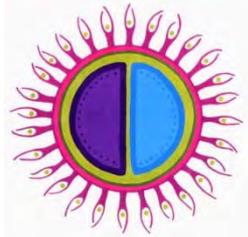


# **CO-LEARNING: Indigenous and Western sciences talking and walking together ...** *a journey with some methodology insights*

presentation for:



## **Aboriginal Studies Program** **- ABS460Y Aboriginal Methodology**

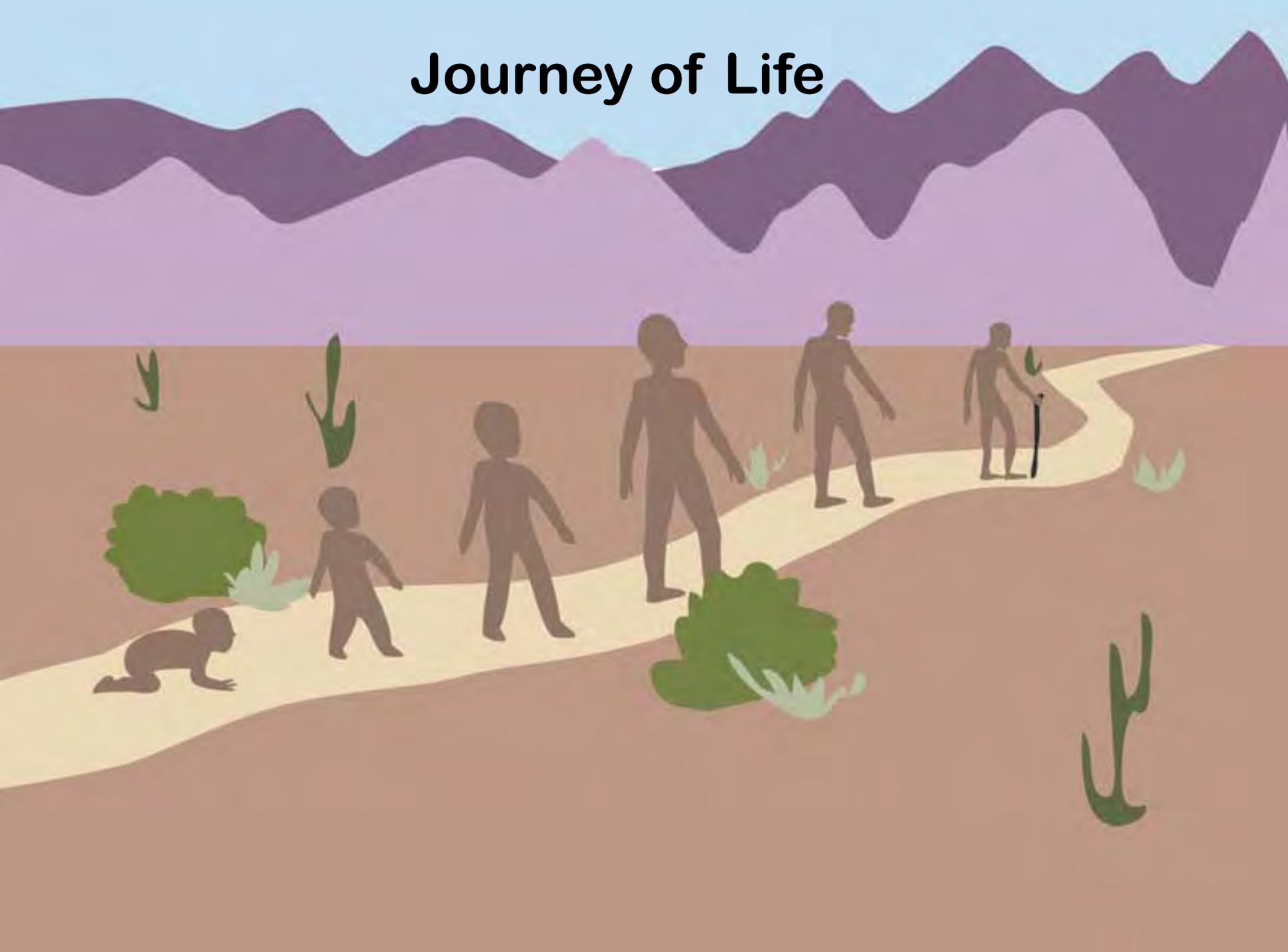
**University of Toronto (Distinguished Lecturer Series)**  
7 November 2007

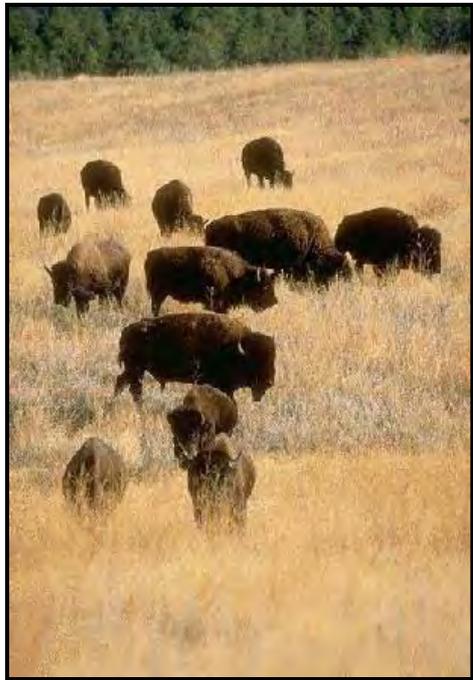
**Cheryl Bartlett, PhD**  
Canada Research Chair  
in Integrative Science

CAPE BRETON  
UNIVERSITY



# Journey of Life

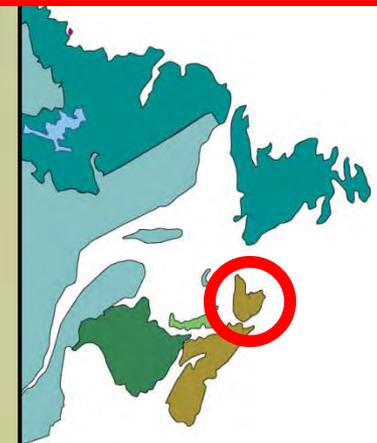
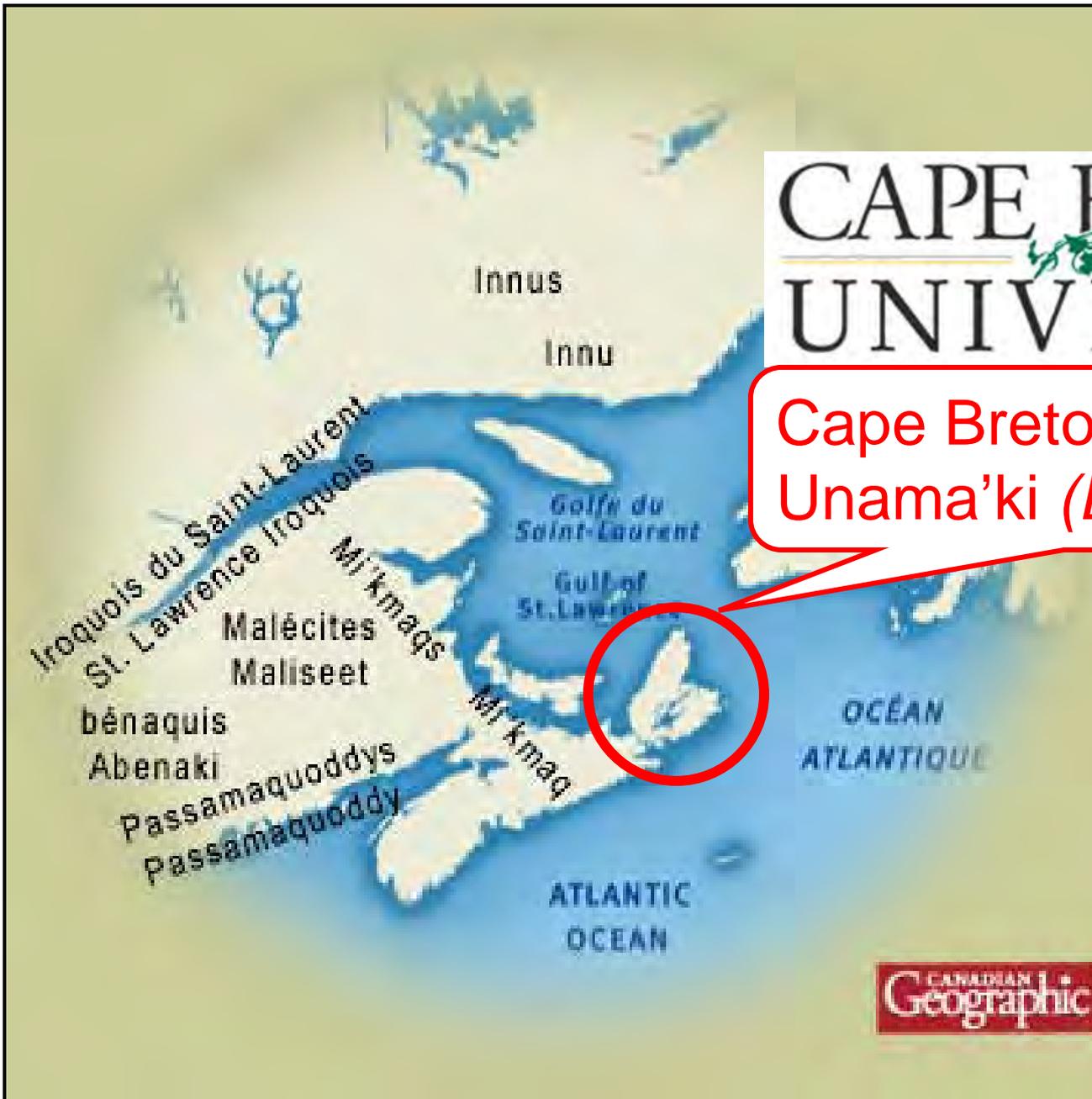






# CAPE BRETON UNIVERSITY

Cape Breton Island  
Unama'ki (*Land of Fog*)



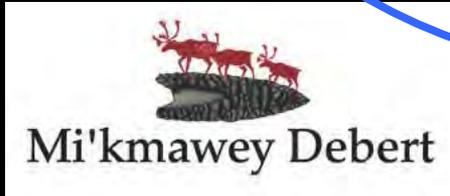
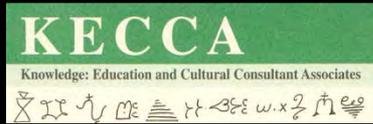


Canada Research Chairs / Chaires de recherche du Canada

Social Sciences and Humanities Research Council of Canada / Conseil de recherches en sciences humaines du Canada



# Mi'kmaq Elders



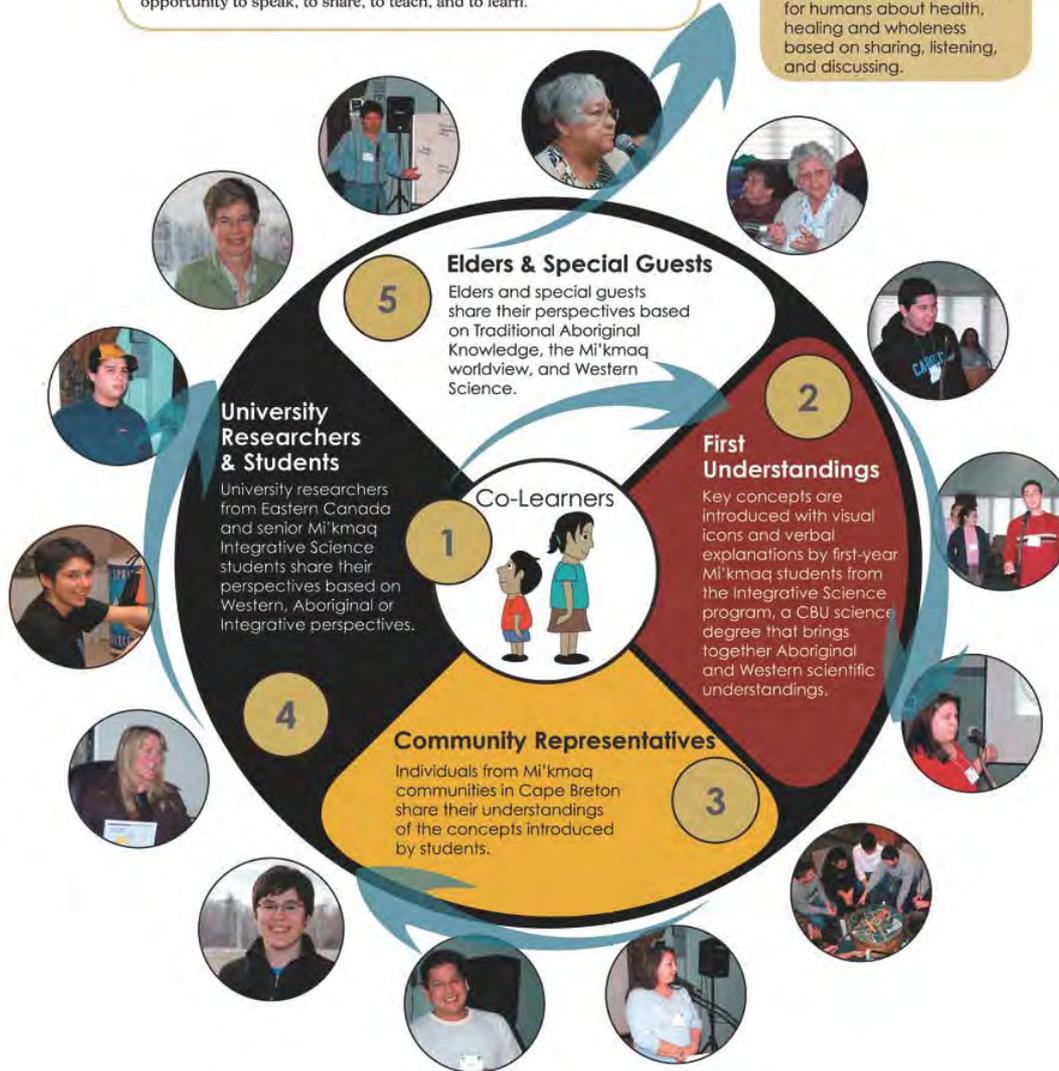
# Co-Learning Journey

A shared understanding of how to talk together

This visual is based on the Medicine Wheel (or Circle of Learning) which is a commonly used Aboriginal teaching tool. The visual shows that within the discussion, all have a role to play. Each person has an opportunity to speak, to share, to teach, and to learn.



