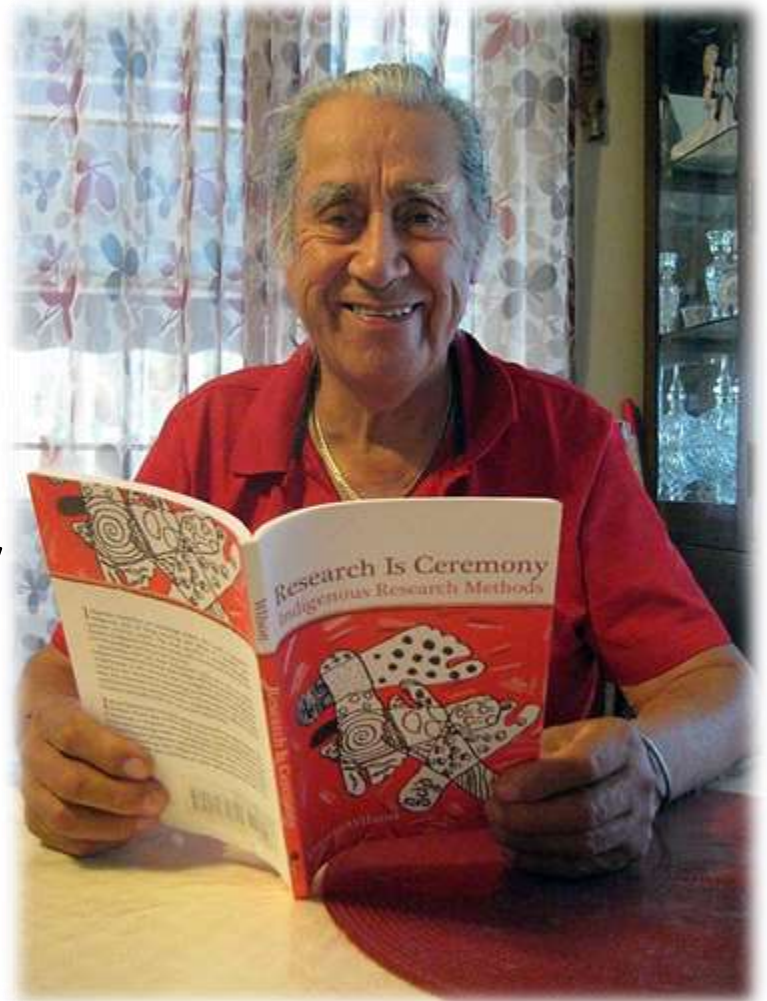
2

KNOWLEDGE SCRUTINIZATION: put our two paradigms on the table to be scrutinized ...
(words of Elder Albert Marshall)

MI'KMAQ KNOWLEDGE

- *nature of thinking or thought: wsitqamu'kewe'l ankitasuaqnn (worldly thoughts or knowledge gained throughout your life) ≈ epistemology*
- *worth of reality; real world; real life: wsitqamu'kewe'l penawsinn ≈ ontology*
- *how knowledge is gained: ta'n tel mnsnmen kjiji'taqn ≈ methodology*
- *worth of knowledge that will be used: kjijitaqn ta'n tel wie'wasitew ≈ axiology*

italicized text = Albert's thoughts



KNOWLEDGE SCRUTINIZATION: put our two paradigms on the table to be scrutinized ... (words of Elder Albert Marshall)

2

OUR KNOWLEDGES

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

CONCEPTS and ACTIONS (epistemologies)

<ul style="list-style-type: none"> - respect - relationship - reverence - reciprocity - ritual (ceremony) - repetition - responsibility 	<ul style="list-style-type: none"> - the question - hypothesis (making & testing) - data collection - data analysis - model & theory construction
--	--

epistemology

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

NATURAL WORLD (ontologies)

<p>All my Relations</p> <p>beings ... interconnective and animate: spirit + energy + matter</p> <p>with CONSTANT CHANGE with the sacred and the profane</p>	<p>parts & wholes</p> <p>objects ... comprised of parts and wholes characterized by systems and emergences: energy + matter</p> <p>with EVOLUTION</p>
---	---

ontology

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

METHODOLOGIES

<p>weaving of patterns within nature's patterns via creative relationships and reciprocities among <i>love, land, and life (vigour)</i> that are constantly reinforced and nourished by Aboriginal languages</p>	<p>un-weaving of nature's patterns (especially via analytic logic and the use of instruments) to cognitively reconstruct them, especially using mathematical language (rigour) and computer models</p>
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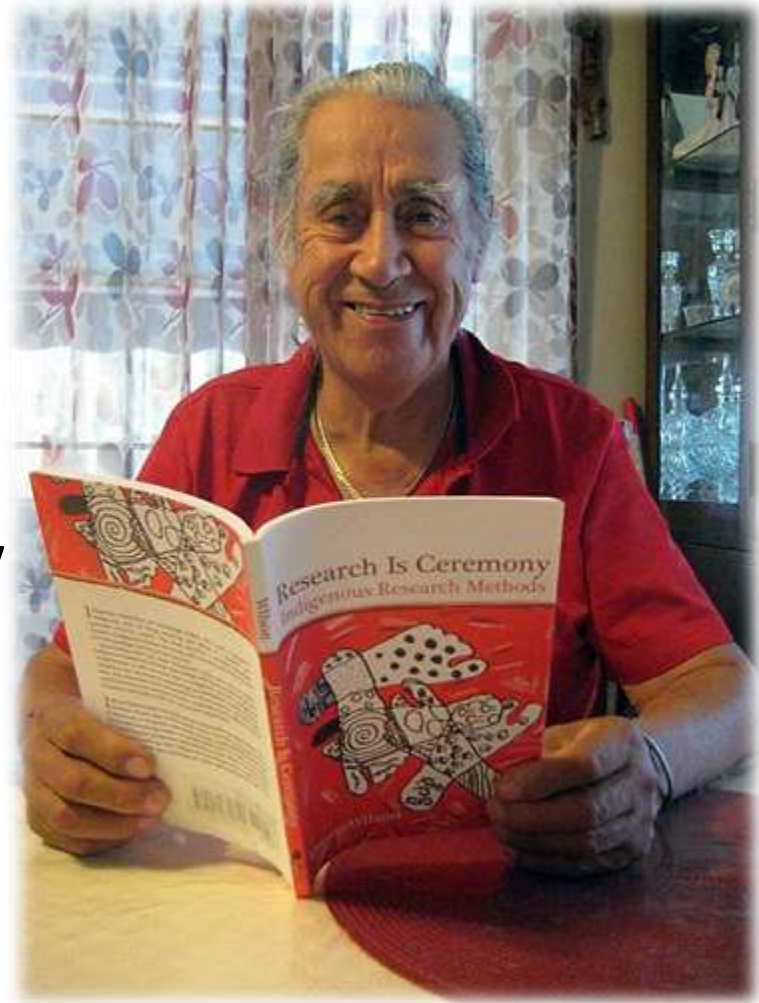
methodology

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

KNOWLEDGE OBJECTIVES

<p>collective, living knowledge to enable nourishment of one's journey within expanding sense of "place, emergence and participation" for collective consciousness and interconnectiveness</p> <p>Intends re-orientation of understanding within un-orientated</p>	<p>dynamic, testable, published knowledge independent of personal experience that can enable prediction and control (and "progress")</p> <p>Intends construction of understanding within orientated</p>
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axiology

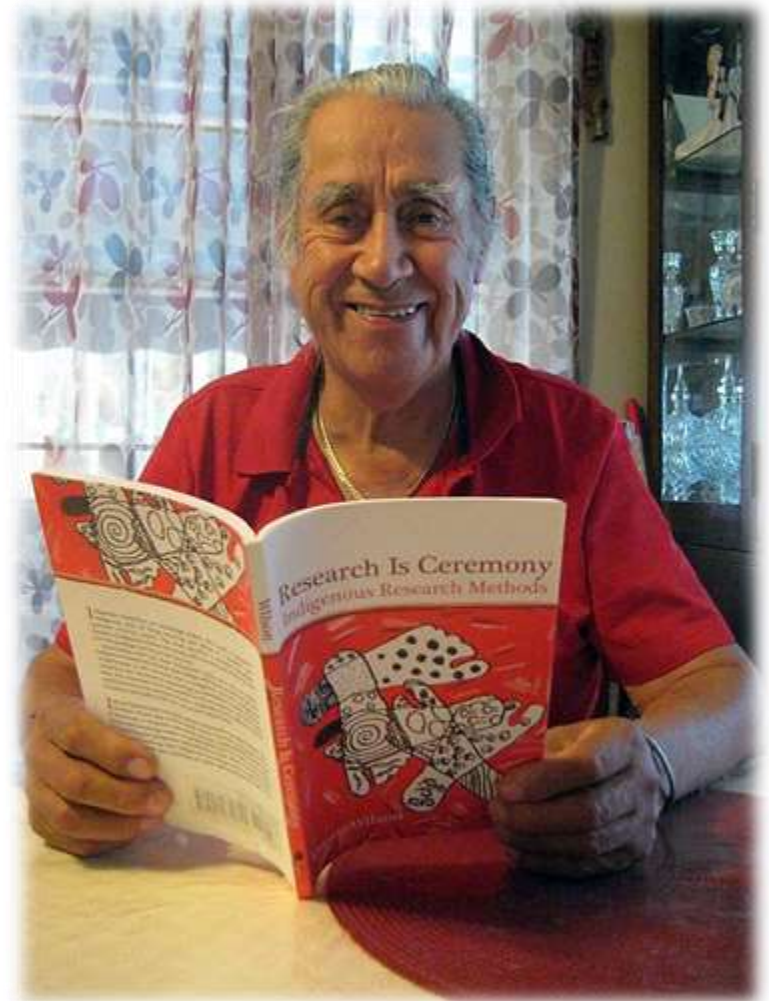


2

KNOWLEDGE SCRUTINIZATION: put our two paradigms on the table to be scrutinized ...
(words of Elder Albert Marshall)

WESTERN KNOWLEDGE

Western science can tell us what happens when people are physically starved, but it can't tell us what happens to people when they are spiritually starved. Western knowledge has not answered this yet.



