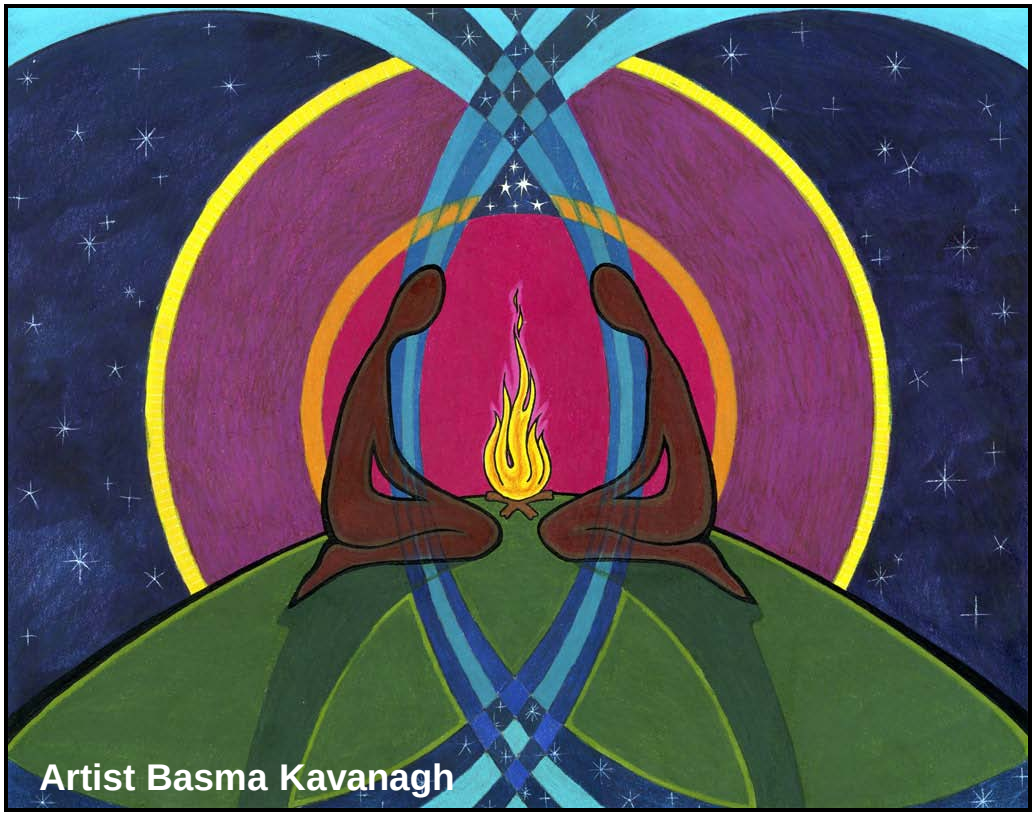
Integrative Science:
transdisciplinarity in action



CAPE BRETON UNIVERSITY

Institute for Integrative Science & Health

Cheryl Bartlett, PhD

and

Marilyn Iwama, PhD

Graduate Student Seminar, Environmental Studies Program, Dalhousie University; Halifax, NS; 4 April 2006