Each participant gains some new understandings of Mother Earth and her lessons for humans about health, healing and wholeness based on sharing, listening, and discussing.



**10+ years: where our journey  
has been and continues to be ...**

**Science**

**Indigenous**

**Western**

**The central dilemma of science education today is the teaching of science from only one cultural perspective, and in an incomplete and non-connected manner.**

Gregory Cajete, PhD, scientist & educator, Univ. of New Mexico

**Indigenous**

**Western**

**10+ years: where our journey  
has been and continues to be ...**

## **Integrative Science**

**bringing together Indigenous and Western  
scientific knowledges and ways of knowing**

**Indigenous**

**Western**

# Integrative Science



# Integrative Science

## SCIENCE

education, research, applications,  
youth and community outreach

Indigenous

our sciences  
our stories

Western

“bringing our knowledges together”

our worldviews

stories of our interactions with and within nature

Science: dynamic, pattern-based knowledge



the patterns  
that we see  
within nature  
reflect our ...

**SANCTIONED  
PERSPECTIVES & INTELLIGENCES:**  
who we are; where we are; where we were;  
what we know, do and value

# Co-Learning: Indigenous and Western sciences talking and walking together ... a journey with some methodology insights

1. walk-talk
2. knowledge in the land
3. naturalized models
4. evidence enriched



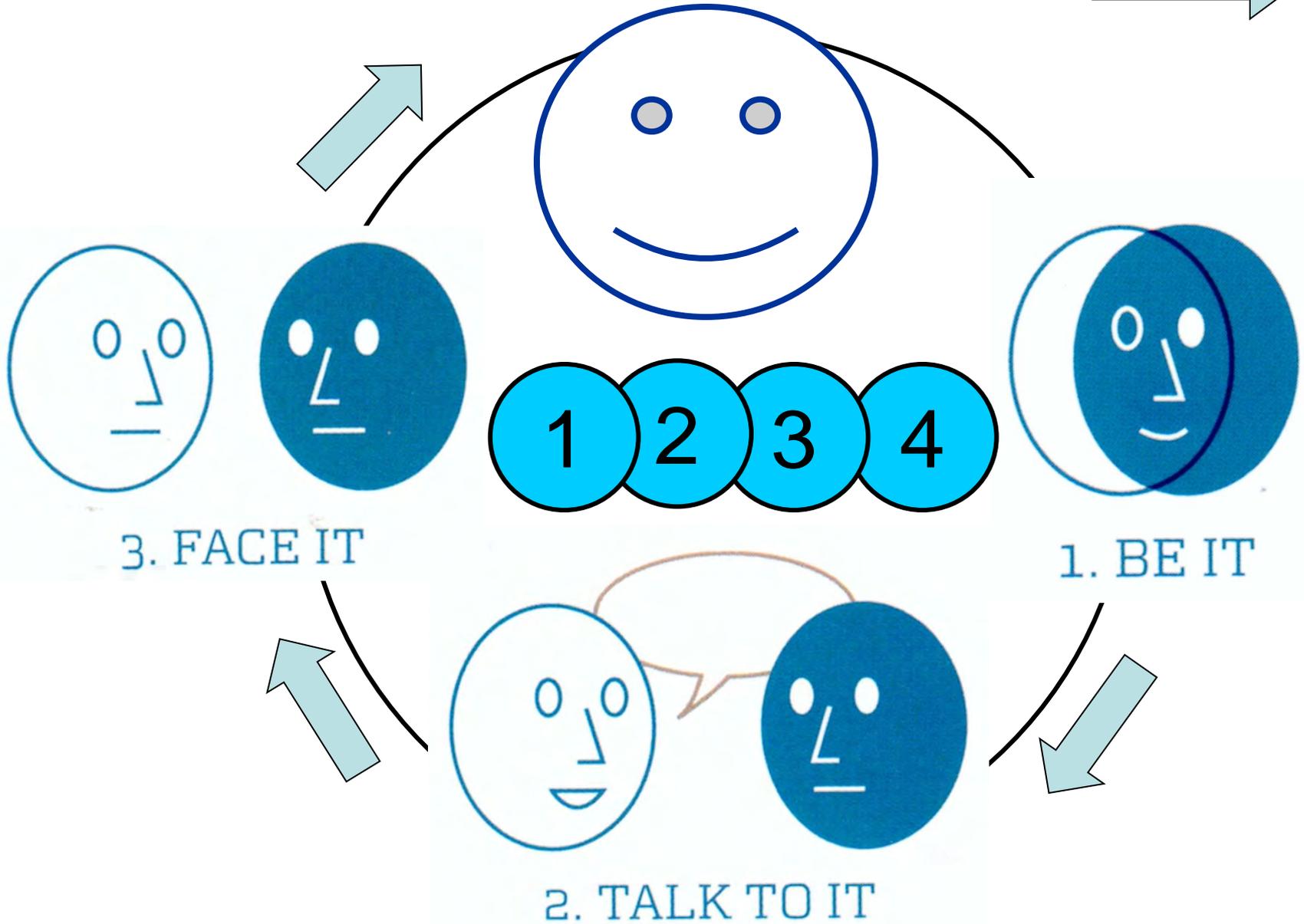
***Insight #1:***

**“WALK”  
as well as talk.**

We must become able to put the “**know, do, value**” aspects of our worldviews in front of us ... like an object ... and then we must develop the abilities to walk around them ... to acknowledge them, take ownership of them, understand them, and put them beside those of another worldview ... to see our mutual strengths and to begin working together in a reciprocally respectful manner.



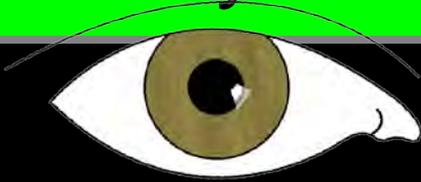
4. "KNOW, VALUE, and DO" IT ... SHARE IT ... and GROW IT



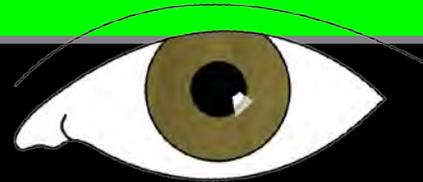
1

# Two-Eyed Seeing

our key concepts & actions



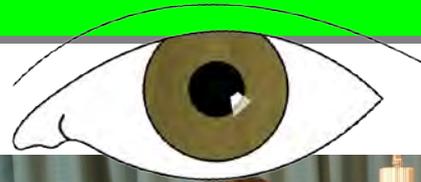
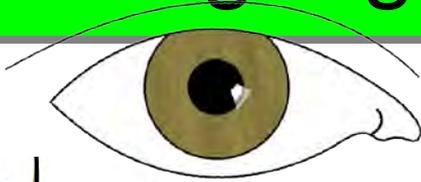
- respect
- relationship
- reverence
- reciprocity
- ritual (ceremony)
- repetition
- responsibility



- hypothesis  
(making & testing)
- data collection
- data analysis
- model & theory  
construction

2

# Two-Eyed Seeing our language & methodology



vigour

**WEAVING**



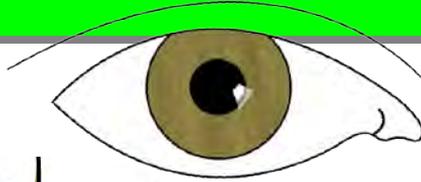
rigour

**UN-WEAVING**

3

# Two-Eyed Seeing

our overall knowledge objective



towards resonance  
of understanding  
within environment

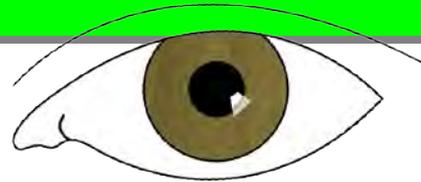
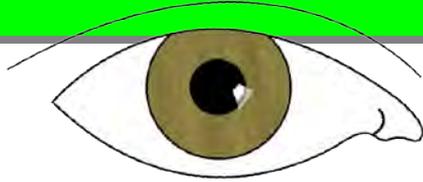