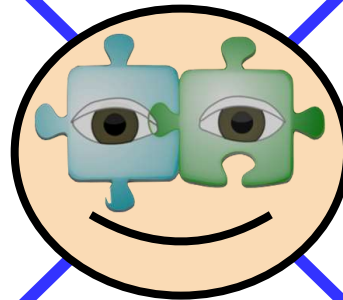
3

KNOWLEDGE VALIDATION

authenticity, accuracy, sacredness

→ peer review via acceptable processes

- Indigenous Knowledge Holders
- Researchers & Scholars



KNOWLEDGE VALIDATION

3

authenticity, accuracy, sacredness

→ peer review via acceptable processes

- Indigenous Knowledge Holders
- Researchers & Scholars

Why?

FRAUD

all too easy

to make something up

esp. for money or career advancement



FRAUD

all too easy

to falsify data

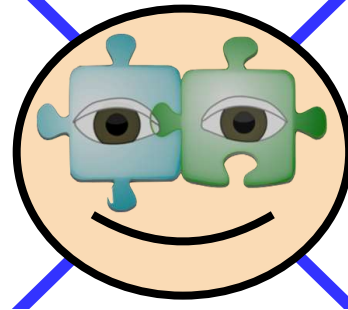
ALSO, MISTAKES DO HAPPEN



KNOWLEDGE VALIDATION

3

- authenticity, accuracy, sacredness
→ peer review via acceptable processes
- Indigenous Knowledge Holders
 - Researchers & Scholars



**How can we help Elders ensure
the validation they insist upon ... is in place?
How does “validation” fit within
oral knowledge transmission?**

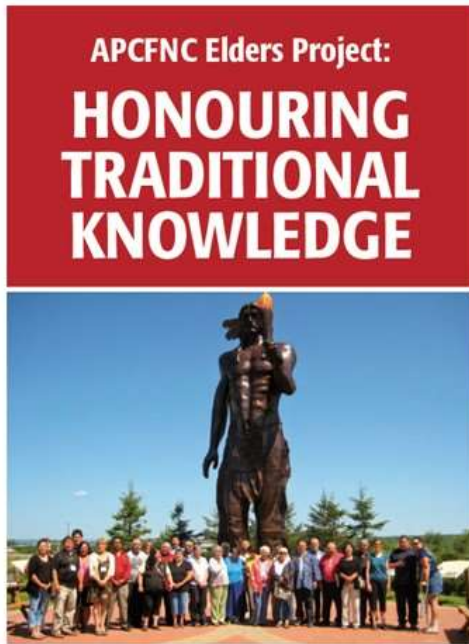
KNOWLEDGE VALIDATION

3

- authenticity, accuracy, sacredness
- peer review via acceptable processes
- Indigenous Knowledge Holders

Elders' 8 Recommendations

<http://www.apcfncc.ca/en/resources/HonouringTraditionalKnowledge>



Atlantic Aboriginal Economic Development
Integrated Research Program



ELDERS RECOMMENDATIONS

The following is the list of recommendations regarding Traditional Knowledge. It is an initial list of recommendations for sharing Traditional Knowledge. Reading it should be considered a form of consultation with Elders.

1. It needs to be recognized that Atlantic Aboriginal languages, and their cultural knowledge, leadership need to recognize the urgent need to learn from their Traditional Knowledge.
2. It is imperative that Elders be involved in ecological, economic development, as well as social development. Elders are in a position to help protect and enhance cultural knowledge.
3. Traditional Knowledge should be used in economic development, fisheries, health, and education.
4. Elders should be consulted in meaningful community planning, development, and decision-making. Elders' involvement would include being invited to decisions that Elders have input into decisions made.
5. Traditional Knowledge must be shared. Traditional Knowledge is passed on through oral tradition.
6. An Elders Council, appointed by Elders, should be formed to advise on matters related to protocols and/or other issues. The Council should be made up of Elders in all areas of the Atlantic region. The Elders Council, once formed, would be responsible for creating a template for sharing Traditional Knowledge for relevant post-secondary institutions.
7. Elders should be involved in developing curricula for primary and secondary education to ensure proper and meaningful education to develop a balance between western and traditional knowledge for Aboriginal children for their future generations. Post-secondary institutions should be encouraged to develop curricula (as described above in recommendation 7) that include Traditional Knowledge for relevant post-secondary institutions.
8. Each Aboriginal community needs to be encouraged to develop products of Traditional Knowledge. These products should be developed and respect traditional practices such as traditional laws, cultural and spiritual practices, language, and practices related to hunting and fishing, food gathering, medicine, ecology, science, and education.

To view the complete project, go to:
<http://www.apcfncc.ca/en/resources/HonouringTraditionalKnowledgeFinal.pdf>



FOR MORE INFORMATION PLEASE CONTACT:

Julie Smith
Atlantic Aboriginal Economic Development Integrated Research Program, 3422100
1000-1000

Please call her office at 902-973-2446
Email: julie@apcfncc.ca

3

KNOWLEDGE VALIDATION

authenticity, accuracy, sacredness
→ peer review via acceptable processes

- Researchers & Scholars

Author writes
article and submits
to journal

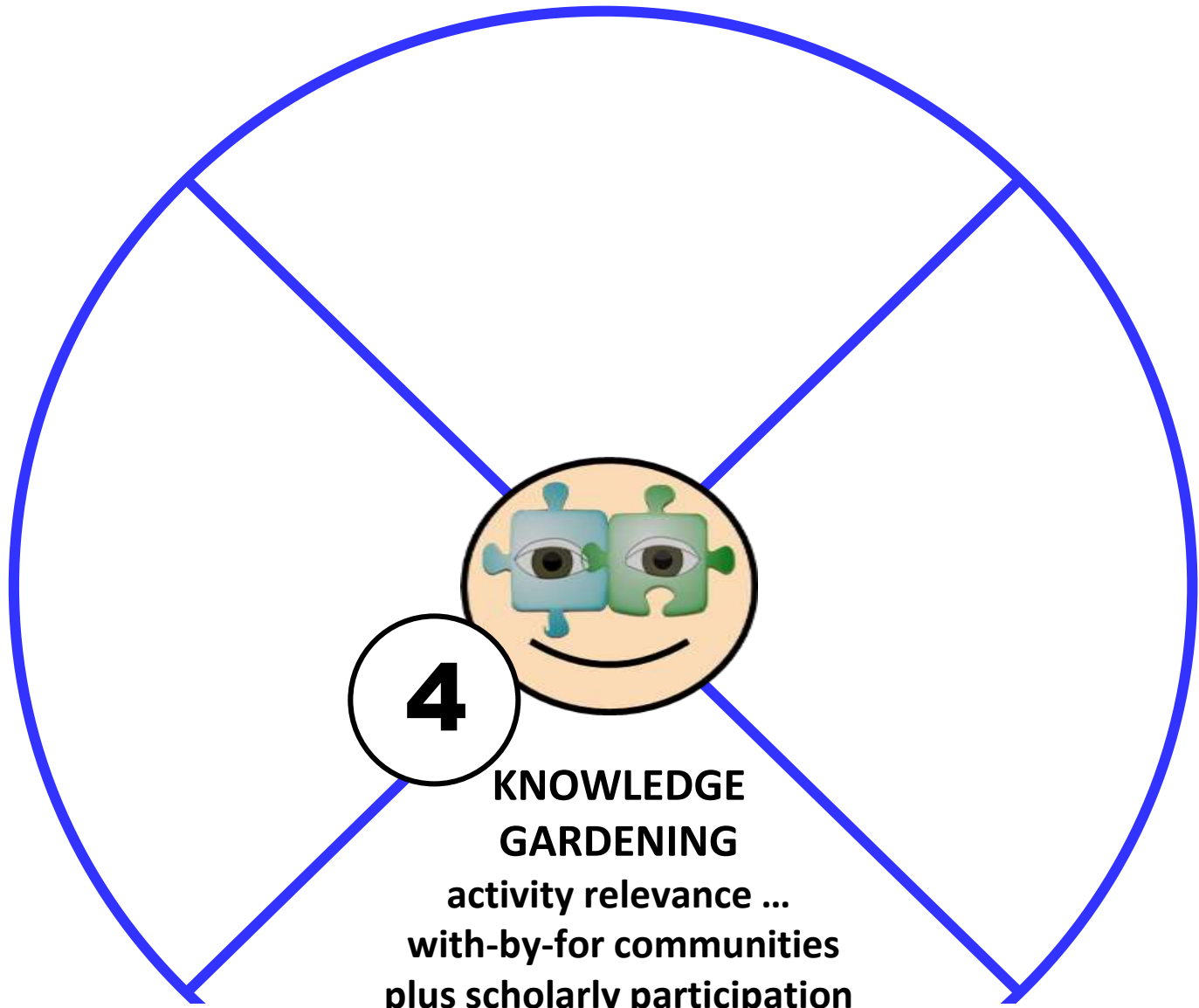
Editor sends copy
to a peer (expert
in the field) for
reviewing

SCHOLARLY PEER REVIEW PROCESS

Paper accepted and published,
then usually listed in
databases for other
researchers to find and
read, to inform their writing

The peer reviewers
check the manuscript for
accuracy and assess the
validity of the research
methodology and
procedures.





4

**KNOWLEDGE
GARDENING**

**activity relevance ...
with-by-for communities
plus scholarly participation**

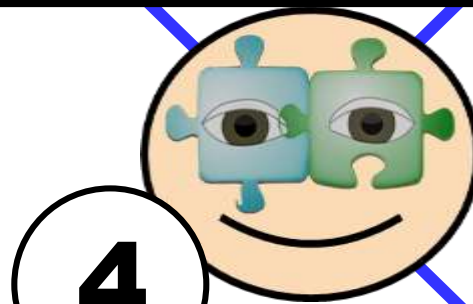
→ grounded learning, mentorship, research

- Community Members & Organizations
- Researchers & Students

Why

**We need to learn how to grow our understandings
so our knowledges can “work as one”.**

*Together: we need to talk AND walk our talk
... to co-learn within “actionable projects”.*



4

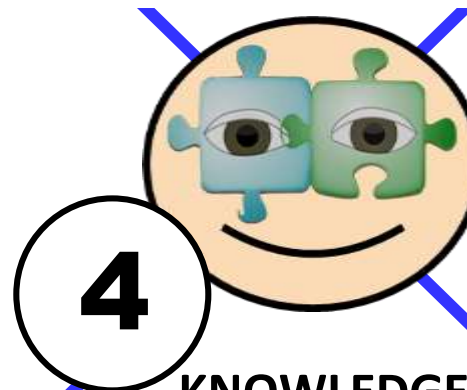
KNOWLEDGE GARDENING

**activity relevance ...
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- Researchers & Students

How do we re-awaken the understanding that healing comes from within? How can we strive to make different knowledges “work as one”?