Toqwa’tu’kl Kjijitaqnn
Integrative Science

Science: stories of our interactions with and within Nature

our knowledges

Indigenous

our world views

Western

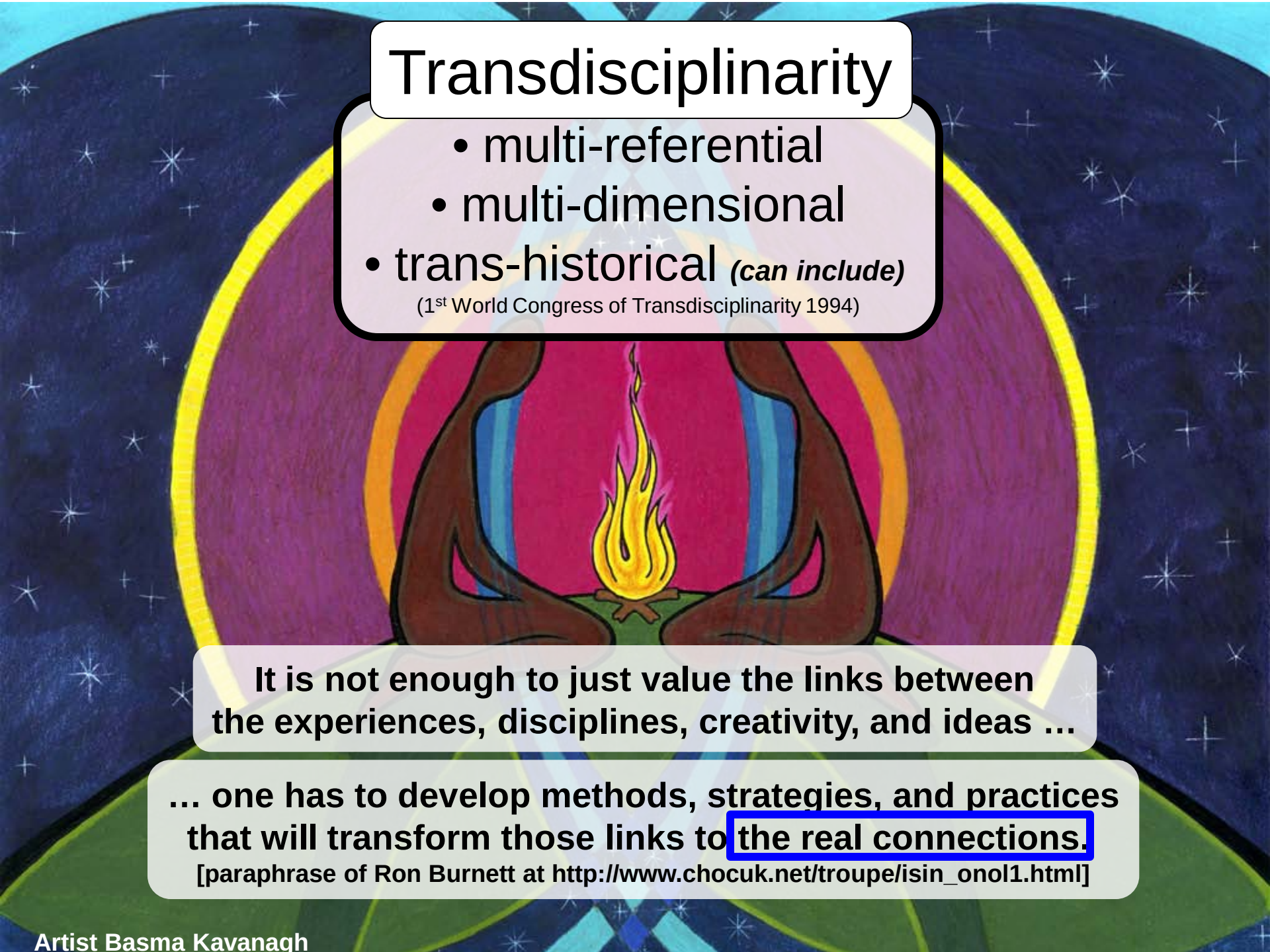
“bringing our stories together”

Artist Basma Kavanagh

Transdisciplinarity

- multi-referential
- multi-dimensional
- trans-historical ***(can include)***

(1st World Congress of Transdisciplinarity 1994)