towards construction  
of understanding  
of environment

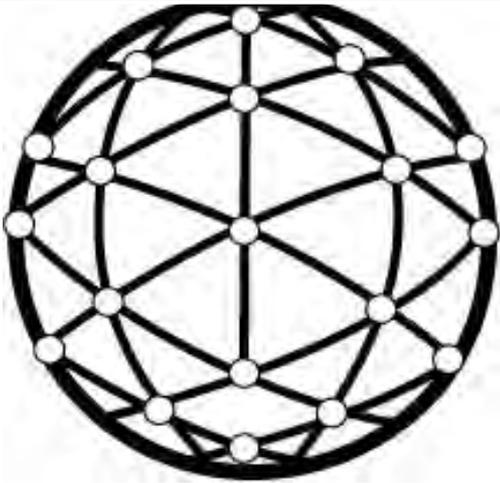
4

# Two-Eyed Seeing

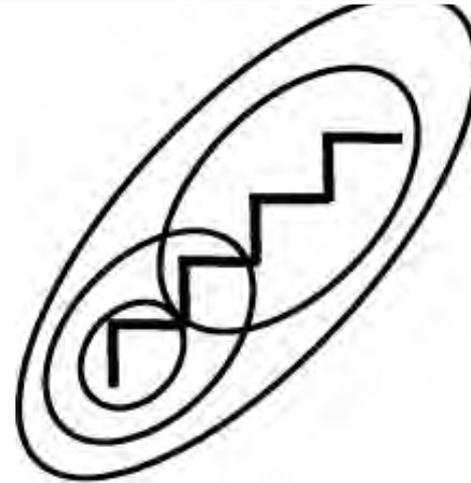
how our world is



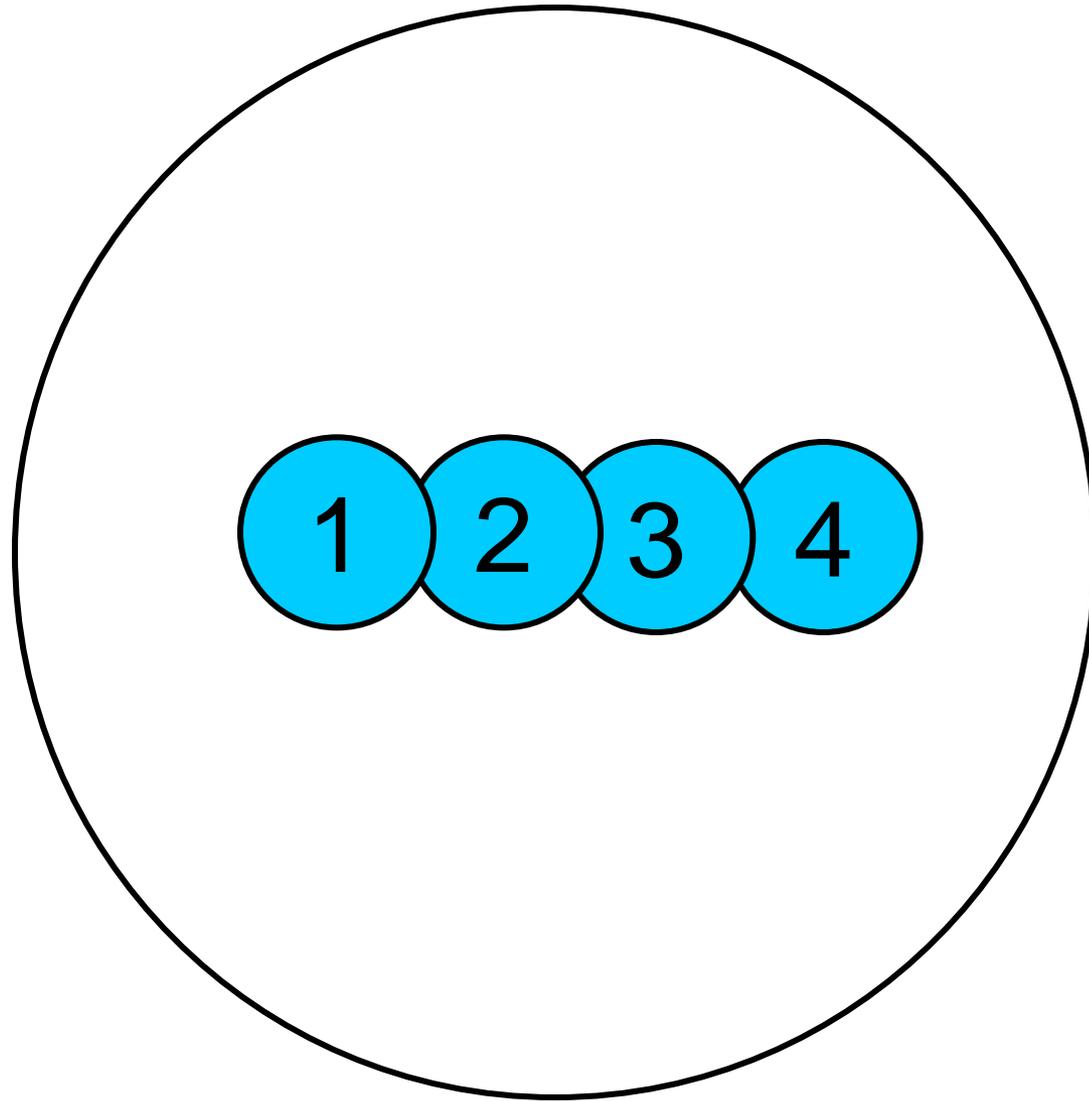
**interconnective**



**parts & wholes**



# role of the knower in the knowing

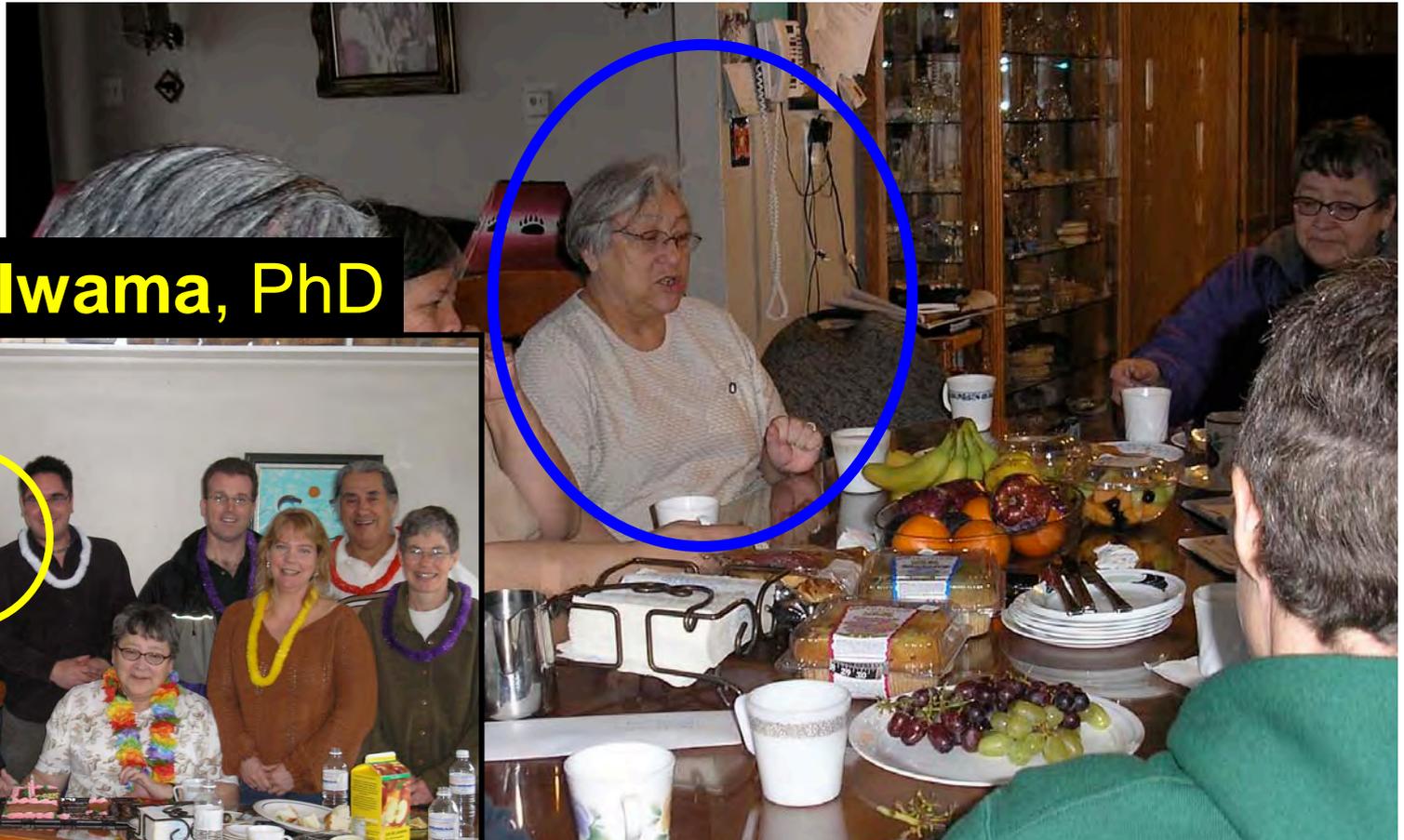




***Insight #1:***  
**["WALK"**  
**as well as talk.]**

**= an extension  
of understandings  
from discussions  
about healing  
language.**

**Mrs. Murdena Marshall BEd, MEd**  
Elder and Spiritual Leader, Mi'kmaq Nation  
Eskasoni First Nation, Nova Scotia  
Associate Professor (retired), Mi'kmaq Studies, CBU



**Marilyn Iwama, PhD**



Murdena Marshall:

There's something called the  
*healing tense.*

# THE HEALING TENSE ... an example

Mi'kmaq

English

Ketkiayop

I was drunk

Keskiayasa*nek*

I was drunk

# We Heal Together

*"... when he goes into this healing tense,  
then my attitude has to change ...  
everybody in the household ...  
everybody ... has to abide with him."*

Murdena Marshall

Generalize

kesnukwiap – I was sick

kesnukwias *nek* – I was sick

An aerial photograph of a dense forest, showing a mix of green and brownish trees, suggesting a natural or semi-natural woodland. A semi-transparent green rounded rectangle is overlaid in the upper left quadrant, containing white text.

*Nipuktuk Wejiaql A'tukuaqnn:*  
From the Forest Comes Our Story

# How Bullfrog was Conquered



# How Bullfrog Learns His Lesson

## *Epilogue*

Bullfrog: I know now that I was selfish and caused much suffering. I was wrong.



# The Healing Tense Heals

**“[Bullfrog] has taken his misdeeds and placed them in front of him and walked around them, and said yes, I was there.”**

Murdena Marshall

... in conversation with Dr. Ivar Mendez, Director,  
Brain Repair Centre, Dalhousie University



Love is the main ingredient of wellness.

- *Murdena Marshall*

## **We heal together**

*... when he goes into this healing tense, then my attitude has to change ... everybody in the household ... everybody ... has to abide with him.*



Love is the main ingredient of wellness.

- *Murdena Marshall*

The voice of our language is in the land.

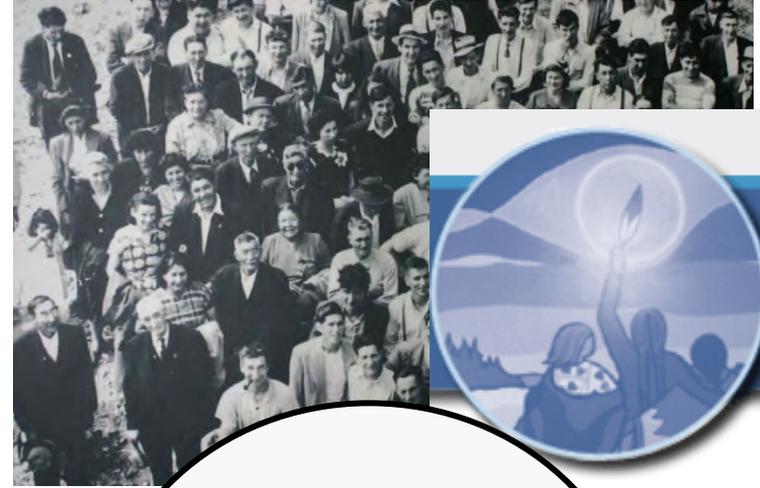
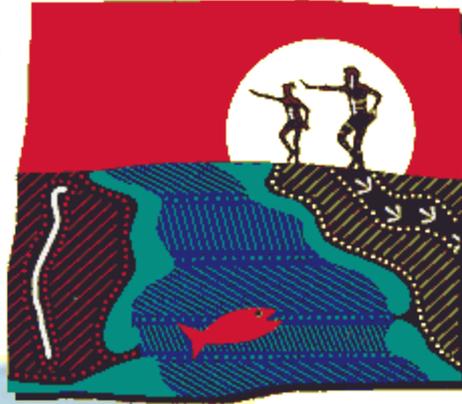
- *Albert Marshall*



***Insight #2:***

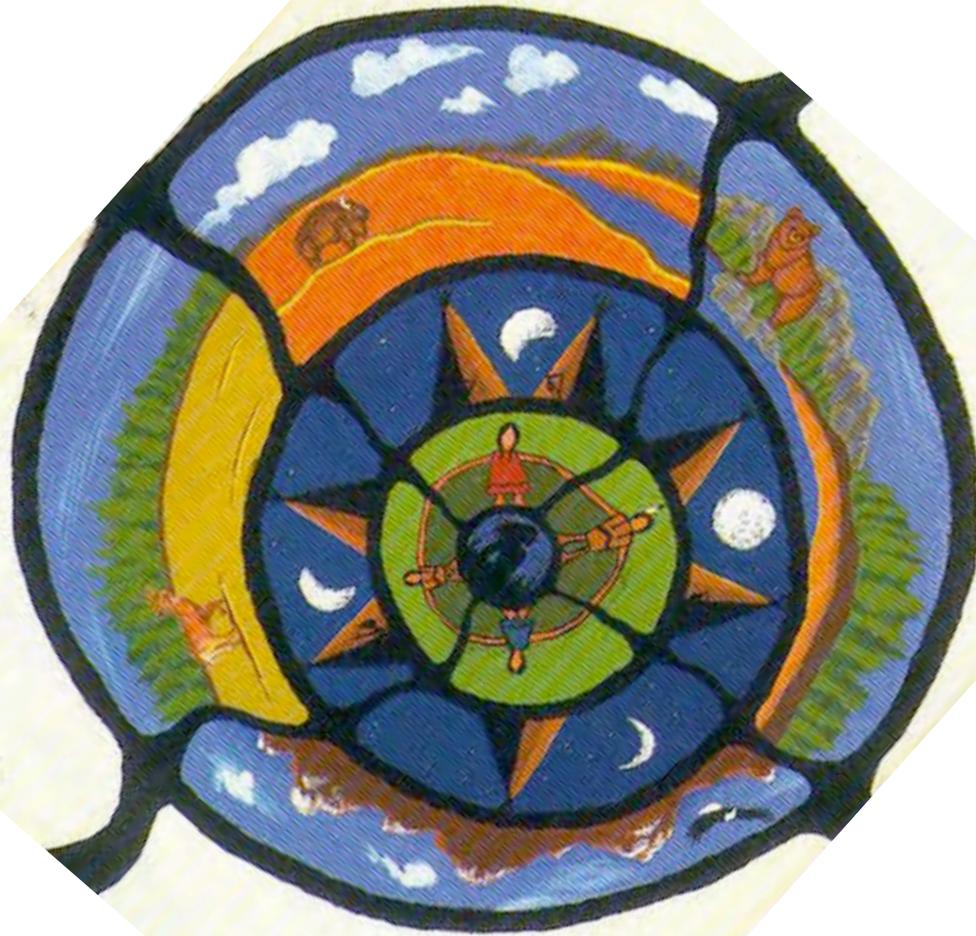
**Walk and talk  
with the land.**

Our voices are in the land.