KNOWLEDGE GARDENING

activity relevance ...
with-by-for communities
plus scholarly participation

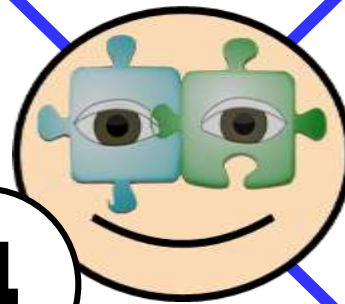
→ grounded learning, mentorship, research

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- Researchers & Students

How do we re-awaken the understanding that healing comes from within? How can we strive to make different knowledges “work as one”?

**WEAVE TOGETHER
RICH & DIVERSE
UNDERSTANDINGS
within
“actionable projects”**

4



**KNOWLEDGE
GARDENING**

activity relevance ...
with-by-for communities
plus scholarly participation

→ grounded learning, mentorship, research

- Community Members & Organizations
- Researchers & Students



Knowledge
is spirit.
It is a gift,
passed on
through
many people.
As Elders,
we must
pass it on.

words of
Elder Albert Marshall



4



Knowledge is alive, and thus both physical and spiritual.

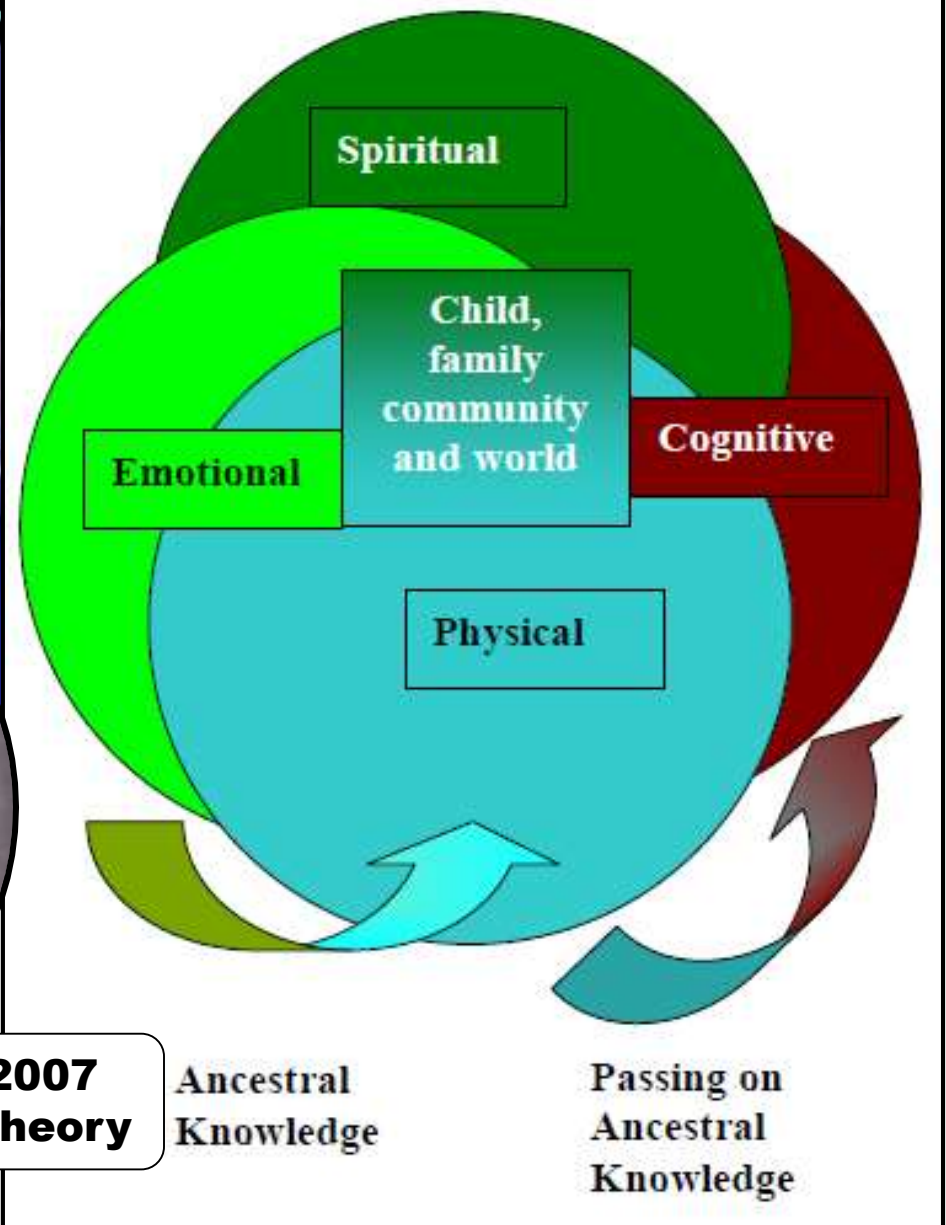
KNOWLEDGE lives in STORIES

Knowledge is spirit.
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Cindy Blackstock 2007
The Breath of Life Theory



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Stories

FROM C.F. BLACK and J. BORROWS:

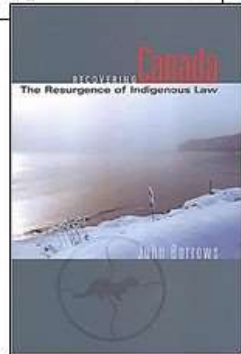
The Land is the
Source of the Law

A DIALOGIC ENCOUNTER WITH
INDIGENOUS JURISPRUDENCE

2011



C. F. Black



'I want you to remember only this one thing,' said the Badger. 'If stories come to you, care for them. And learn to give them anywhere they are needed ... sometimes a person needs a story more than food to stay alive. That is why we put these stories in each other's memories. This is how people care for themselves.'



p. 3 in "The Land is the Source of the Law" by **Christine F. Black** 2011

quoting **John Borrows** 2002, 2007

p.13 in "Recovering Canada: the resurgence of Indigenous Law"

CF Black: Indigenous Australian from the Kombumerri and Munaljahlai Clans
J Borrows: Anishinaabe/Ojibway and a member of the Chippewa of the Nawash First Nation

Knowledge is alive, and thus both physical and spiritual.

KNOWLEDGE lives in STORIES

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passed on
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As Elders,
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pass it on.

words of
Elder Albert Marshall

Stories

FROM LESLIE MARMON SILKO:

I will tell you something about stories ...
They aren't just entertainment.
Don't be fooled.
They are all we have, you see,
all we have to fight off
illness and death.

You don't have anything
if you don't have the stories.

in: Ceremony (1997) by: Leslie Marmon Silko ...

STORYTELLER with mixed ancestry,
by her own description: Laguna Pueblo, Mexican, and white



Knowledge is alive, and thus both physical and spiritual.

KNOWLEDGE lives in STORIES

Knowledge
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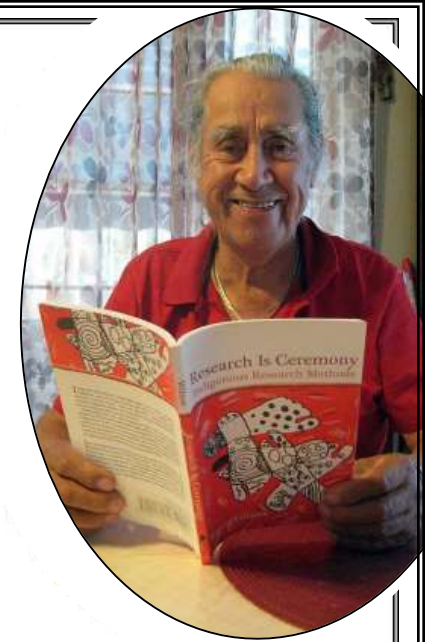
words of
Elder Albert Marshall

Stories

FROM ELDER ALBERT MARSHALL:

Traditionally, nothing was taught as black and white. Everything was story ... where you have the responsibility to listen and reflect. This is a much more profound way of learning because you have the opportunity for relationship with the knowledge.

I must bring relationships into my life. If a sense of relationship with the knowledge is not identified, then it becomes a duty and you memorize to appease someone. The understandings have not been assimilated; the head and heart have not been connected.



Knowledge is alive, and thus both physical and spiritual.
KNOWLEDGE lives in STORIES

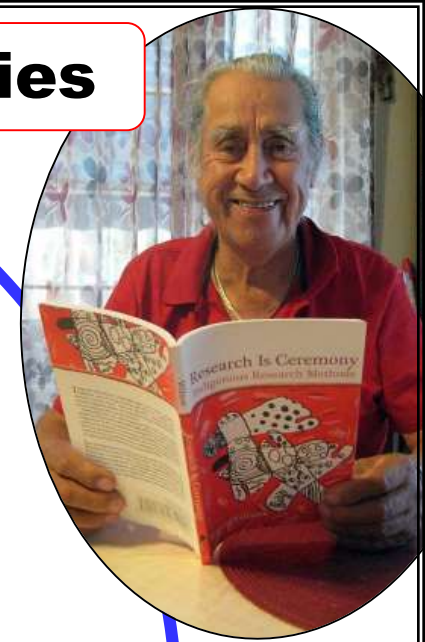
Knowledge Stories

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pass it on.

words of
Elder Albert Marshall



4

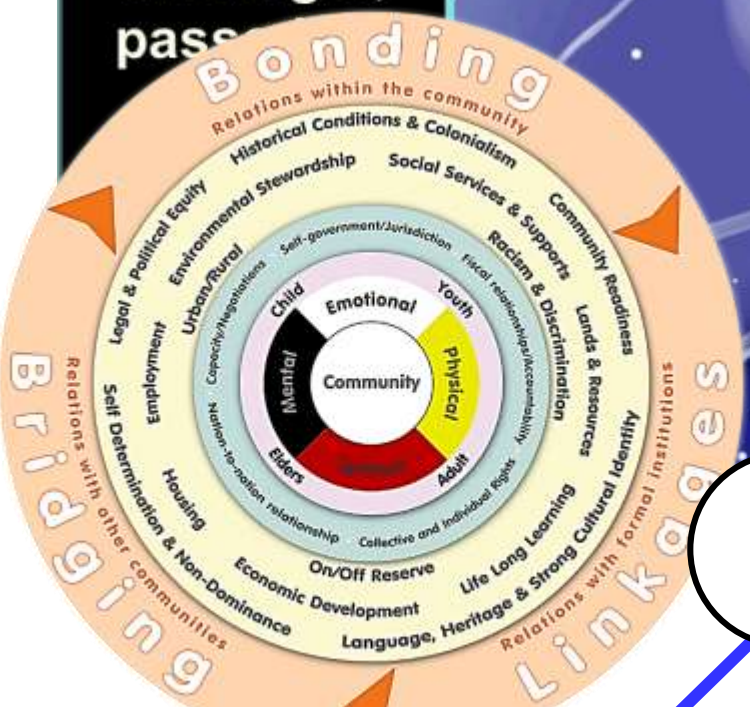


**How can we harness the power of story?
How can we learn to “listen to understand”,
rather than simply listening to say something back?**

**Knowledge is alive, and thus both physical and spiritual.
KNOWLEDGE lives in STORIES**

Knowledge Stories

Knowledge is spirit.
It is a gift,
pass



4

**models, theories,
articles, curricula**

Assembly of First Nations
Holistic Policy & Planning Model

Knowledge is alive, and thus both physical and spiritual.