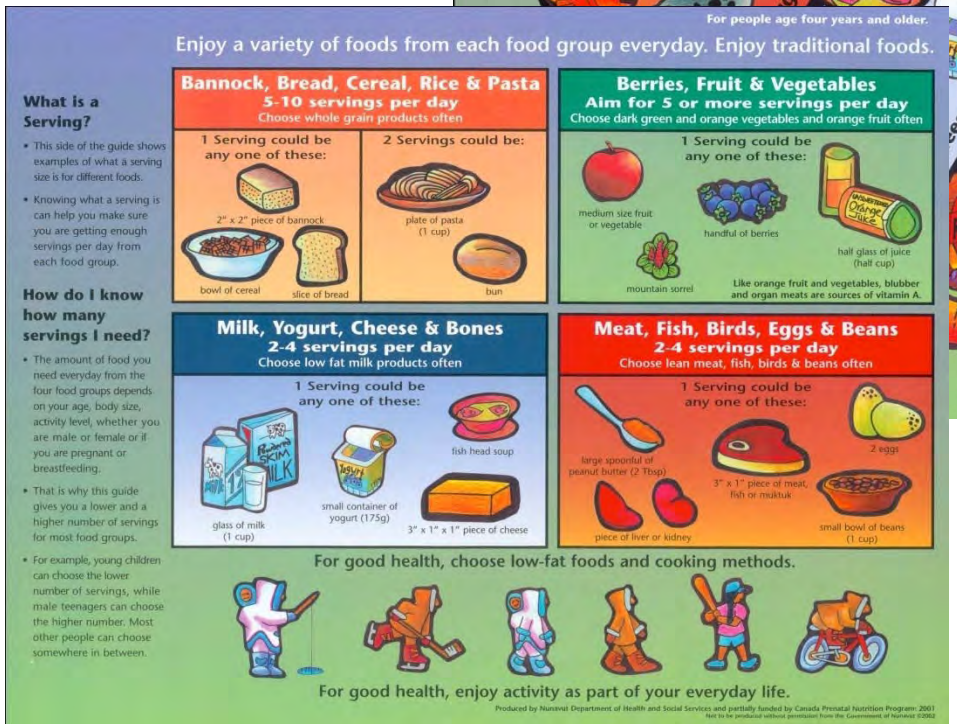


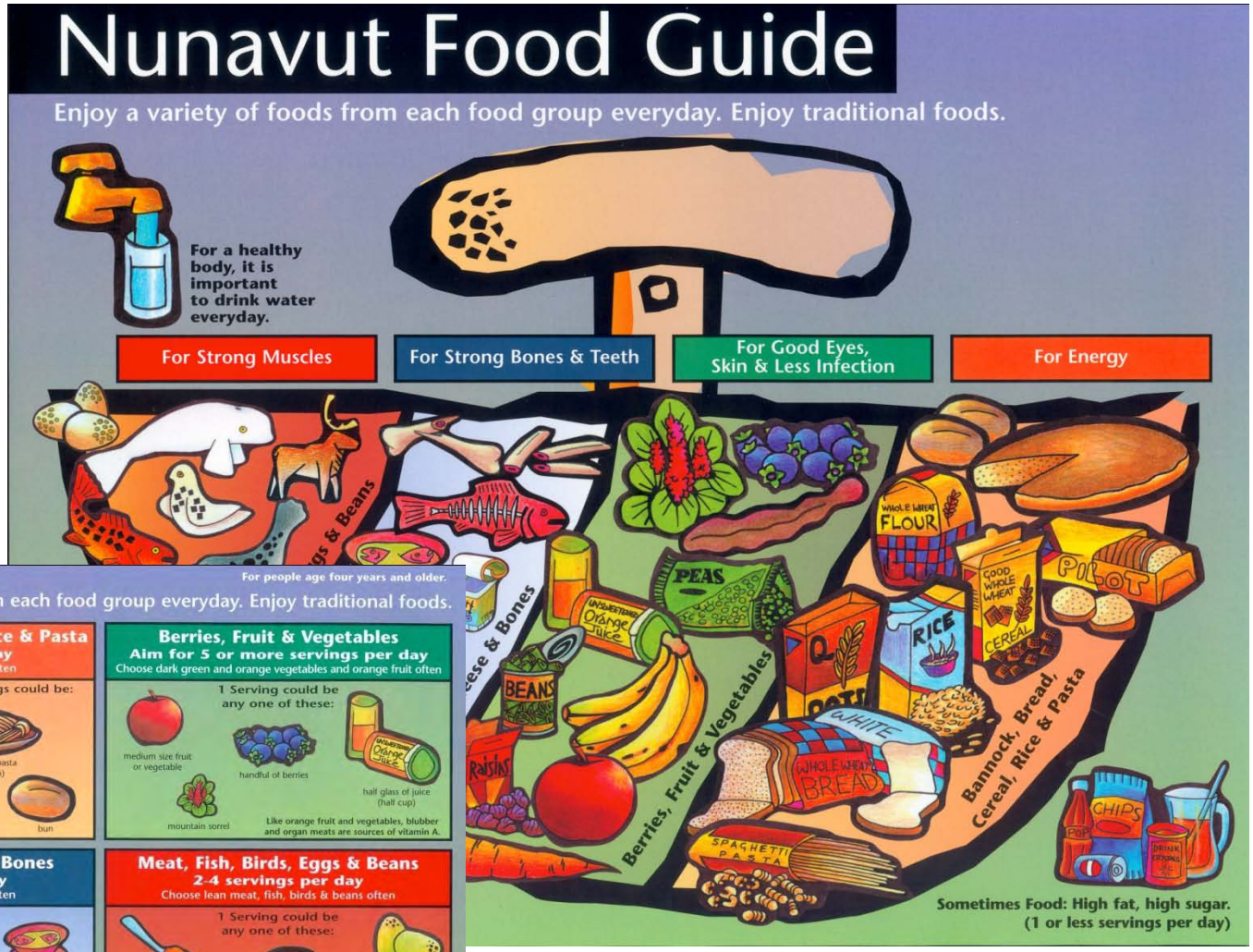
It is not enough to just value the links between the experiences, disciplines, creativity, and ideas …

… one has to develop methods, strategies, and practices that will transform those links to the real connections.

[paraphrase of Ron Burnett at http://www.chocuk.net/troupe/isin_onol1.html]