Life  
Love  
Land





**We need to  
stay connected  
to the earth ...  
... and work  
with Nature ...  
... not be a  
“master over”.**

**Artist: Rod Restoule  
from: Into the Daylight;  
C. Morrissette, 1998**

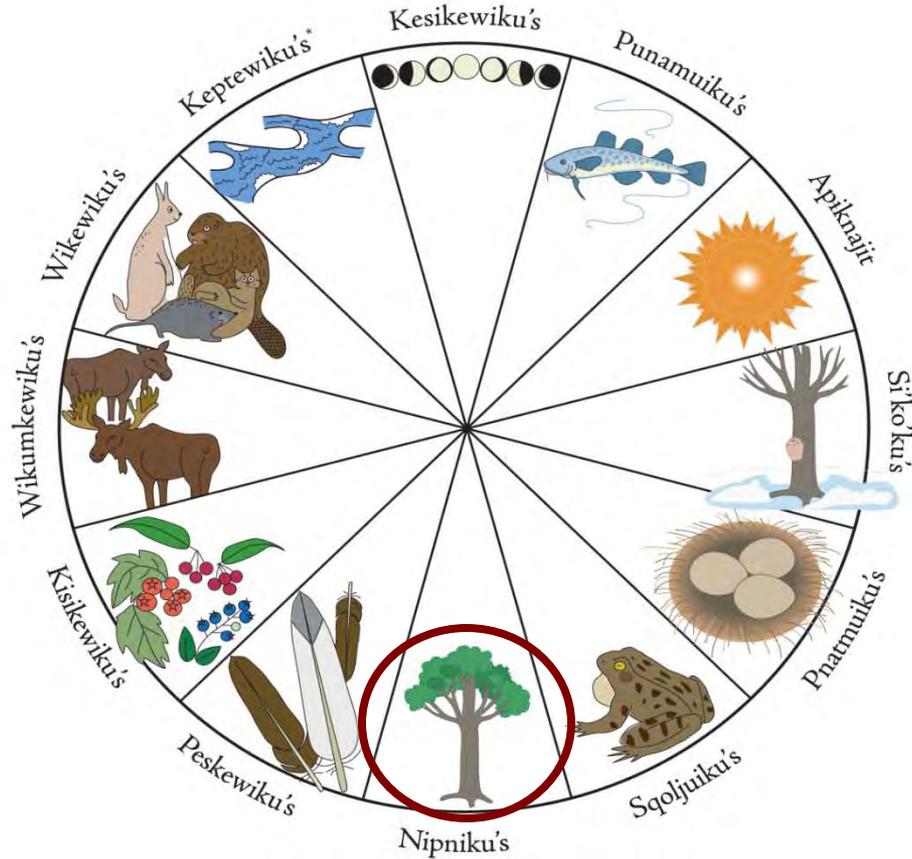


**We are  
all inter-  
connected.**

*from:* **Mi'kmaq Family  
and Children Services**



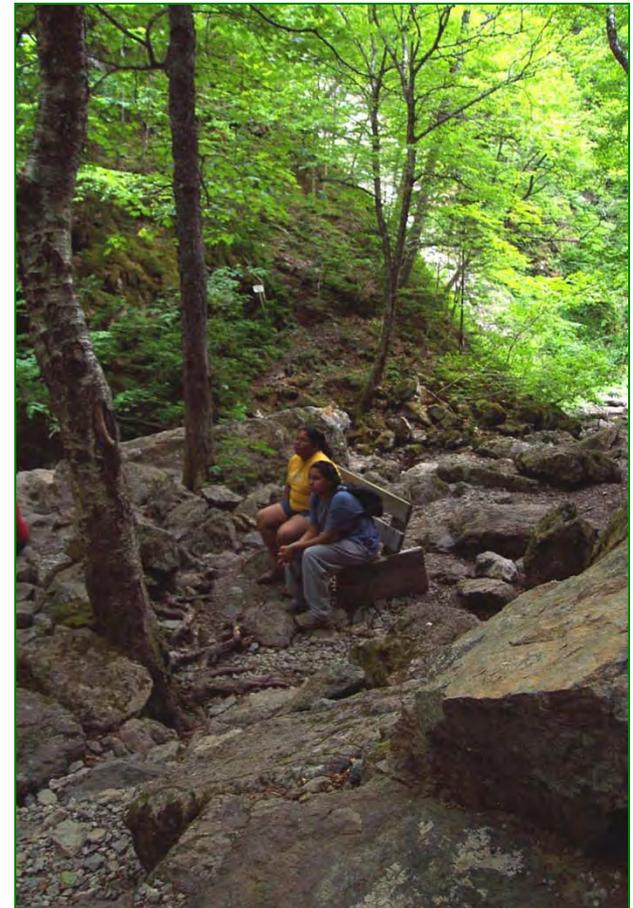
# Mi'kmawe'k Tepknusetk



\*Alternative - Keptewiku's

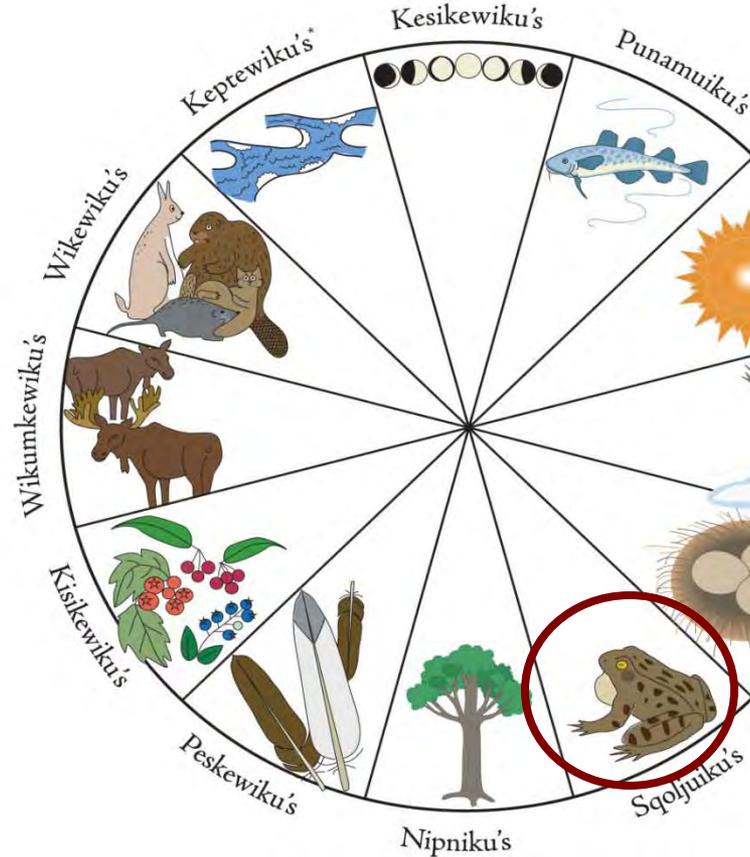


## Earth speaks: forest time





# Mi'kmawe'k Tepknusetk



\*Alternative – Kepti'kewiku's



# Earth speaks: health indicators

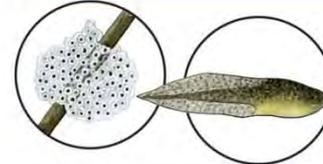
## ECOSYSTEM HEALTH CONSCIOUSNESS Difference, Pattern, Variation

TOQWA'TU'KL KJIJITAQNN • INTEGRATIVE SCIENCE

### Frogs of Unama'ki



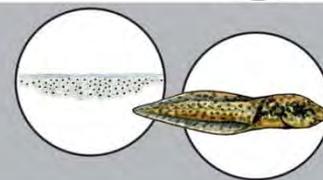
#### Mink Frog



**Mink Frog • *Rana septentrionalis***  
 Mink Frog is green with many dark markings and is 4 – 7 cm long. He gets his common name from his musky odour; he smells like a mink. Mink Frog's song sounds like pieces of wood being rapped together ... TAP TAP! While other frogs live on both land and water, Mink Frog spends most of his life in the water. He prefers permanent bodies of water like ponds and lakes. Female Mink Frog lays 2000 to 4000 eggs in a round jelly mass. This jelly mass is attached to an underwater plant stem or submerged twig. Mink Frog eats dragonflies, damselflies, water beetles, aphids, minnows, leeches, snails, millipedes, and spiders.

MINK FROG

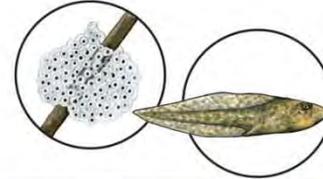
#### Green Frog



**Green Frog • *Rana clamitans***  
 Green Frog is green with gray or brown markings on her back and legs, and has a pale belly marked with dark streaks. Male Green Frog has a bright yellow throat and is 6 – 10 cm long. Green Frog's song sounds like a loose banjo string being plucked, or like a small pebble dropped into water ... LINGKI! Green Frog prefers to be close to water, and tends to live at the edge of rivers, ponds, lakes or streams. Female Green Frog lays 1000 to 4000 eggs in a loose jelly mass that floats on the surface of the water like a raft. Green Frog eats beetles, fleas, caterpillars, grasshoppers, spiders, snails, slugs, waterbugs, butterflies and moths, and sometimes other small frogs.

GREEN FROG

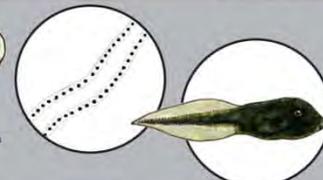
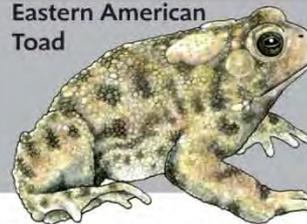
#### Pickerel Frog



**Pickerel Frog • *Rana palustris***  
 Pickerel Frog is light brown with many dark blotches on his back and legs. He is 4 – 7 cm long. Pickerel Frog's song sounds like somebody snoring, or like the sound of someone slowly pushing open a creaky door ... ARREP ARREP! Pickerel Frog lives on the shores of ponds or lakes, or on the banks of streams, often staying near permanent bodies of water at breeding time. However, he will also live in moist fields, bogs, or damp woods. Female Pickerel Frog lays her eggs in a round jelly mass attached to a plant or stick below the surface of the water. She can lay as many as 800 to 1800 eggs at a time. Pickerel Frog eats beetles, ants, spiders, caterpillars, snails, bugs, mice, snails, true bugs, and many small water creatures.

PICKEREL FROG

#### Eastern American Toad



**Eastern American Toad • *Bufo americanus***  
 Toad is a plump creature with stubby toes and rough, warty skin. He is usually brownish, with darker brown or black markings. Toad has a pale belly with dark spots that become more distinct at night. Toad can grow to be 5 – 11 cm long. Toad lives in many different places, for example, in the woods, near a swamp or lake, in a field, or even in your backyard! His song sounds like a long, high trilling sound ... THRRR! Female Toad prefers temporary ponds for breeding. She lays 8000 to 8000 eggs at a time in two long strings near the bottom of the pond or puddle. Toad eats many kinds of insects like caterpillars, earwigs, saw bugs, as well as slugs, earthworms, and millipedes.