Knowledge Stories

Knowledge is spirit.
It is a gift,
pass



Language Revitalization

Our language teaches us that everything alive is both physical and spiritual.

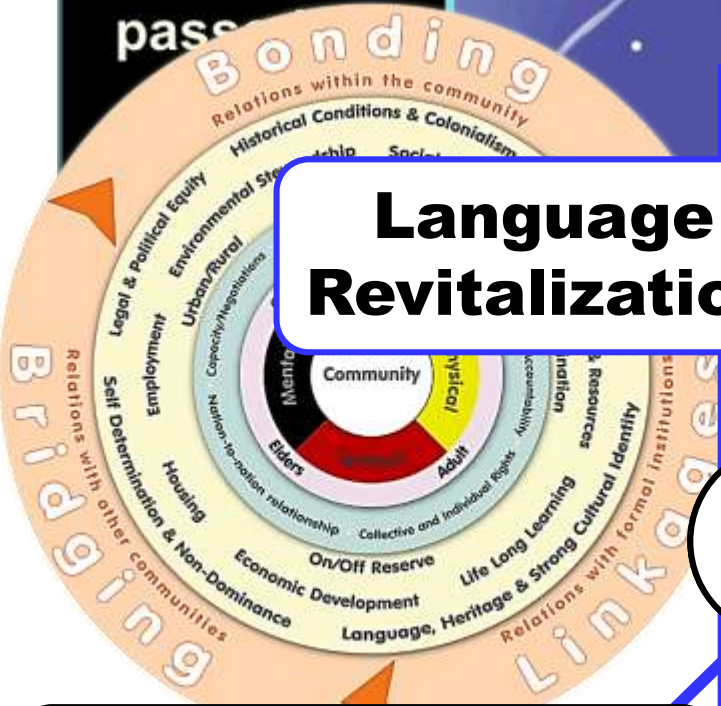
the “HEALING TENSE”
in the Mi’kmaw language



teachings of
Elder Murdena Marshall

4

WE HEAL TOGETHER

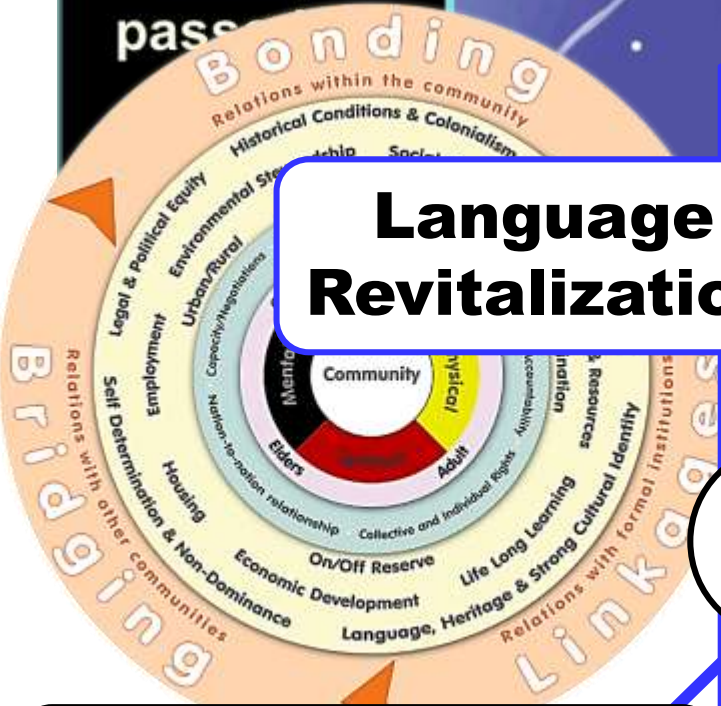


models, theories,
articles, curricula

Knowledge is alive, and thus both physical and spiritual.

Knowledge Stories

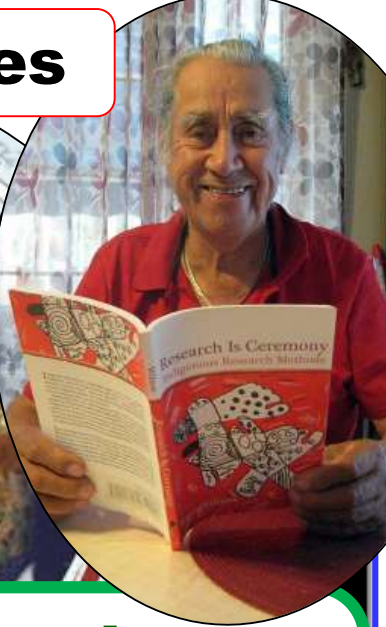
Knowledge is spirit.
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Language Revitalization

4

models, theories,
articles, curricula



Mawisikamukawey (Mother Earth) ecological integrity



WE HEAL TOGETHER

Knowledge is alive, and thus both physical and spiritual.

Knowledge Stories

Knowledge

WEAVE TOGETHER RICH & DIVERSE UNDERSTANDINGS within “actionable projects”

Language Revitalization

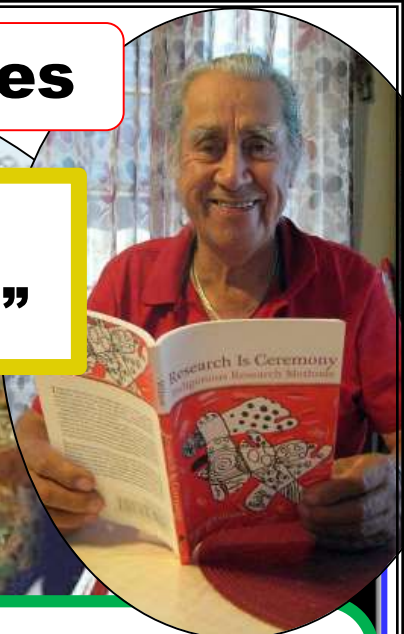
**Mawisikamukawey
(Mother Earth)
ecological integrity**

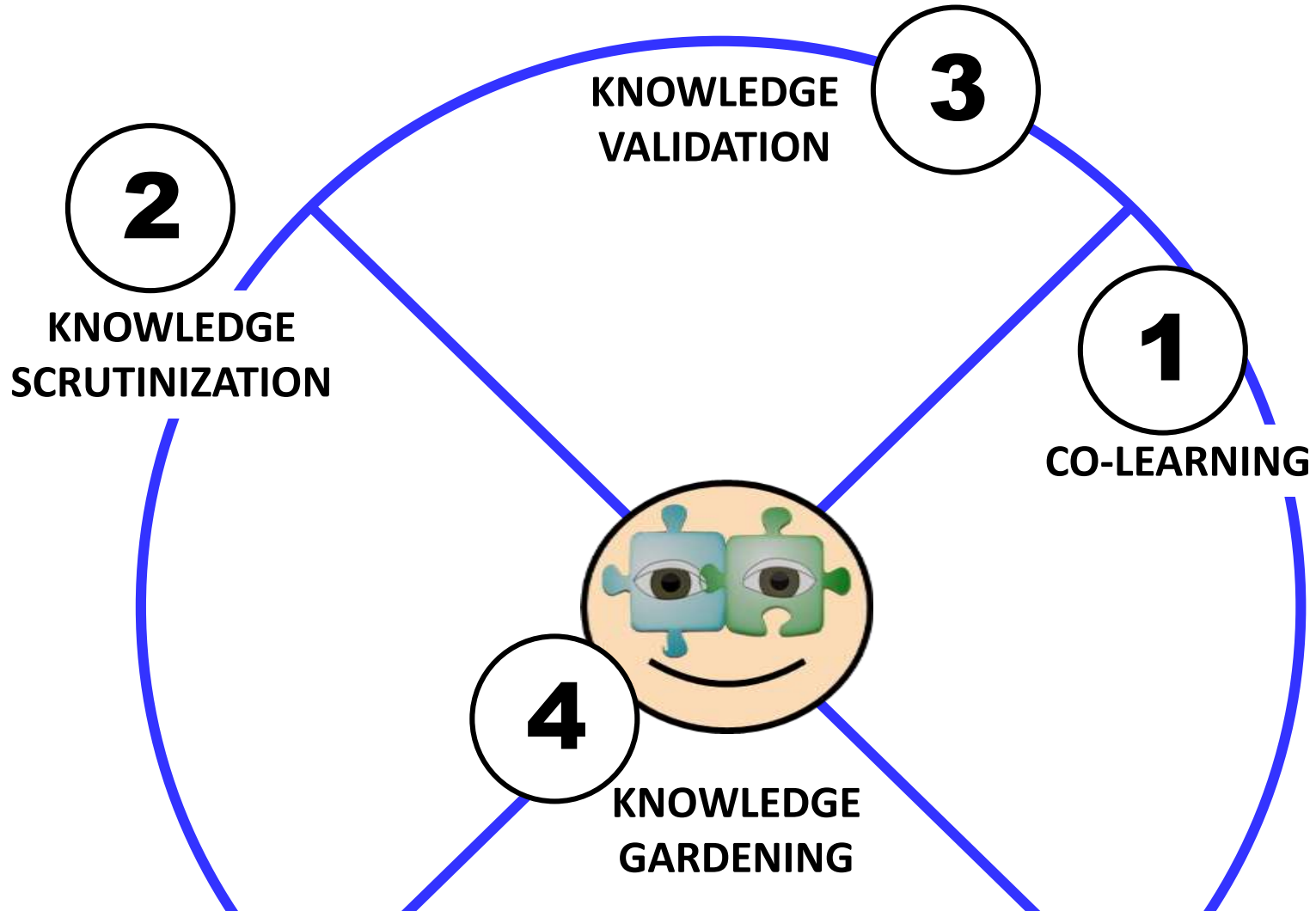
4

**models, theories,
articles, curricula**

**WE HEAL
TOGETHER**

Knowledge is alive, and thus both physical and spiritual.