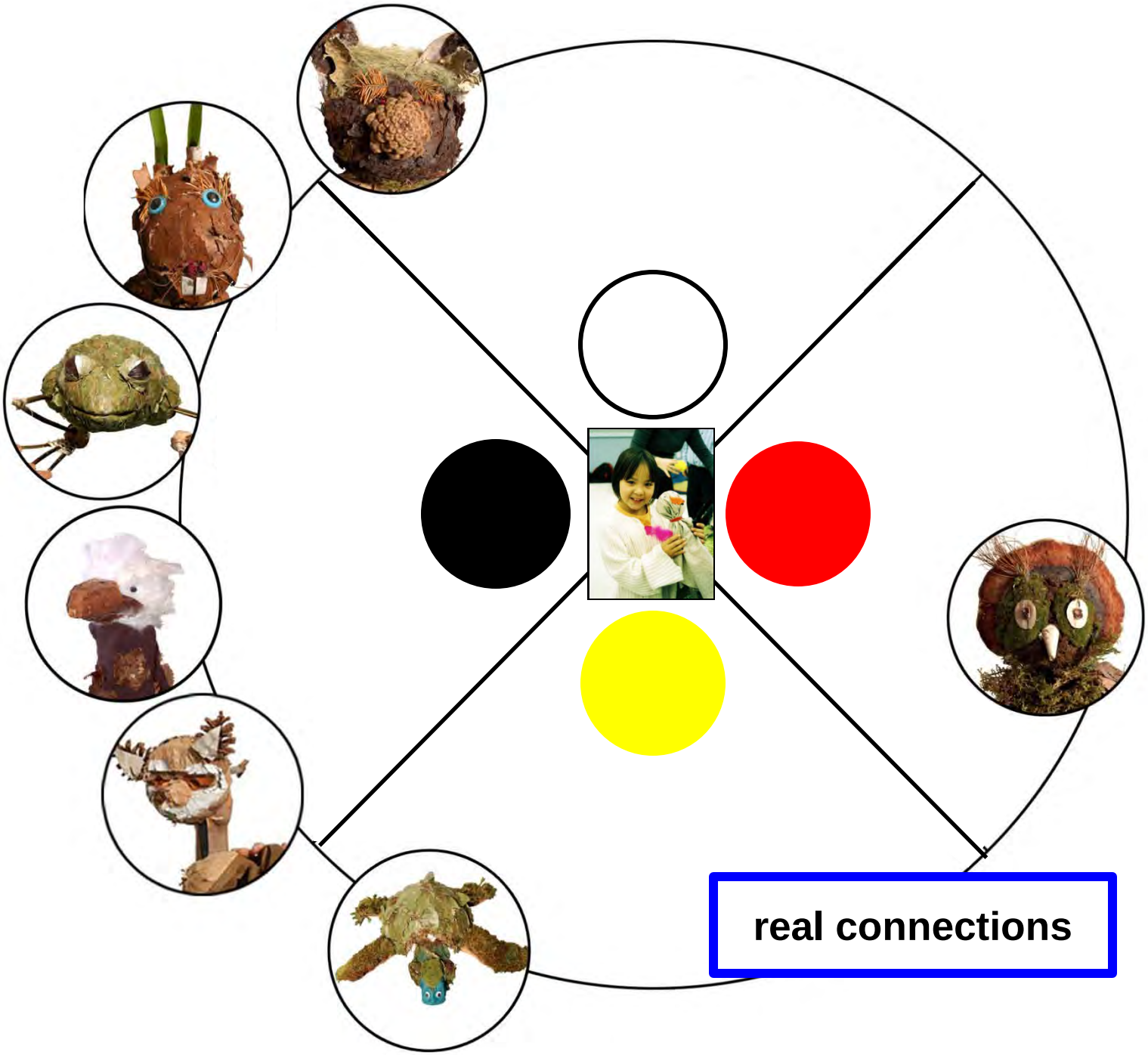
Artist Basma Kavanagh





real connections

real connections

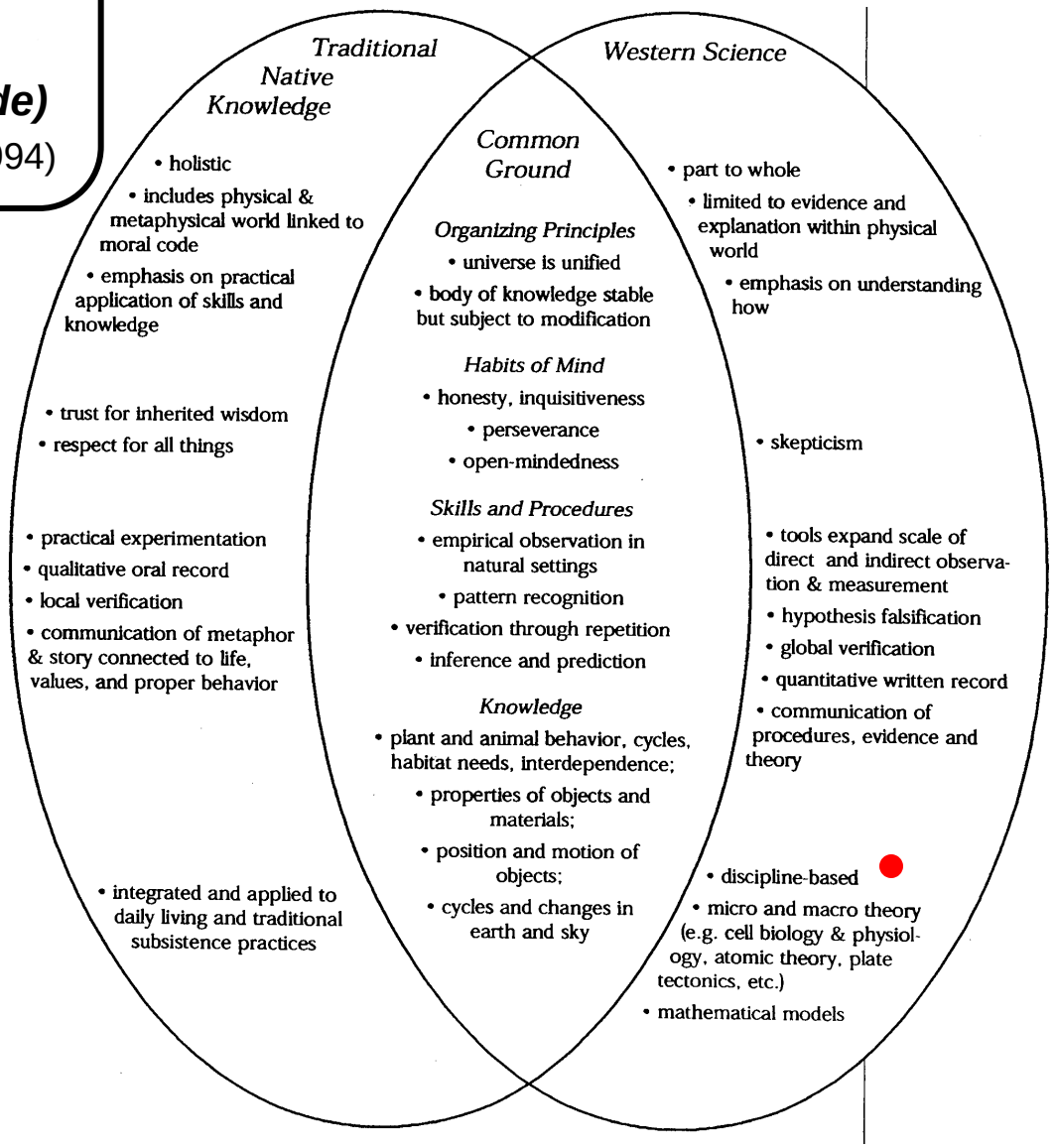


real connections

- multi-referential
- multi-dimensional
- trans-historical ***(can include)***

(1st World Congress of Transdisciplinarity 1994)