AMERICAN TOAD

#### Northern Spring Peeper

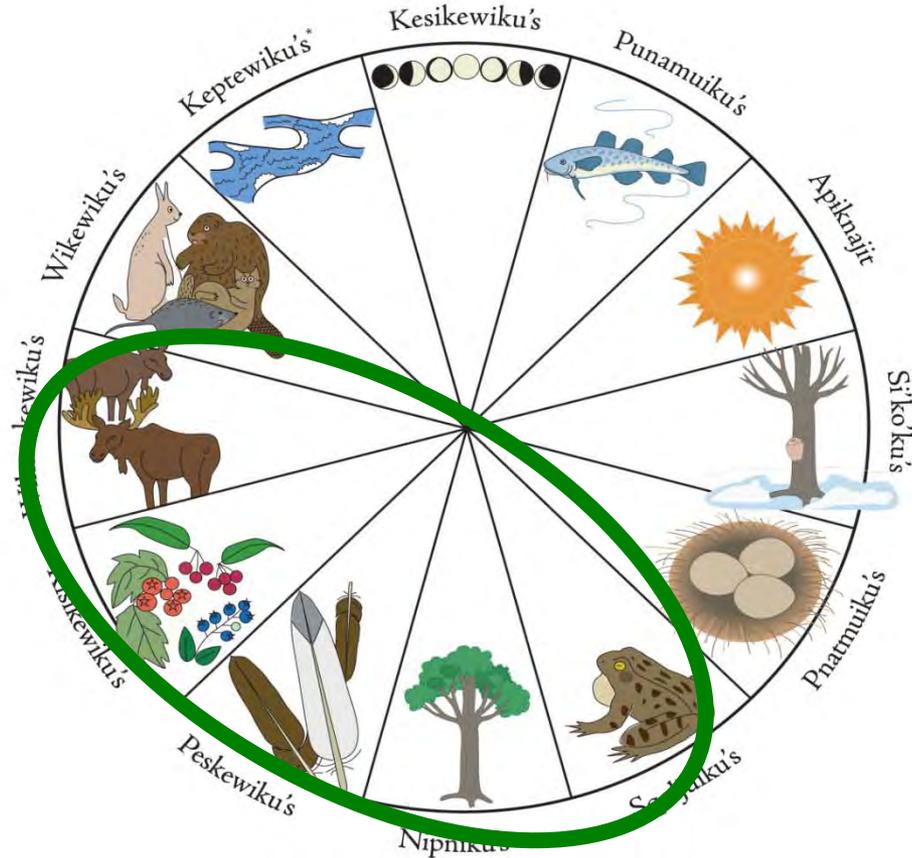


**Northern Spring Peeper • *Pseudacris crucifer***  
 Spring Peeper is our smallest frog; he grows to 2 – 4 cm long. We know that spring has arrived when we hear Spring Peeper singing at night. His song sounds like a high PEEP! Spring Peeper lives in the woods near ponds, marshes or swamps. He is our only tree frog and can change the colour of his skin to blend in with his

SPRING

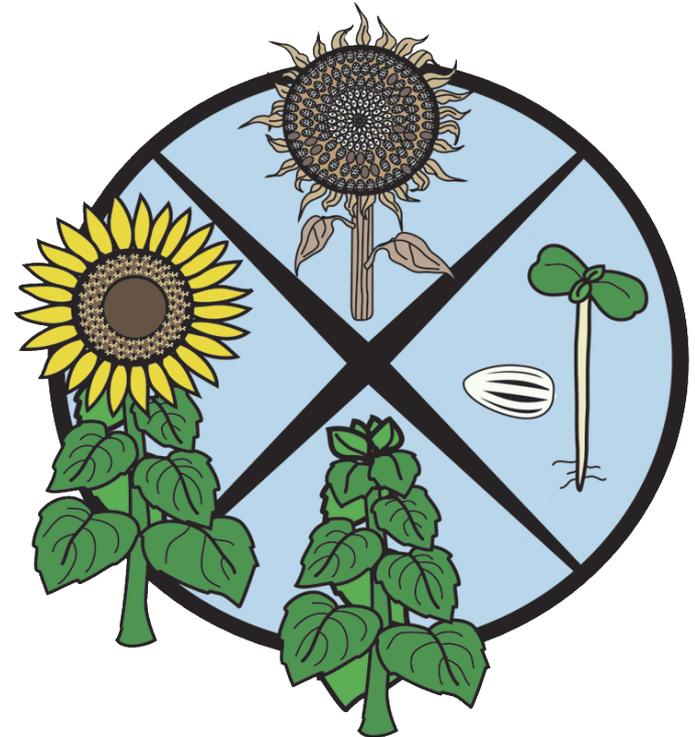


# Mi'kmawe'k Tepknusetk

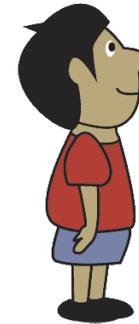
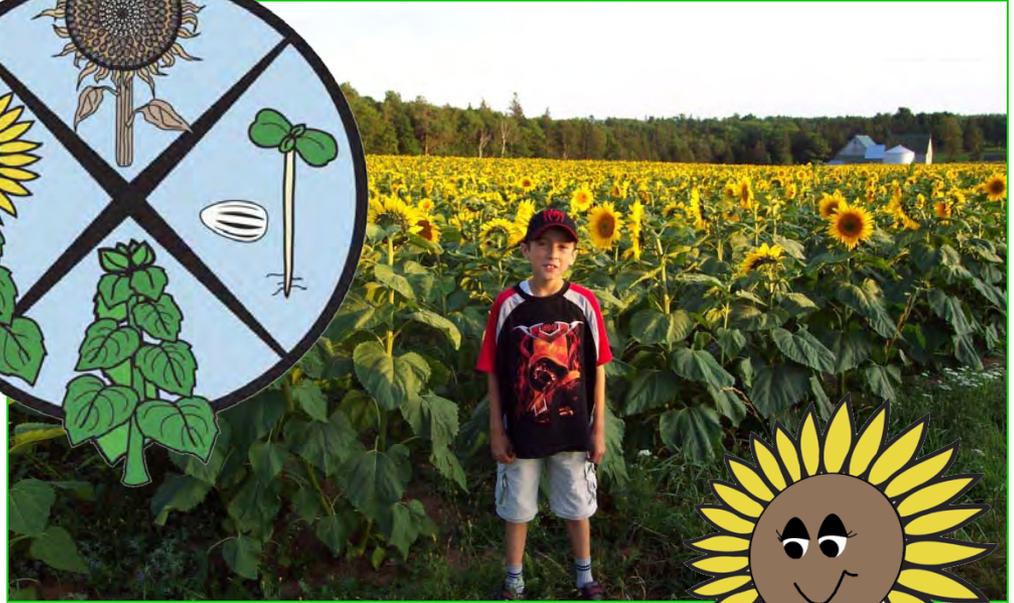


\*Alternative – Keptewiku's

## Earth speaks: wholistic health lessons



# healthy young ... need TLC



# puppets made from the Earth

TOQWA'TU'KL KIJITAQNN  
Integrative Science

*Nipuktuk Wejiaql A'tukuvaqnn*  
FROM THE FOREST COMES OUR STORY



**Apl'ikmuj**  
*Lepus americanus*  
SNOWSHOE HARE

**Kaqajulman**  
*Clintonia borealis*  
BLUE BEAD LILY

**Pukusp**  
DECAYING WOOD

**Kawatk**  
*Picea sp.*  
SPRUCE CONE

**Stoqn**  
*Abies balsamea*  
DWARF FIR

**Wso'qmanaqsil**  
*Cornus canadensis*  
BOWENBERRY

**Oqnn**  
TWIGS

**Kuow**  
*Pinus strobus*  
PINE NEEDLES

**Apl'ikmuj** - Hare gets very nervous in the night, even larger than the coming of winter because the fire scares much the time when, but new for each will arrive. Hair summer coat of brown changes to a winter coat of white. Hairy winter coat is like the white winter snow and has summer coat like the brown summer earth and forest floor. These different colors camouflage her making it difficult for predators to see her in the environment. While wearing her summer coat, Hare will dash about, chase grasses, ferns, and flowers. In her winter coat, she eats bark and small twigs of pine and spruce trees. *Apl'ikmuj* is a beloved character in many Mi'kmaq legends.

A small multicultural group of young people worked at the University College of Cape Breton during the summer of 2004 to make puppets for the characters in two Mi'kmaq legends: *Haw Rabbit Got His Long Ears and How Bullfrog*. The characters in Mi'kmaq were made from natural materials with reference to the forest of Nova Scotia - Cape Breton. The project was part of a larger research effort to help people learn and understand Mi'kmaq and modern scientific understandings of our forests and ecosystems within coastal ecosystems, especially as the climate continues to change and human use of the sea is on the rise. Some of the artists and photographers: *James G. MacIsaac, University of Saint Joseph's, Halifax, Nova Scotia*.

For Mi'kmaq legend information visit: [www.mikmaq.ca](http://www.mikmaq.ca) (902) 759-2200  
for additional information contact: Integrative Science Program, University College of Cape Breton, 250 Blue 1900, Sydney, Nova Scotia, B1P 6L2. E-mail: [is@ucb.ns.ca](mailto:is@ucb.ns.ca) web: [www.ucb.ns.ca](http://www.ucb.ns.ca)



TOQWA'TU'KL KIJITAQNN  
Integrative Science

*Nipuktuk Wejiaql A'tukuvaqnn*  
FROM THE FOREST COMES OUR STORY



**T'itikli**  
*Bubo virginianus*  
GREAT HORNED OWL

**Jikoqs**  
*Fomes fomentarius*  
BRACKET FUNGUS

**Kuow**  
*Pinus strobus*  
PINE NEEDLES

**Maskwi**  
*Betula papyrifera*  
BIRCH BARK

**Wisqasaw**  
*Pinus strobus*  
PINE CONE

**Pukusp**  
*Dicranum sp.*  
MOSS

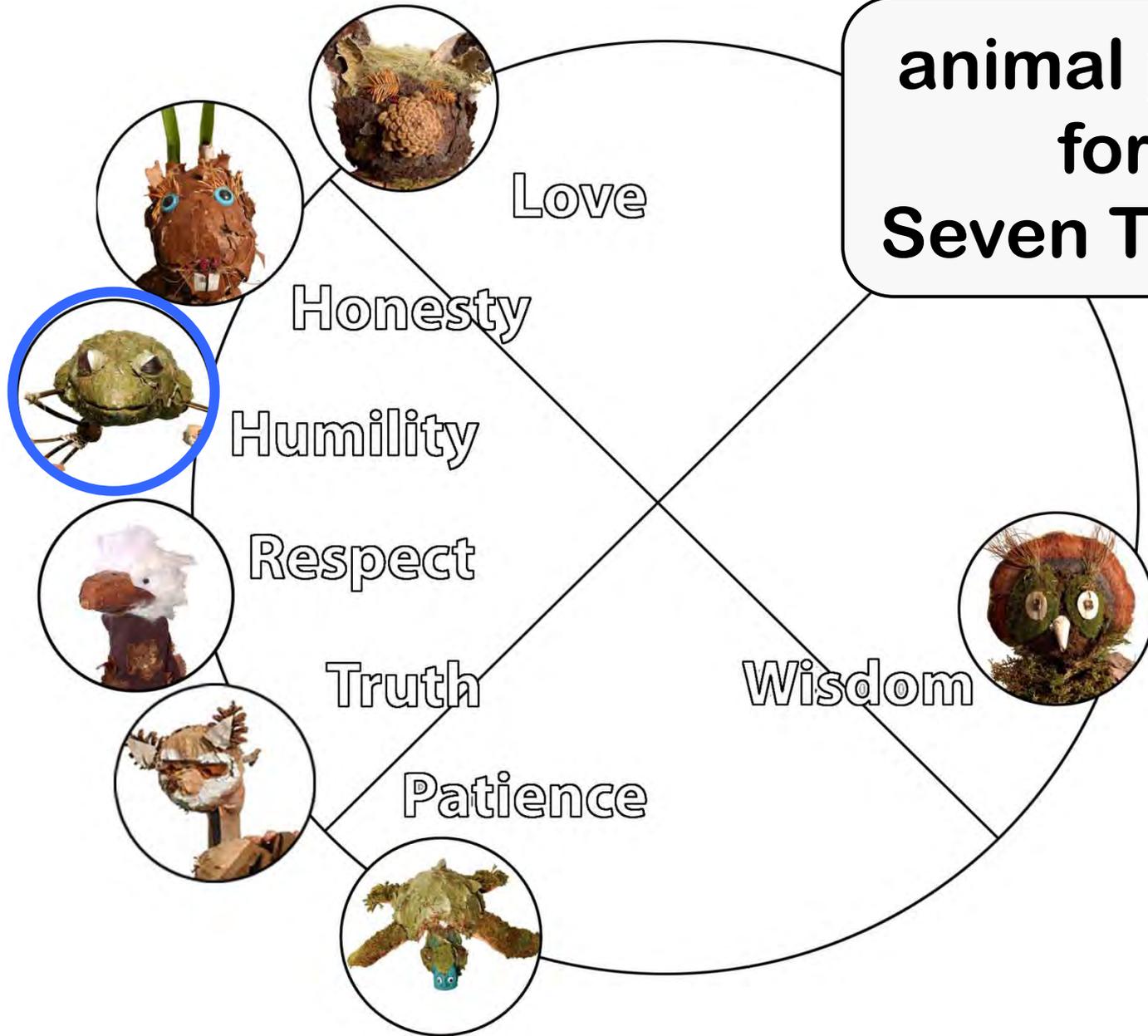
**Oqnn**  
TWIGS

**Ulnetkul**

**Jikoqs - BRACKET FUNGUS:** This hard, woody, slow growing bracket fungus once had a very special role to play in the life of the Mi'kmaq Nation. Jikoqs, Keeper of the Sacred Flame, was used to ensure that embers of the fire remained alive when the people moved to a new camp. The fungus was set on fire and then placed in a clamshell for protection. Jikoqs would burn slowly and thus *keep the fire alive*. At the new campsite, Jikoqs would be used to start a new campfire - this was in the time before we had modern matches. Similarly, to ensure that the fire could be restarted every morning at the same campsite, Jikoqs and a clamshell were used to safeguard an ember each night. The species of fungus used was possibly *Fomes fomentarius*, which is known in English as *tinder* (many tiny holes (tinder polypore)).

A small multicultural group of young people worked at the University College of Cape Breton during the summer of 2004 to make puppets for the characters in two Mi'kmaq legends: *Haw Rabbit Got His Long Ears and How Bullfrog*.