repeat to remind and emphasize:

TWO-EYED SEEING

four key essentials ... each with challenges

OUTLINE

- Who? When? Why?
- What? How?
 - Integrative Science
- **Two-Eyed Seeing**
 - Essentials & Challenges
 - 1) Co-Learning +
- Cultural Humility

- 2) Knowledge Scrutinization
- 3) Knowledge Validation
- 4) Knowledge Gardening

We, Together

OUTLINE

- Who? When? Why?
- What? **How?** ←
- **Integrative Science**
- Two-Eyed Seeing
 - Essentials & Challenges
 - 1) Co-Learning +
- Cultural Humility

- 2) Knowledge Scrutinization**
- 3) Knowledge Validation
- 4) Knowledge Gardening

We, Together

KNOWLEDGE SCRUTINIZATION: We need to embark on a co-learning journey of Two-Eyed Seeing in which our two paradigms will be put on the table to be scrutinized ...

(words of Elder Albert Marshall)

KNOWLEDGE SYSTEMS

AS PREVIOUSLY MENTIONED

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

CONCEPTS and ACTIONS (epistemologies)

<ul style="list-style-type: none"> - respect - relationship - reverence - reciprocity - ritual (ceremony) - repetition - responsibility 	<ul style="list-style-type: none"> - the question - hypothesis (making & testing) - data collection - data analysis - model & theory construction
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epistemology

CO-LEARNING for Two-Eyed Seeing
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with CONSTANT CHANGE with SEASONAL AND METEOROLOGICAL	with EVOLUTION

ontology

CO-LEARNING for Two-Eyed Seeing
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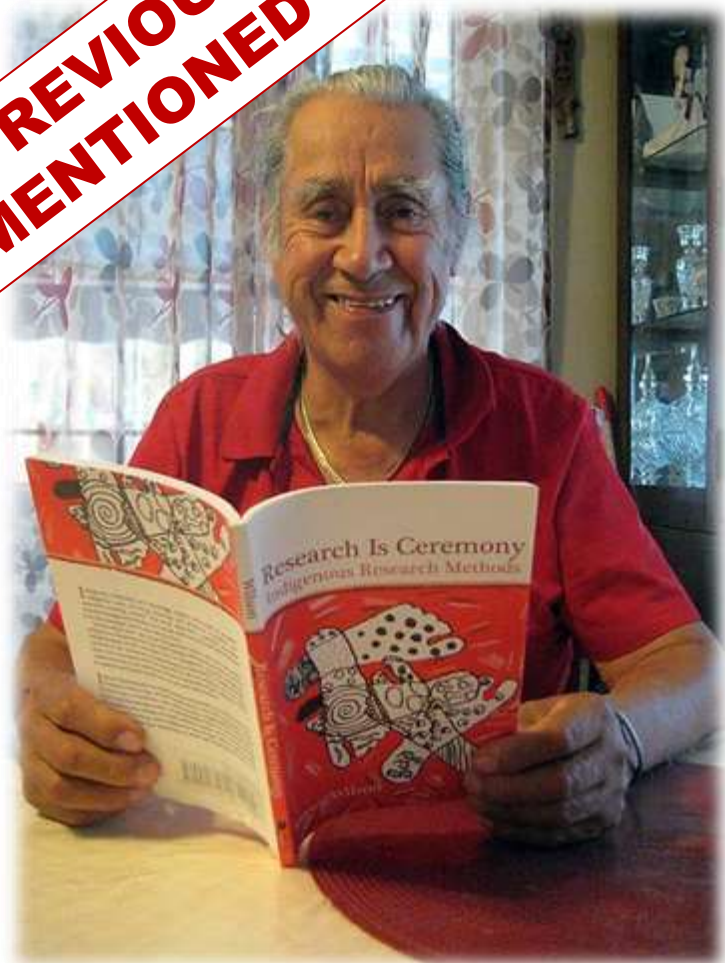
methodology

CO-LEARNING for Two-Eyed Seeing
learning our strengths and learning together

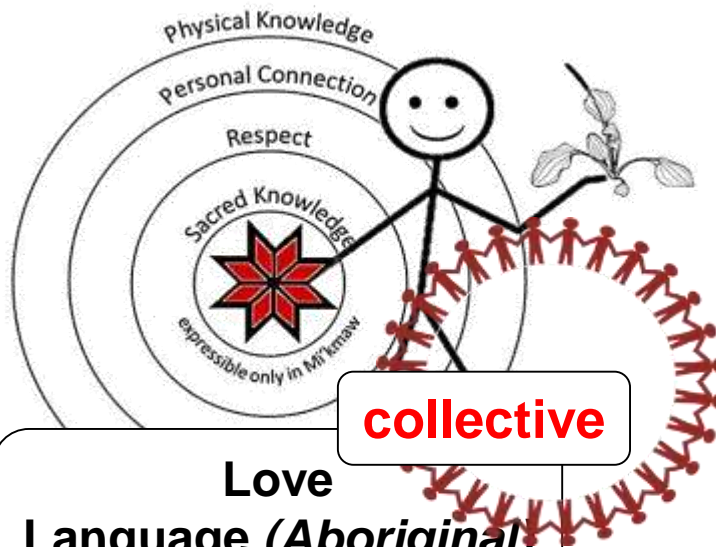
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collective, living knowledge to enable nourishment of one's journey within expanding sense of "place, emergence and participation" for collective consciousness and interconnectiveness	dynamic, testable, published knowledge independent of personal experience that can enable prediction and control (and "progress")
Intends reorientation of understanding within environment	Intends construction of understanding of environment

axiology

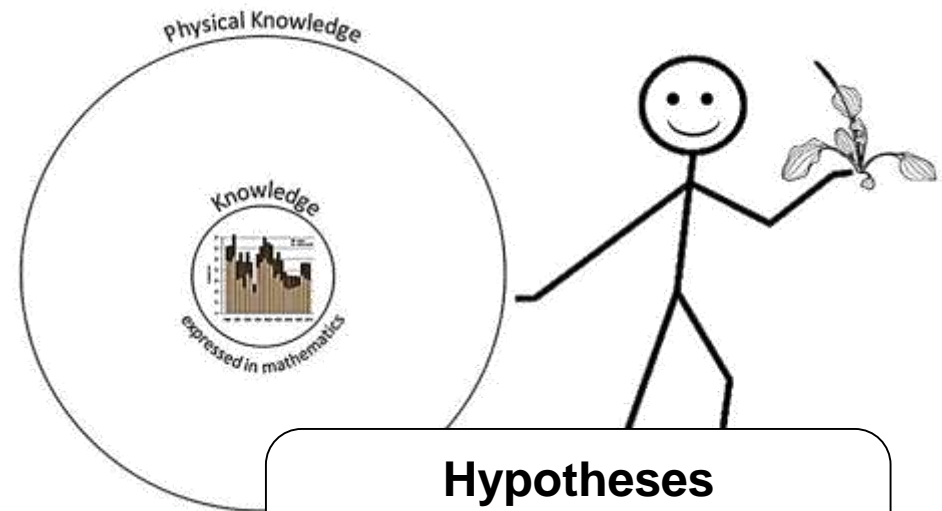


KNOWLEDGE SCRUTINIZATION: We need to embark on a co-learning journey of Two-Eyed Seeing in which our two paradigms will be put on the table to be scrutinized ...
(words of Elder Albert Marshall)



Love
Language (*Aboriginal*)
Life & Land

Indigenous



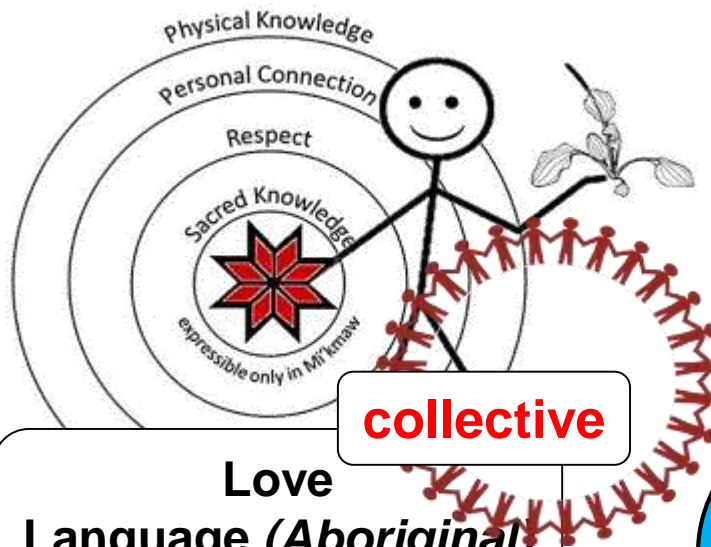
Hypotheses
Language (*Mathematics*)
Theories & Models

Western

**Knowledge System Models
adapted from Elder Murdena Marshall**

KNOWLEDGE SCRUTINIZATION: We need to embark on a co-learning journey of Two-Eyed Seeing in which our two paradigms will be put on the table to be scrutinized ...