SEEING COMMON GROUND
Indigenous Knowledge & Western Science

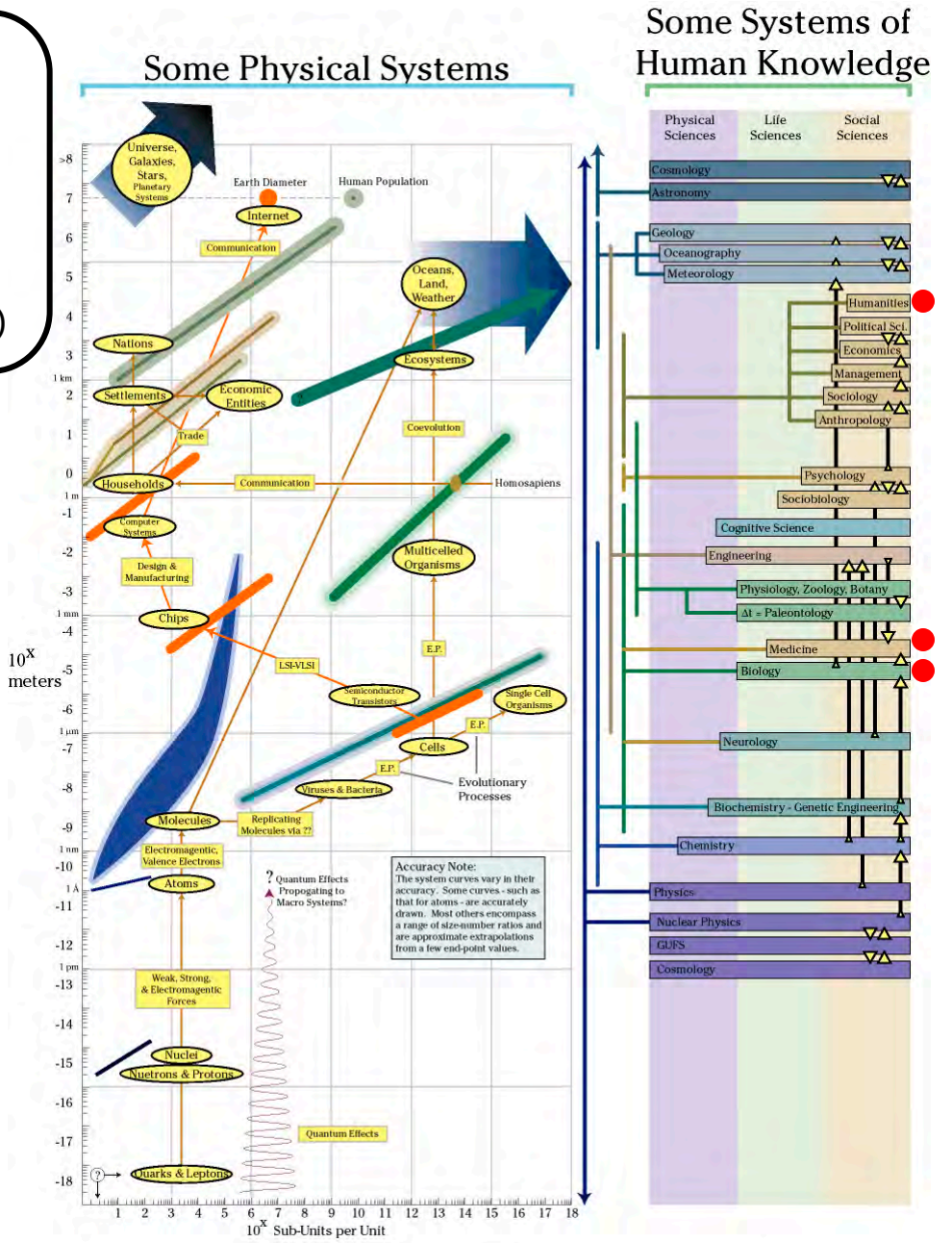


CONCEPT MAP

from: **Handbook for Culturally Responsive Science Curriculum; S. Stephens, 2000**

- multi-referential
- multi-dimensional
- trans-historical ***(can include)***

(1st World Congress of Transdisciplinarity 1994)



http://www.necsi.org:16080/projects/mclemens/syshier.gif

Co-Learning

Go into a forest, you see the birch, maple, pine. Look underground and all those trees are holding hands. We as people must do the same.

(late Mi'kmaq Chief, Spiritual Elder, and Healer Charlie Labrador)

Co-Learning

Go into a forest, you see the birch, maple, pine. Look underground and all those trees are holding hands. We as people must do the same.

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collaborative initiatives

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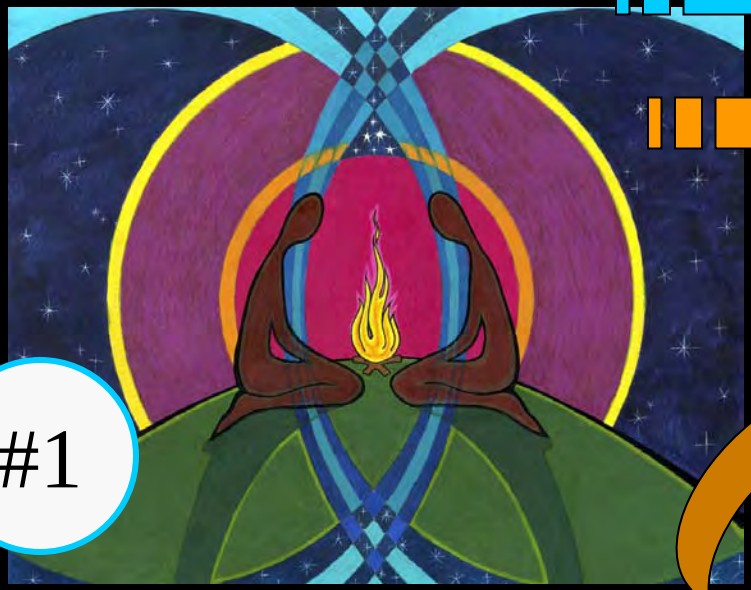
#2

CIHR IRSC

health research



#4

archaeological interpretation

#1

post-secondary science education

Bras d'Or Lake

CBPI

Mi'kmawey Debert

#3

environmental planning

11 LESSONS LEARNED: We need to learn to …

- acknowledge we need each other
- acknowledge we are on a learning journey
- learn to “co-learn”:
  - simple **integrative framework**
- help institutions to help us “legitimize” TK in the minds of youth (and many others)
- work with “living agendas”
- use other “organic language”
- do … in a creative “grow forward” manner

11 LESSONS LEARNED: (cont'd)
We need to learn to …

- think "knowledge gardening" more than knowledge translation or knowledge transfer
- weave back and forth between

  our knowledges, our world views, our stories
- navigate our weaving via awareness of

  "big patterns" (knowledge orientations or maps)
- make our knowledges, i.e. our stories, visual