# animal puppets for the Seven Teachings







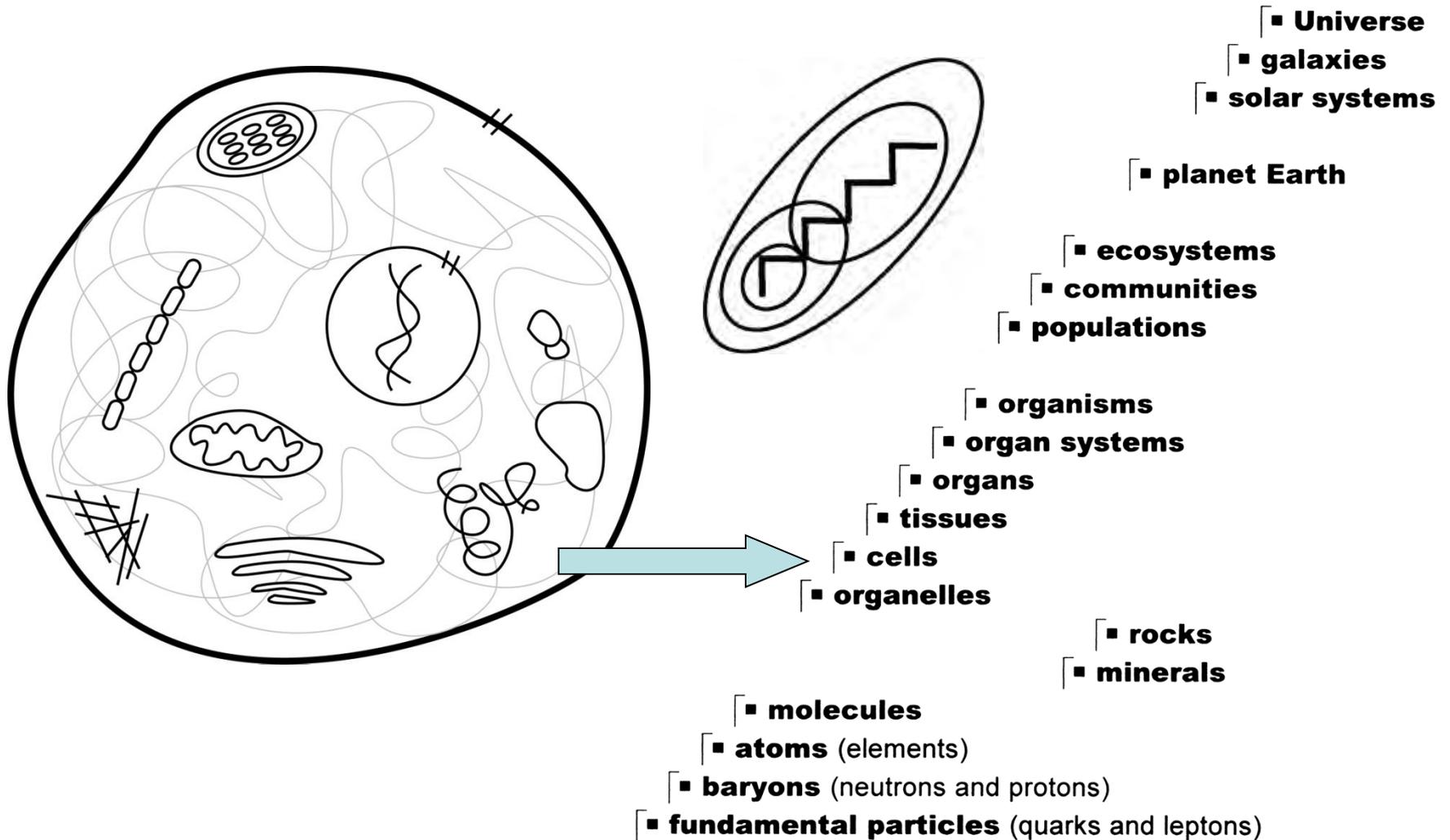
***Insight #3:***

**Walk and talk  
... using  
naturalized  
models and  
metaphors.**

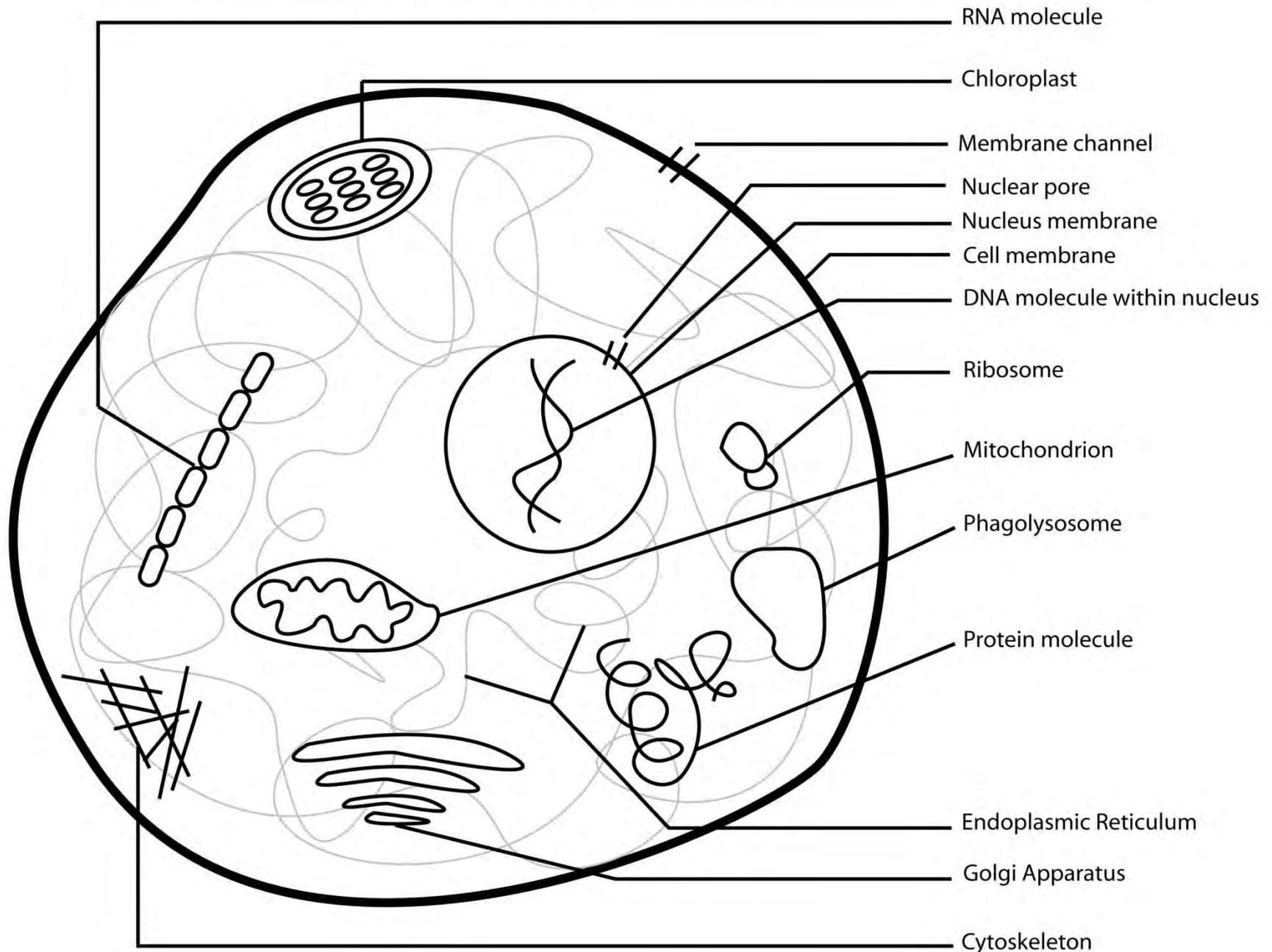
# HOLARCHY

## - VISIBLE MATTER IN THE UNIVERSE -

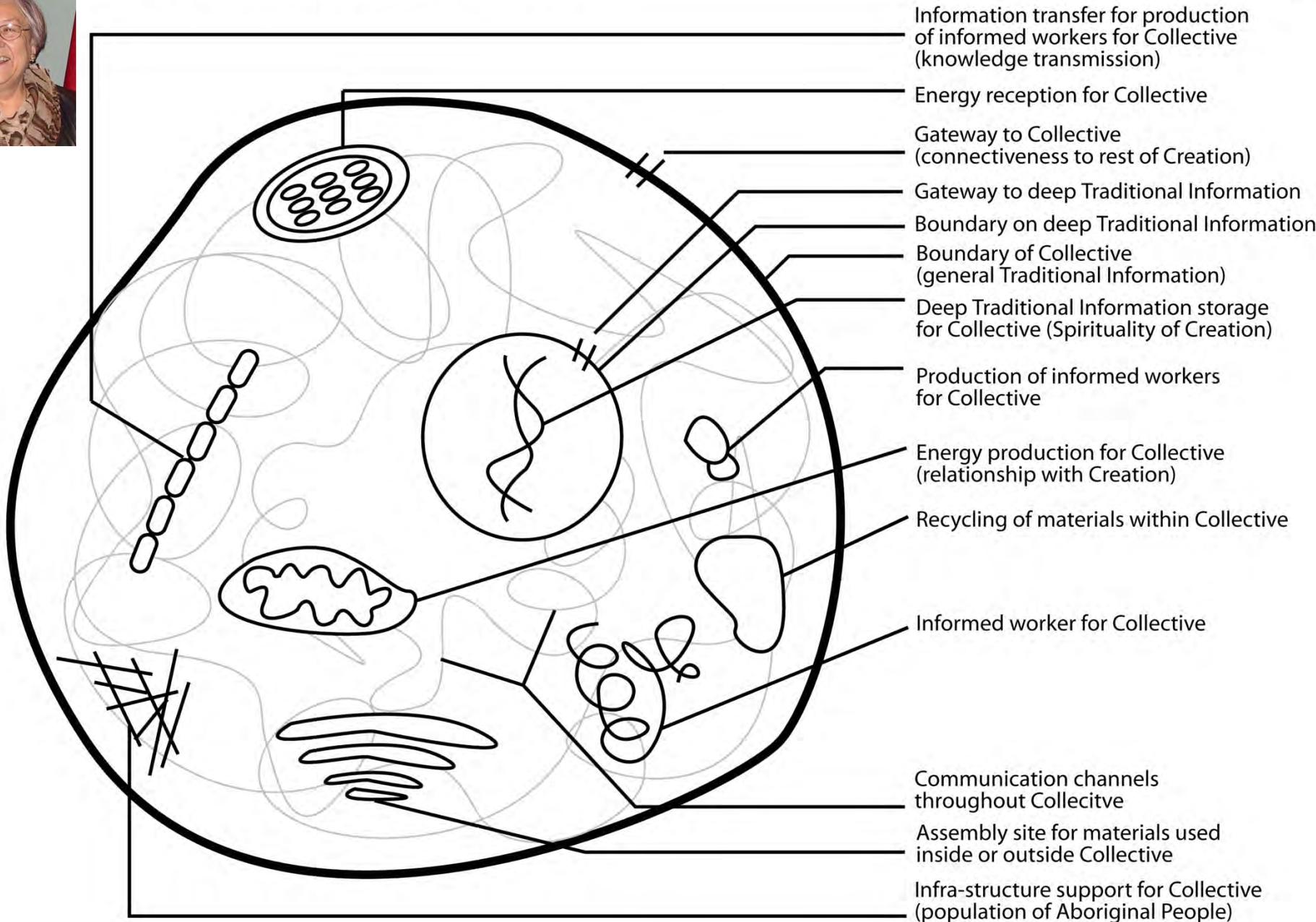
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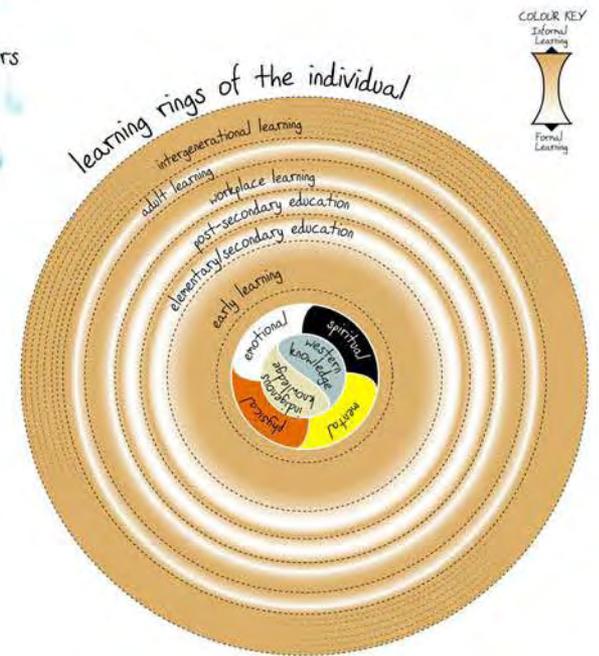
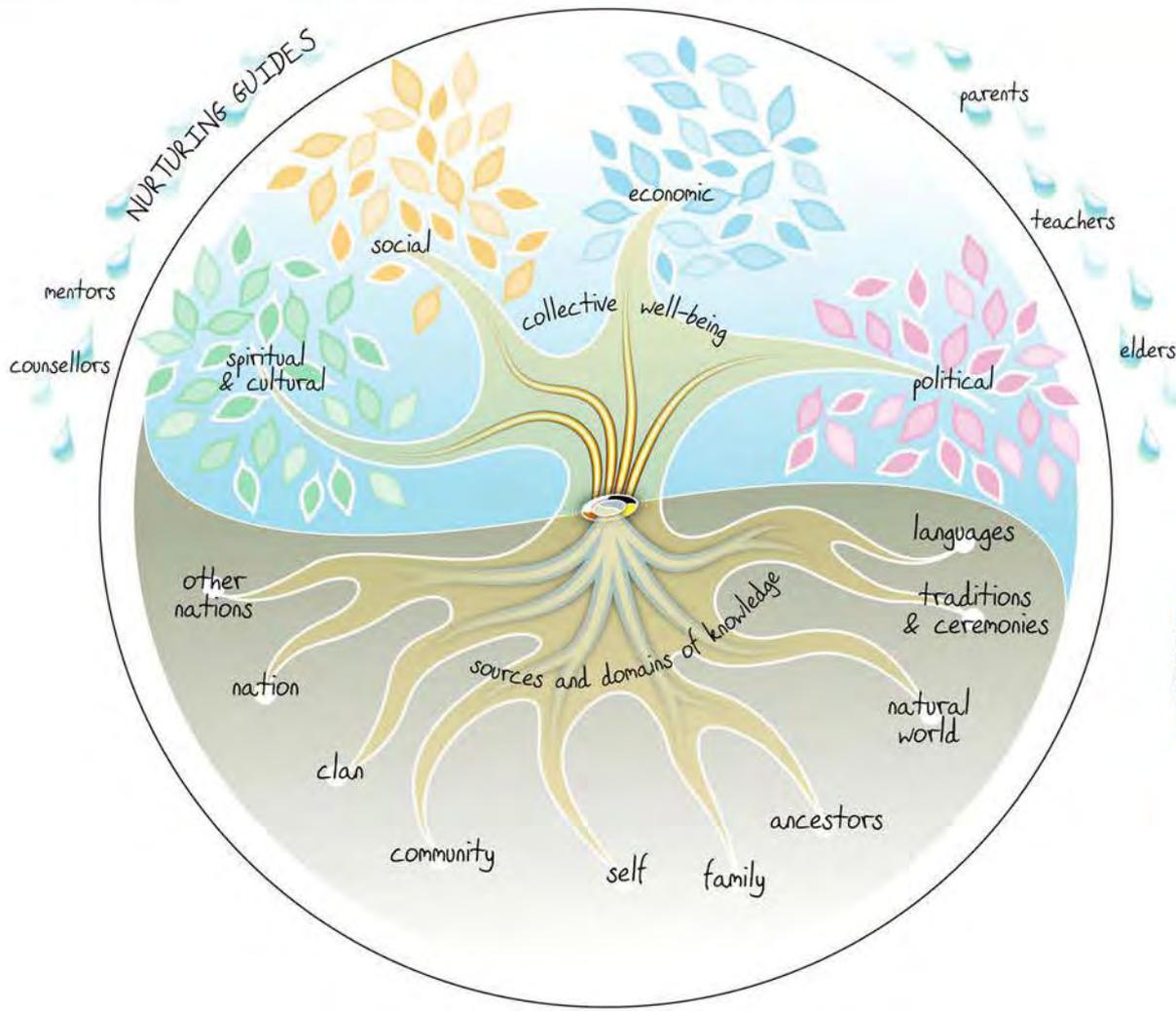