(words of Elder Albert Marshall)

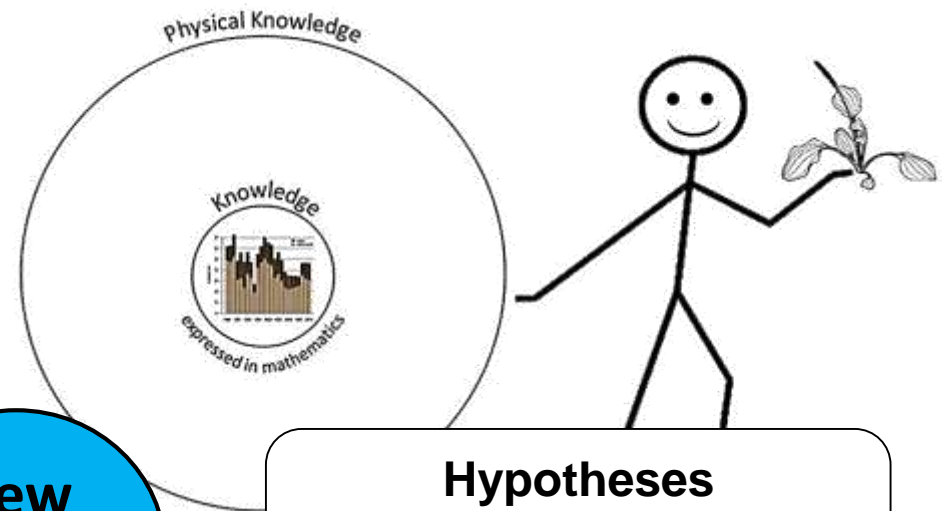


collective

Love
Language (*Aboriginal*)
Life & Land

Indigenous

ATK / MTK / IK / TEK
Ta'ntelo'ti'k



Hypotheses
Language (*Mathematics*)
Theories & Models

Western

mainstream / conventional
science

**new
sciences**

the issue of labels

Integrative Science

KEY: Common Ground



Dr. Marie Battiste
Univ. of Saskatchewan

*** Indigenous Knowledge and Pedagogy in First Nations Education; a 2002 literature review with recommendations:**

“... focussing on the similarities between the two systems of knowledge rather than on their differences may be a more useful place to start when considering how best to introduce educational reform.”

* paper prepared for
National Working Group on Education and
the Minister of Indian Affairs

Integrative Science

KEY: Common Ground to View Science Inclusively



work of Dr. Cheryl Bartlett
Tier 1 Canada Research Chair
and team
with Elders & Educators

Integrative Science



**How to view
science inclusively:**

SCIENCE
= dynamic, pattern-based knowledge
shared through stories
about our interactions with and within nature

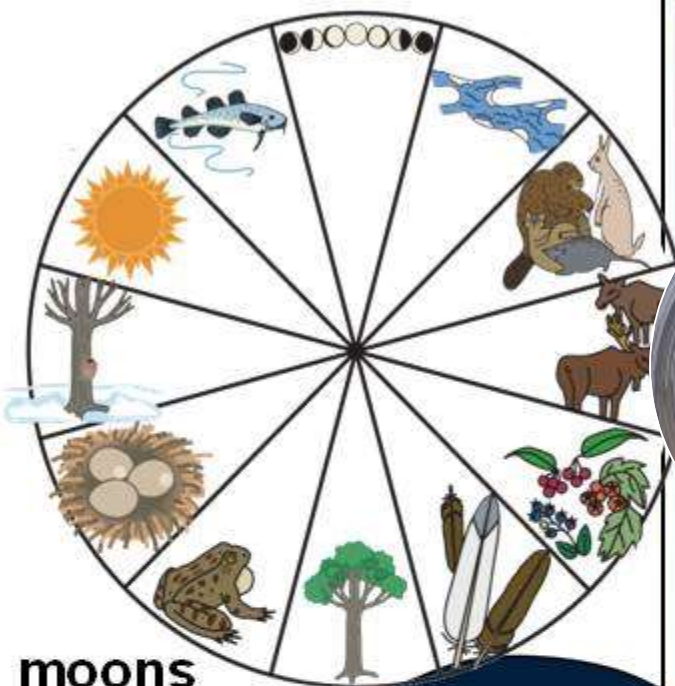
Integrative Science



only briefly here;
more info in Part 2

creating **SCIENCE CURRICULA** based on
dynamic, pattern-based knowledge
shared through stories
about our interactions with and within nature

patterns woven within patterns – Mi'kma'ki



moons



seasons



days
(nights)

generations

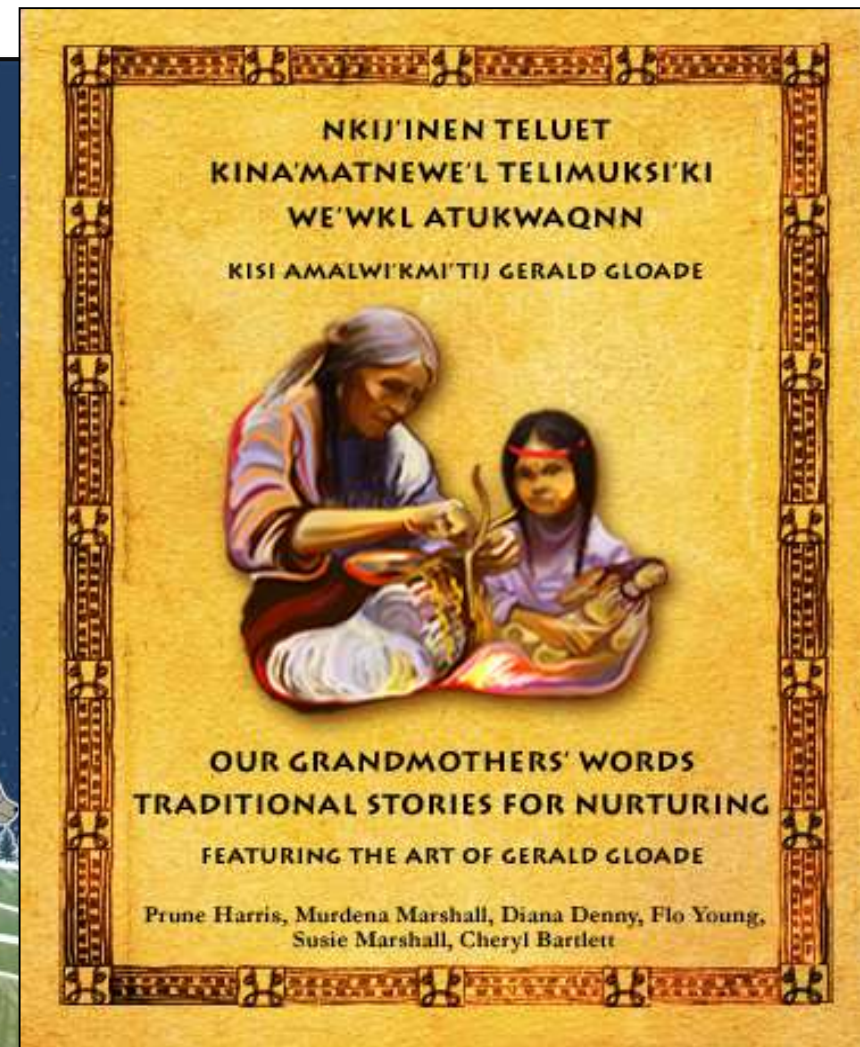
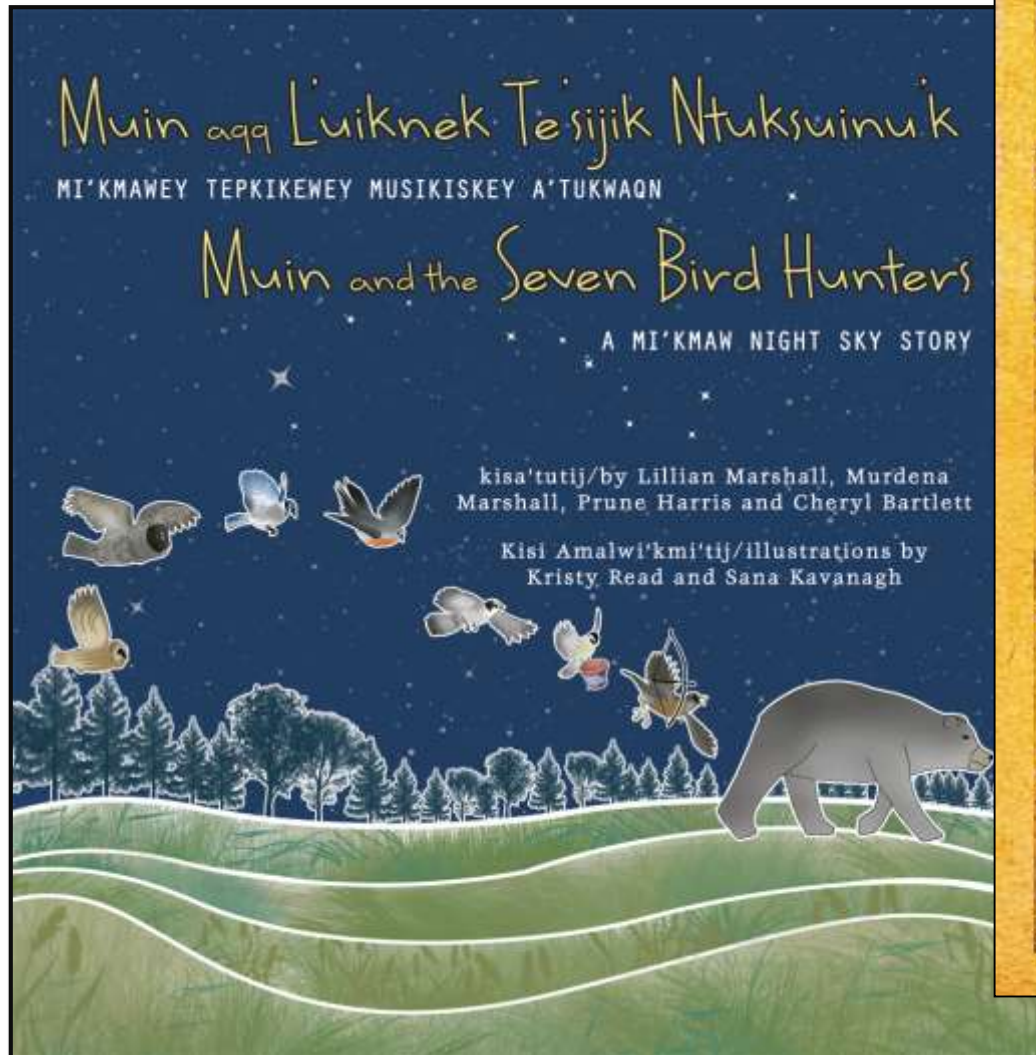
years

Msit No'kmaq
All My Relations

Mawisikamukawey



Elders' wholistic science stories – Mi'kma'ki



Elders' wholistic science stories – Nitsitapiisinni



Nitsitapiisinni

Stories and Spaces

Exploring Kainai Plants and Culture

Niitsitapi Territory

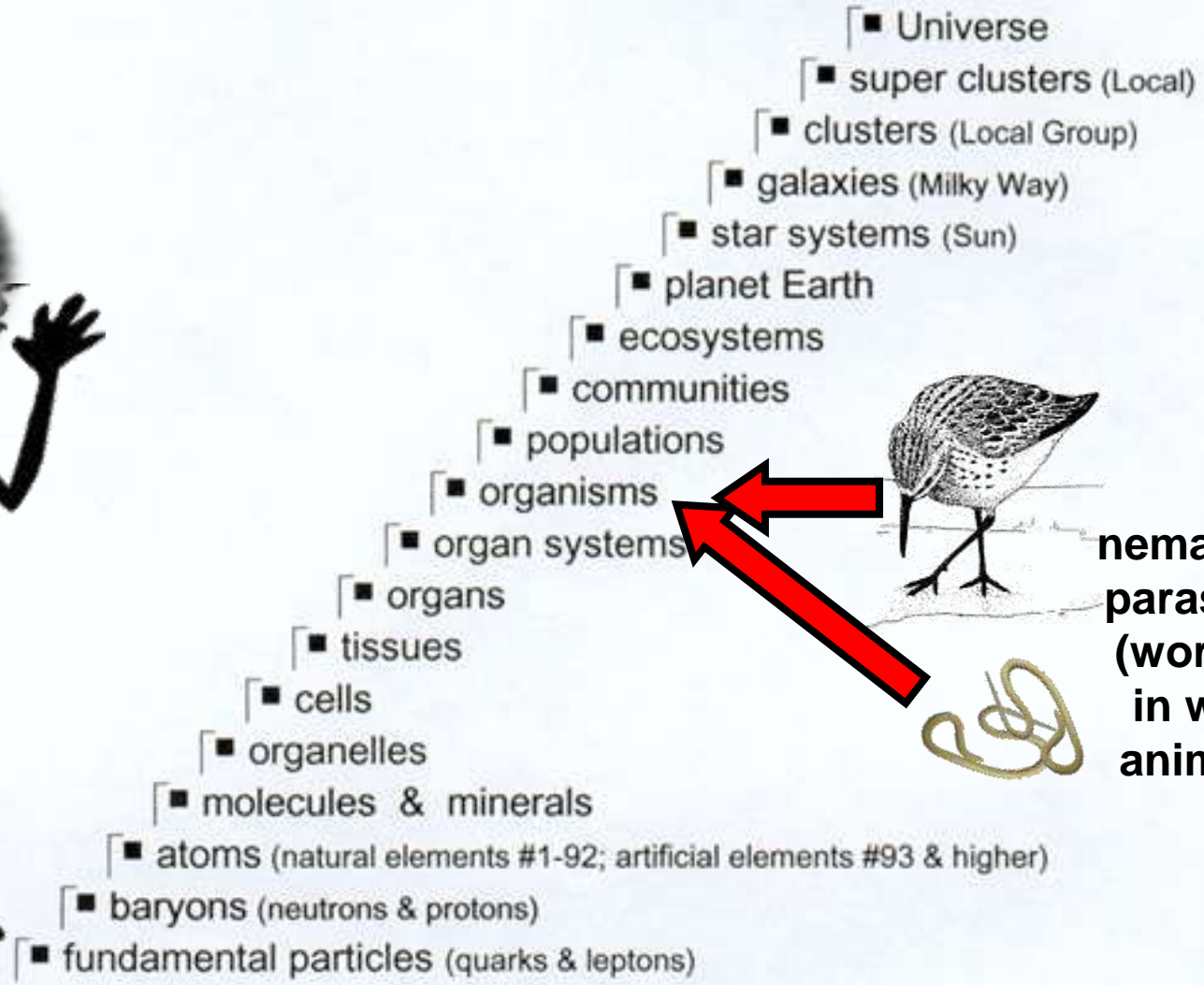
<http://galileo.org/kainai/>

- Floodplain** (Pete Standing Alone)
- Dry Prairie** (Adam Delaney)
- Forest** (Narcisse Blood)
- Parkland** (Carolla Calf Robe)
- Wet Prairie** (Alfreda Delaney)
- Classroom**
- History**
- Plant Index**
- Map of Blackfoot Confederacy Territory**
- Artwork Gallery**
- Photo Gallery**
- Digitized Books**
- How To USE THIS WEB RESOURCE** (INSTRUCTIONAL VIDEOS)
- Thanks**

The first thunderclap of spring tells us that the Thunder Medicine Bundle may be opened.

my science research

Universe: Visible Matter (levels of organization - biology)



nematode
parasites
(worms)
in wild
animals

my science research

GENES / DNA

at the level of macromolecules

DISEASE

response at the level of (multi-cellular) organism

EPIDEMIOLOGY

at the level of populations

GROSS PATHOLOGY

HISTOPATHOLOGY

INFLAMMATION

response at levels of cells and tissues

ECOLOGY OF DISEASE



- se: Vis
- biology)
- se
- super clusters (Local)
- clusters (Local Group)
- galaxies (Milky Way)
- star systems (Sun)
- pla
- ecosy
- communities
- populations
- organism
- organ s
- organs
- es
- ce
- orga
- molecu
- minerals
- atoms (na
- baryons (neu
- ons)
- tons)



nematode
parasites
(worms)
in wild
animals

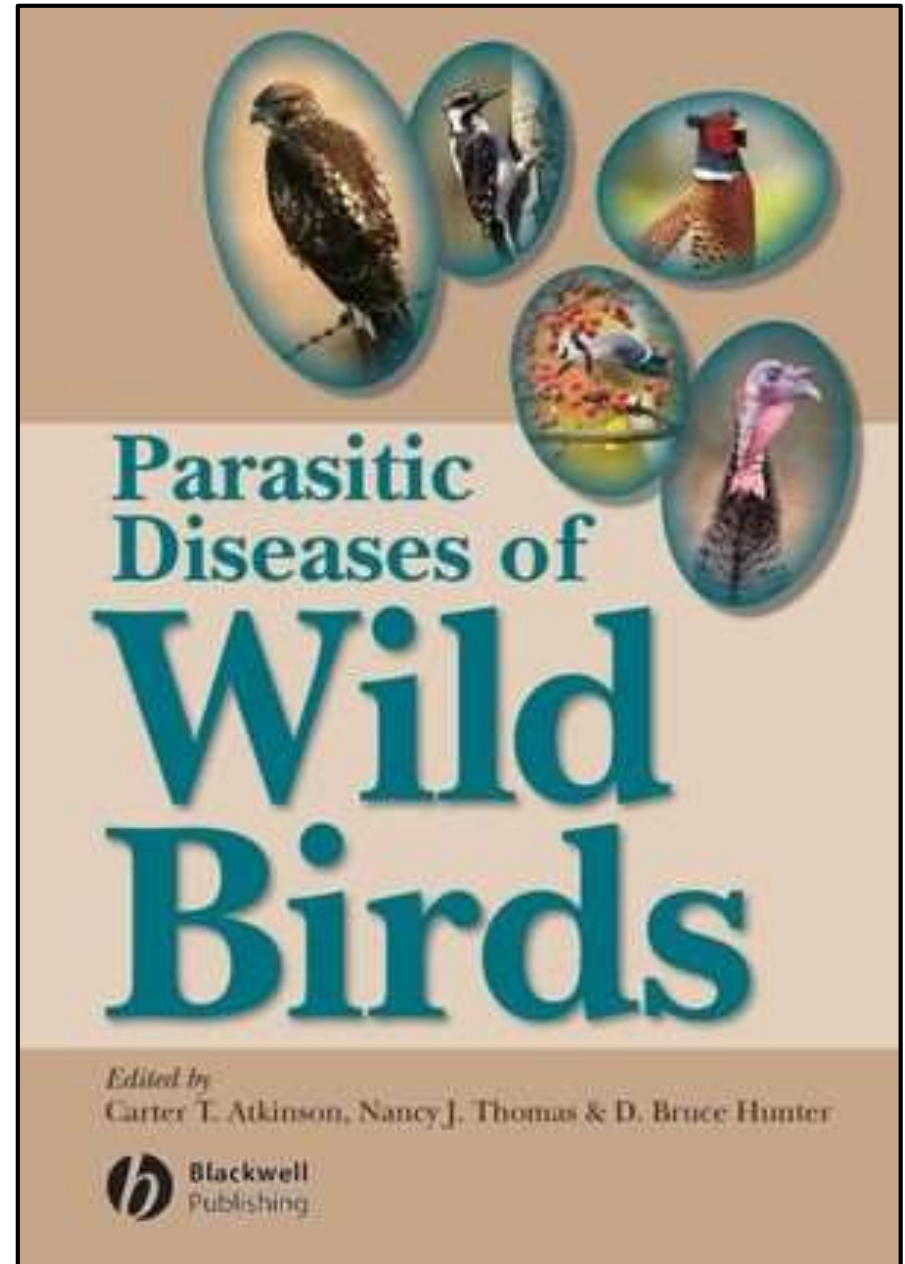


my science research

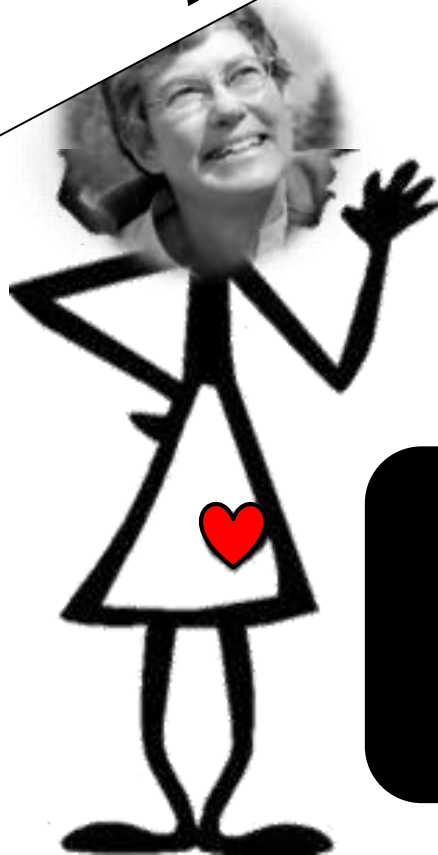
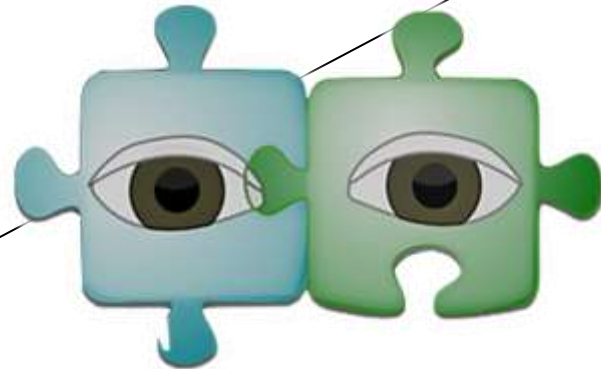
Western science stories