# The Collective: Its Parts (example = the living cell)



# The Collective: Its Functions (by Murdena Marshall BA, MEd)





rs  


# learning rings of the individual

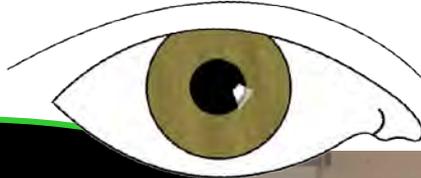


Aboriginal Learning Knowledge Centre – Canadian Council on Learning

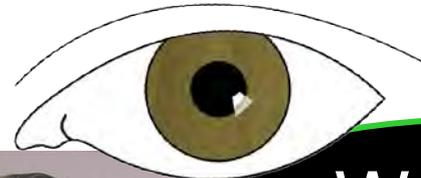


Aboriginal Learning Knowledge Centre – Canadian Council on Learning

learn to see with the strengths  
of each & together



Indigenous

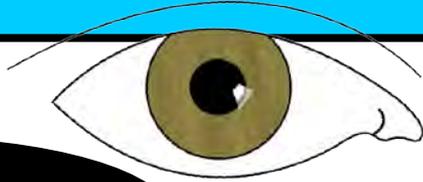


Western



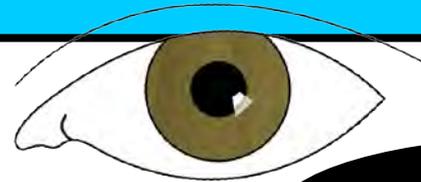
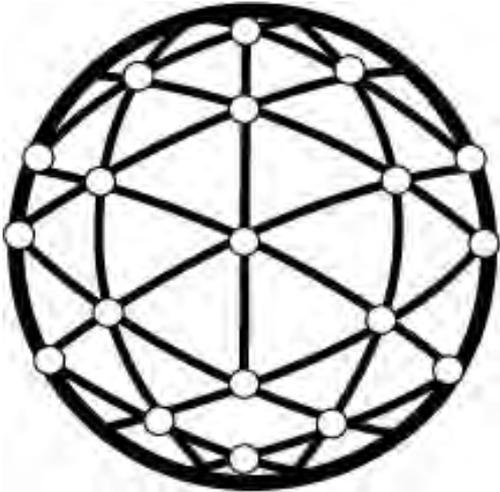
Two-Eyed Seeing

# Two-Eyed Seeing how our world is



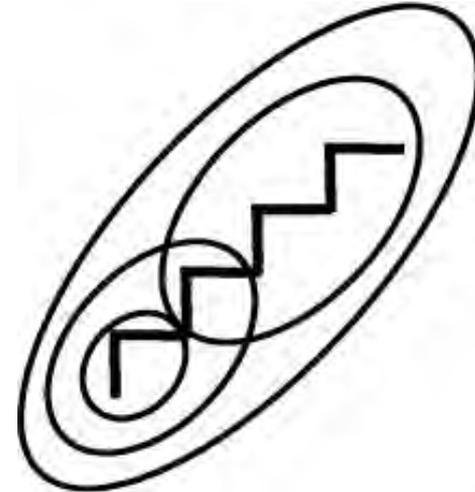
Indigenous

**interconnective**



Western

**parts & wholes**

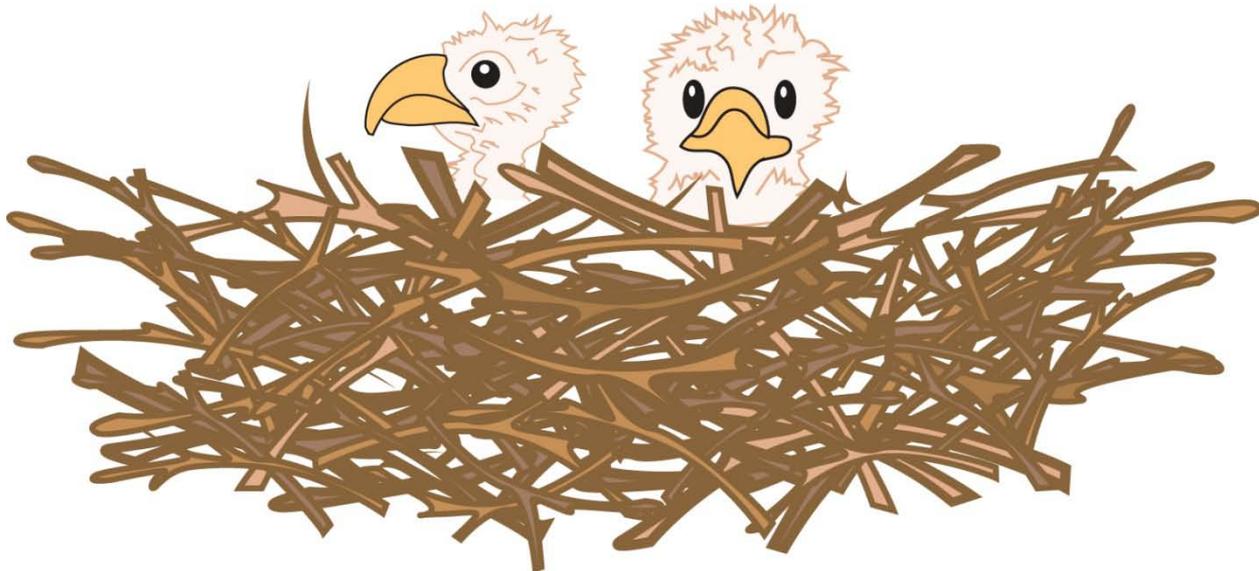




***Insight #4:***

**Walk and talk  
... accepting  
diverse styles  
of evidence.**

**Social Determinants of Health:  
NCC-DH Think Tank (7 March 07, Halifax)  
What is evidence? What knowledge context?**



# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax)

## What is evidence? What knowledge context?

### Who wants this evidence?

Those who want to:

- develop and implement policy:

objects ... to be measured

- 
- heal and be healthy:

subjects ... with living  
experience



# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax)

## What is evidence? What knowledge context?

### Whose values determine this evidence?

- researchers: to “prove” is desirable; skepticism is a virtue
- 
- Aboriginal community: to “know” is OK; trust is a gift



# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax) What is evidence? What knowledge context?

## Who comes together to create “social”?

- Eurocentric: humans together

- 
- Aboriginal: humans together with other sentient beings



Winds of Change, Roy Thomas artist

# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax)

## What is evidence? What knowledge context?

### What “life purpose” for this evidence?

- mainstream: to participate in an economy-based society
- 
- traditional Aboriginal: to seek life ... spirituality central

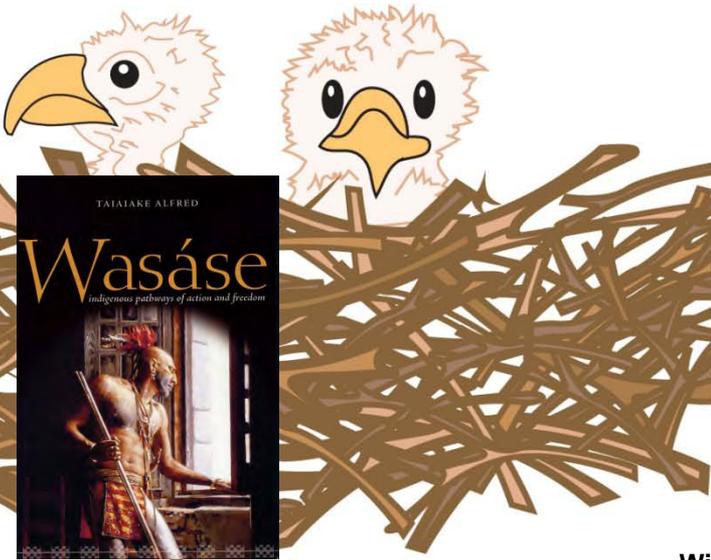


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# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax) What is evidence? What knowledge context?

## What language for this evidence?

- economic model: **social capital; analytic philosophy**
- 
- spirit-centric model: **compassion; Indigenous philosophy**



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# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax) What is evidence? What knowledge context?