**patterns taken apart
to gain understanding
... re-assembled
within explanatory
professional
publications**



**INDIGENOUS
ELDERS HAVE HELPED
ME "TWO-EYED SEE"
A LOT MORE!**



**♥ I LOVE
WESTERN
SCIENCE!**

hypotheses
(making & testing)
data collection
data analysis
model & theory
construction

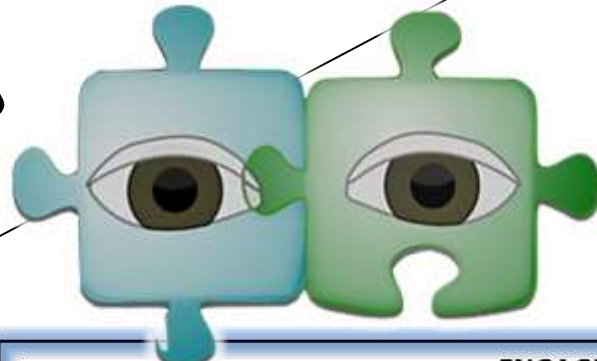
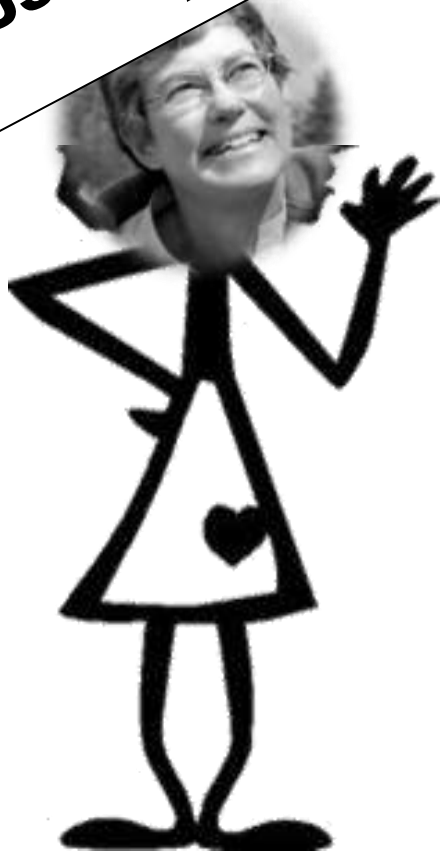
**INDIGENOUS
SCIENCE**

love ♥
language
land
All My Relations

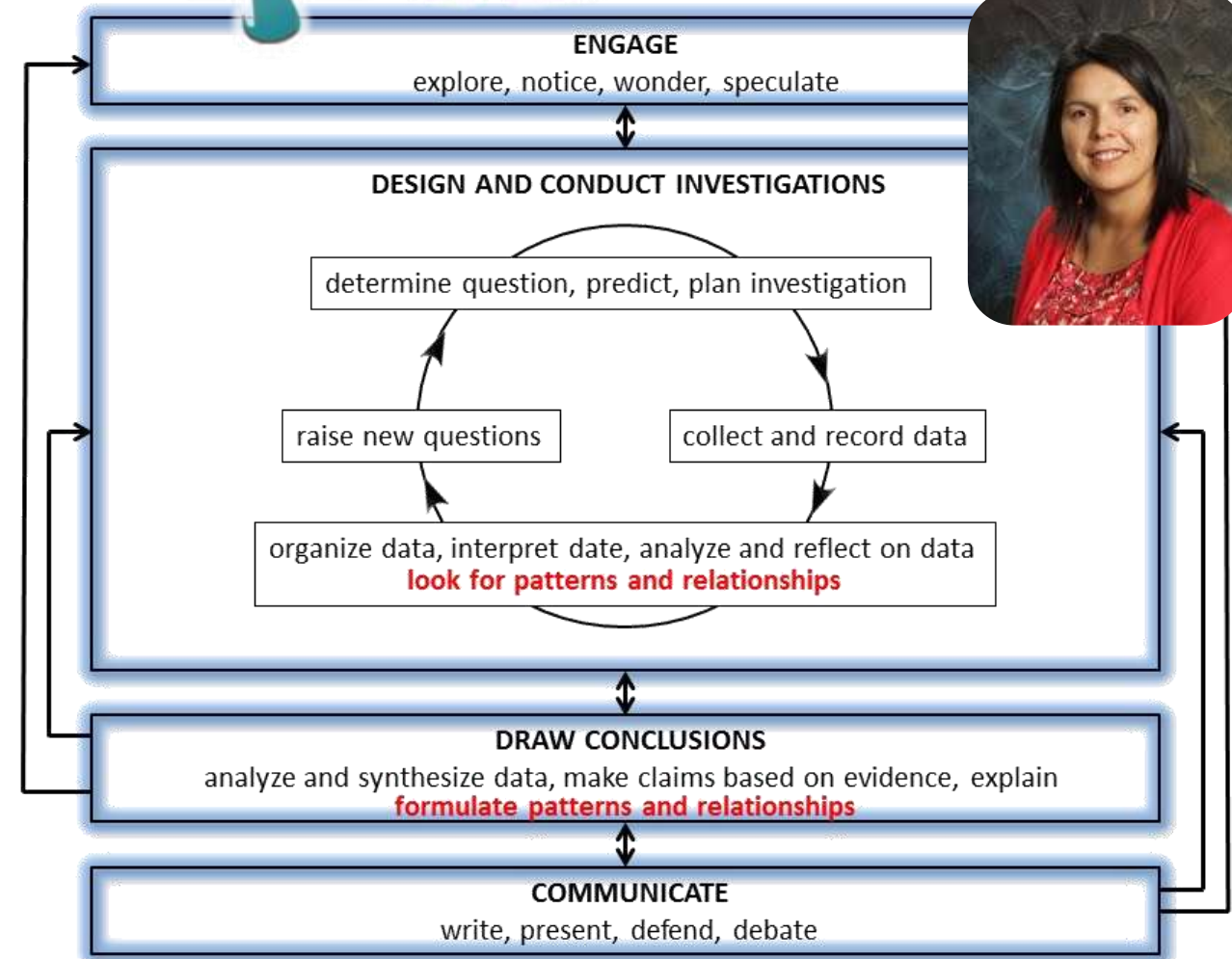
respect
relationship
reverence
reciprocity
ritual (ceremony)
repetition
responsibility



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US ALL “TWO-EYED SEE”
A LOT MORE!**

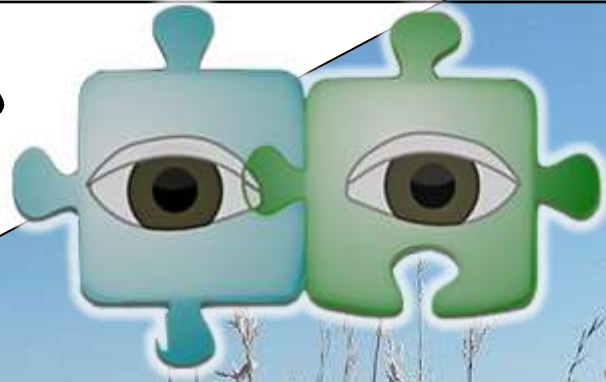


**Two-Eyed Seeing
new elementary curricula
Carola Knockwood
Mi'kmaw Kina'matneway
(NS Mi'kmaw education authority)**

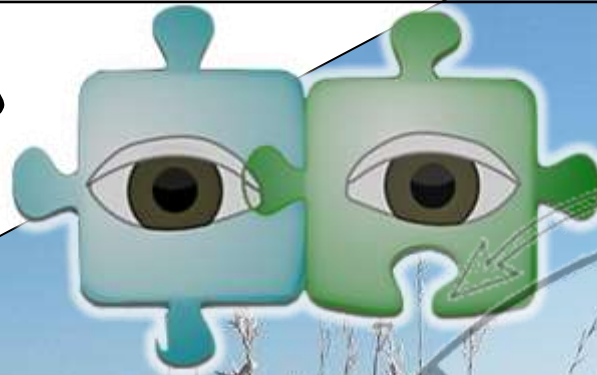


model by Karen Worth, Wheelock College (red added)

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We, Together

Learning & Practising → Cultural Humility

*from health care arena**: **CULTURAL HUMILITY**

- Merely acknowledging the differences between cultures is in itself an important first step but it is certainly not sufficient.
- A person might know almost everything one could possibly know about a culture without demonstrating true cultural humility.
- It's "reflexive attentiveness" of the kind that requires a great deal of "self-awareness" and goes far beyond "knowledge of the details of any given cultural orientation."

* California Health Advocates. "Are You Practicing Cultural Humility? The Key to Success in Cultural Competence" (April 2007) (<http://www.cahealthadvocates.org/news/disparities/2007/are-you.html>)

from our work: **CO-LEARNING**

Elder Albert Marshall:

SOMETIMES IT'S LIKE A HEAVY SLEDGE

This work of Co-Learning guided by Two-Eyed Seeing is not easy and so we need to understand that sometimes our most important job is to plant seeds for the future, for the youth, knowing seeds germinate when the time is right. This job of today requires that we do it as **We, Together**



Wela'lin / Thank you

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