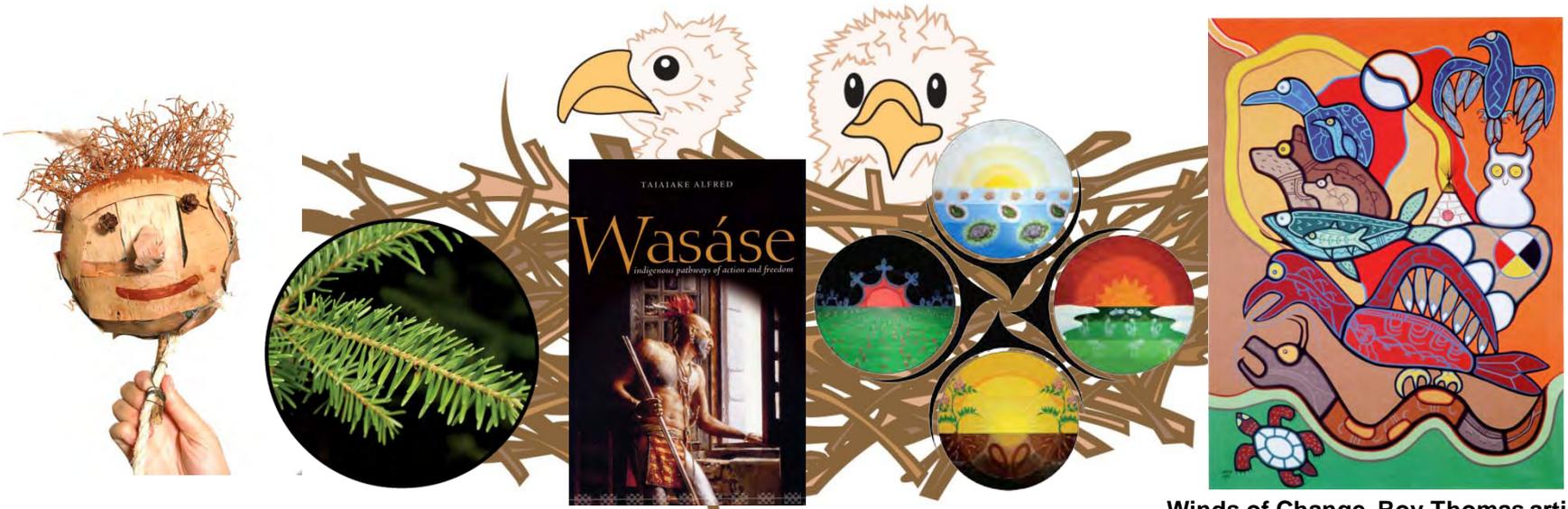
## Evidence seen as ...

- abstract, noun-based indicators:

“quality of life”  
... marginalize  
those of difference

- consciousness-oriented, verb-based indicators:

meaning  
making



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# Social Determinants of Health: NCC-DH Think Tank (7 March 07, Halifax) What is evidence? What knowledge context?

## Evidence within what consciousness:

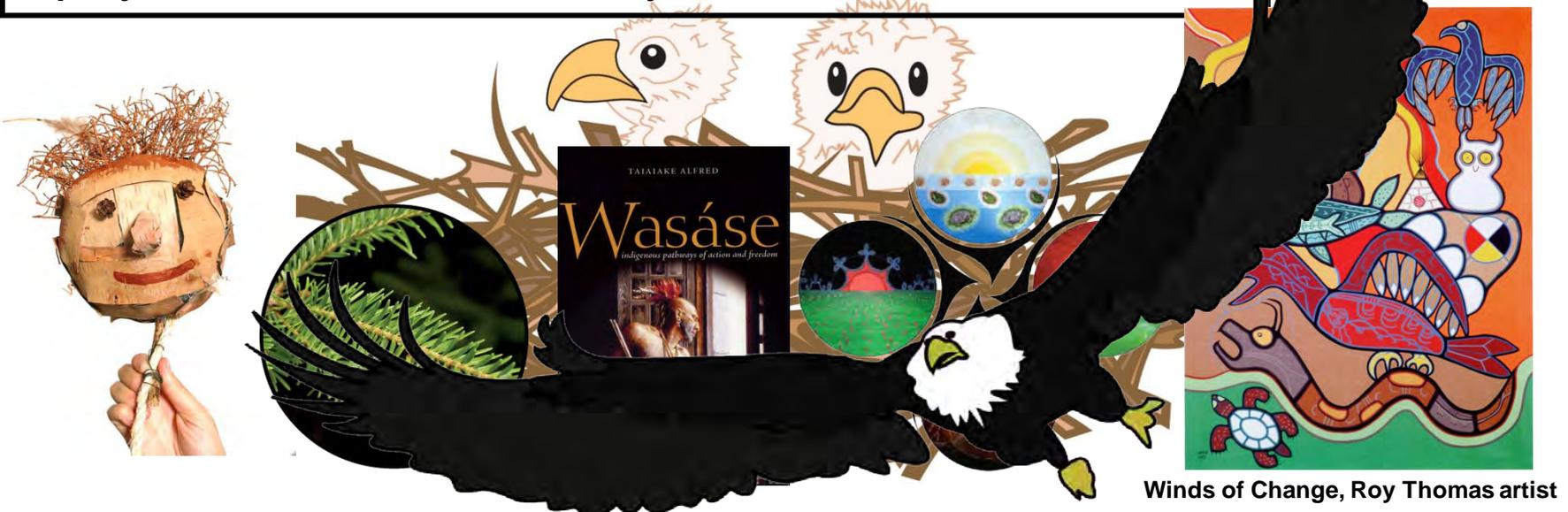
- physical reality: **objects**

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- physical + dream realities: **objects & subjects**

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- physical + dream + unity realities: **!!!!!!!!!!!!!!**



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# RESEARCH ... a Co-Learning Journey

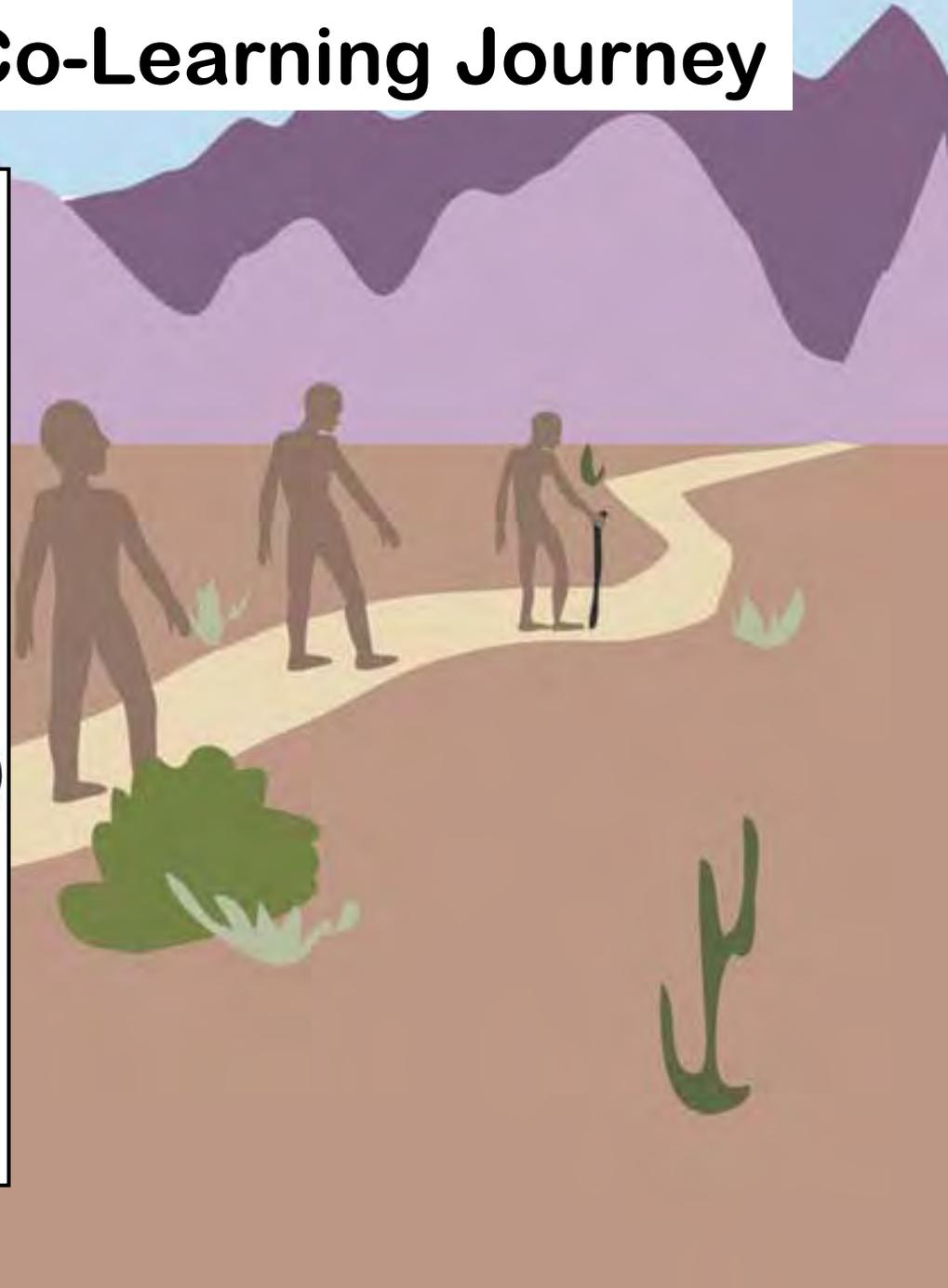
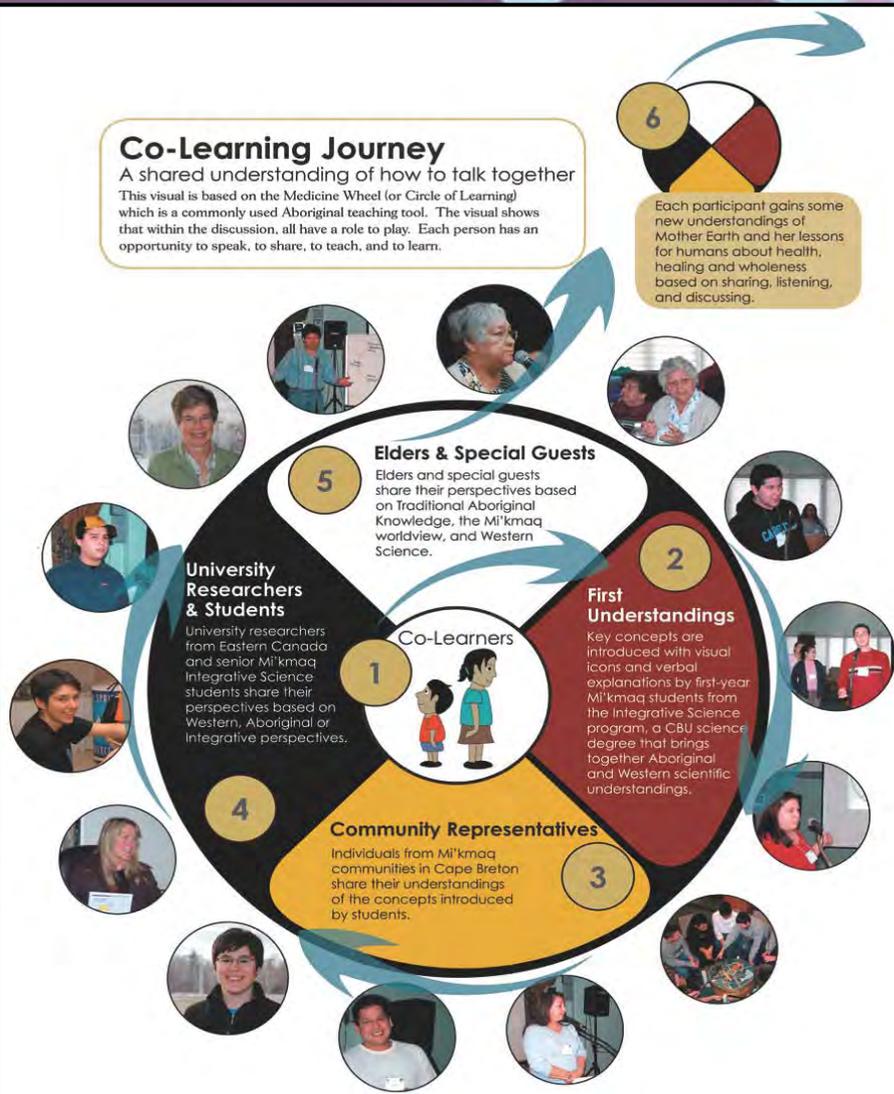
## Co-Learning Journey

A shared understanding of how to talk together

This visual is based on the Medicine Wheel (or Circle of Learning) which is a commonly used Aboriginal teaching tool. The visual shows that within the discussion, all have a role to play. Each person has an opportunity to speak, to share, to teach, and to learn.



Each participant gains some new understandings of Mother Earth and her lessons for humans about health, healing and wholeness based on sharing, listening, and discussing.



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CIHR IRSC / Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Mi'kmaq College Institute / Mi'kmaq Espi Kina'matno'kuom



IWK Health Centre Foundation

IAPH

ATLANTIC ABORIGINAL Health Research Program

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NOVA SCOTIA Health Research FOUNDATION

SABLE OFFSHORE ENERGY INCORPORATED

UNAMA'KI INSTITUTE OF NATURAL RESOURCES

KECCA / Knowledge: Education and Cultural Consultant Associates

NSERC CRSNG

Mi'kmawey Debert

Eskasoni Detachment / Royal Canadian Mounted Police / Gendarmerie royale du Canada