Mr. Albert Marshall, Mi’kmaq Elder
Eskasoni First Nation

integrative framework

both Indigenous and Western, plus:

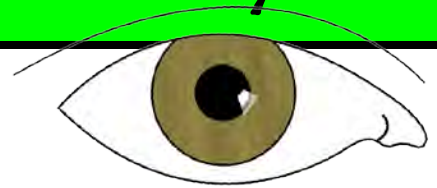
- role of me and you in “the knowing”
  - e.g. patterns: recognition & transformation
- our common ground
- our differences (and respect them)
- our journey … forward & together

AVOID … simply Western plus
bits and pieces of Indigenous

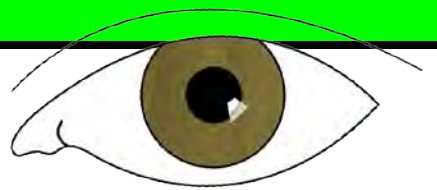
BIG pattern understanding

"two-eyed seeing"

our key concepts & actions

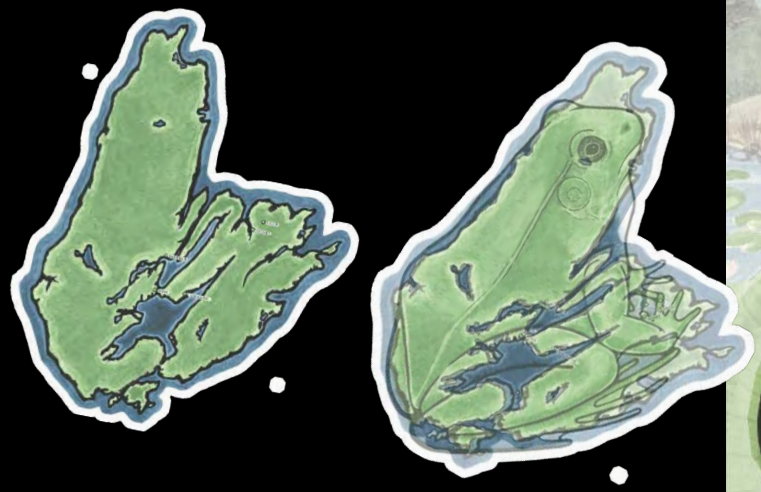


- respect
- relationship
- reverence
- reciprocity
- ritual
- repetition
- responsibility



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

… consider:



As a scientist, I want my imagination rekindled. I want to be shown how to look at things in new ways; I believe my capacity for innovation and creativity in my own discipline will grow as a result.

(Arthur J. Carty, then President NRC, now National Science Advisor to PM)

(2000 Conference on Creativity in the Arts and Sciences)

... consider:

conceptual space shifting

KNOW

VALUE

DO

human
mindful consciousness

… consider:

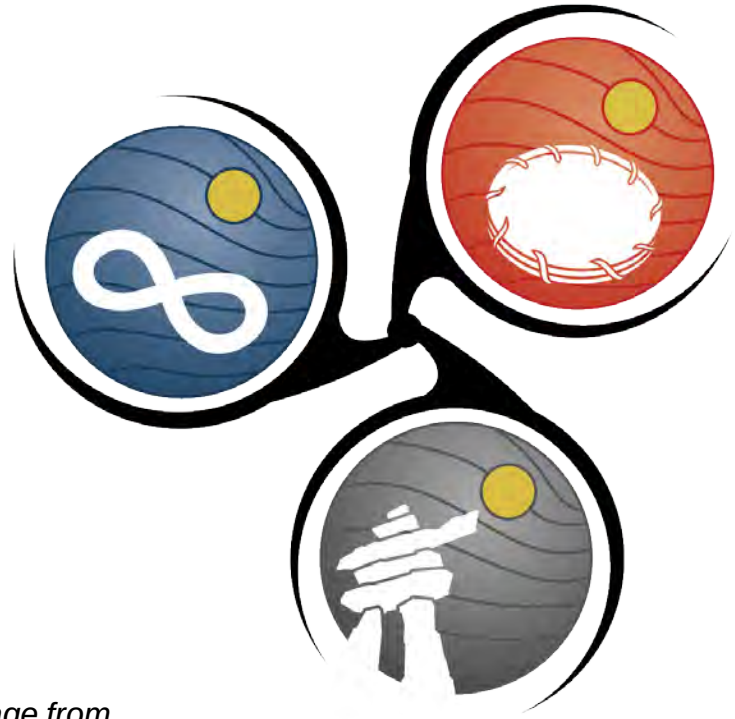
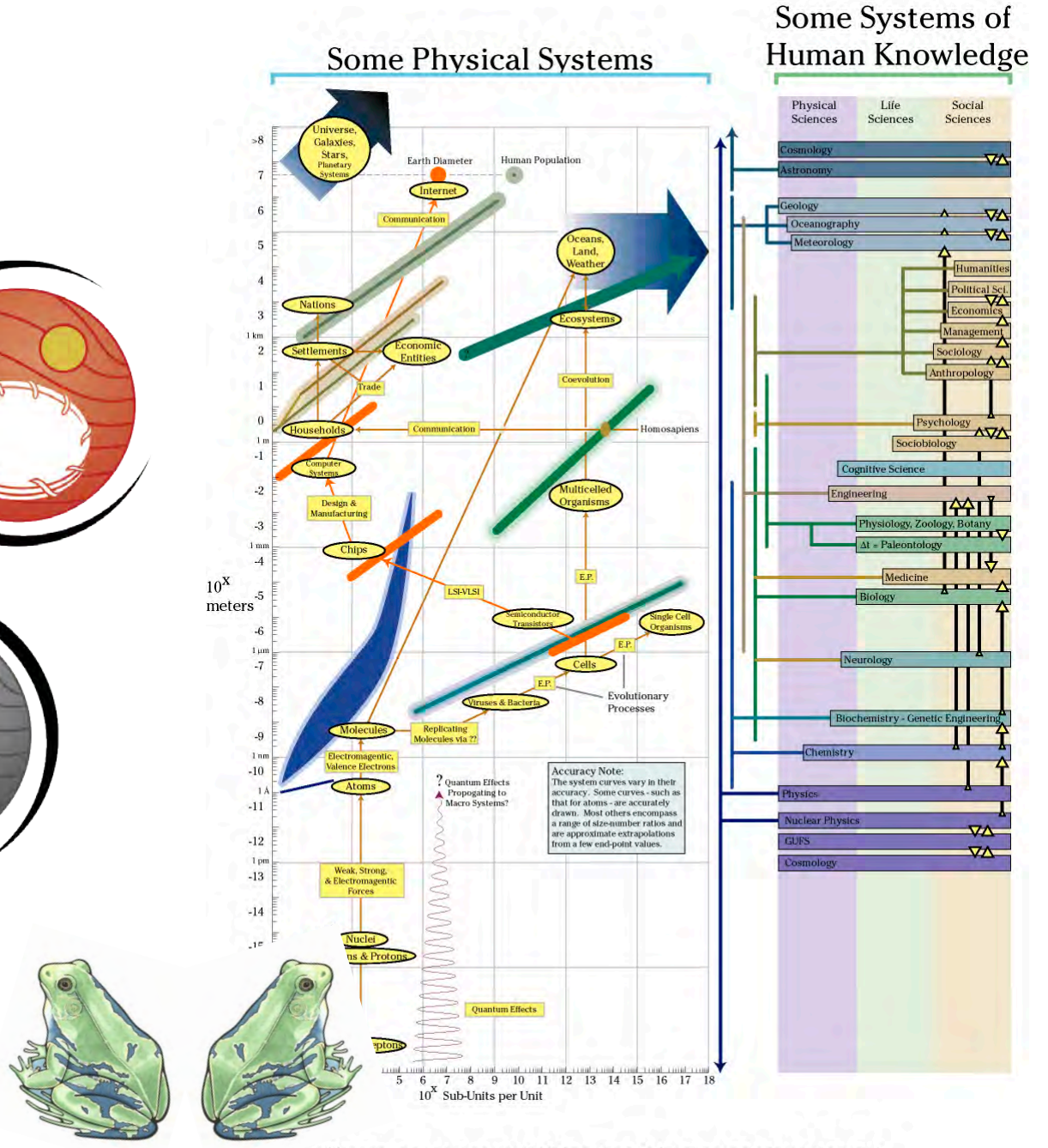


image from
Aboriginal Policy Research Conference
Ottawa, March 2006



http://www.necsi.org:16080/projects/mclemens/syshier.gif

… consider:

domain of the
unknown

FEAR

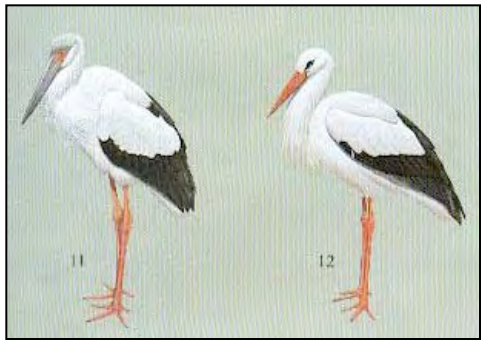
domain of the
known

human consciousness
"must become
PATTERN-able"
(Douglas J. Cardinal)
world renown architect

must learn:
"conceptual space shifting"

(2000 Conference on Creativity in the Arts and Sciences)

PATTERN RECOGNITION & TRANSFORMATION



human consciousness

"pattern smarts"

multiple intelligences theory

(H. Gardner, Harvard Univ.)

sanctioned
world view or methodology

KNOW

VALUE

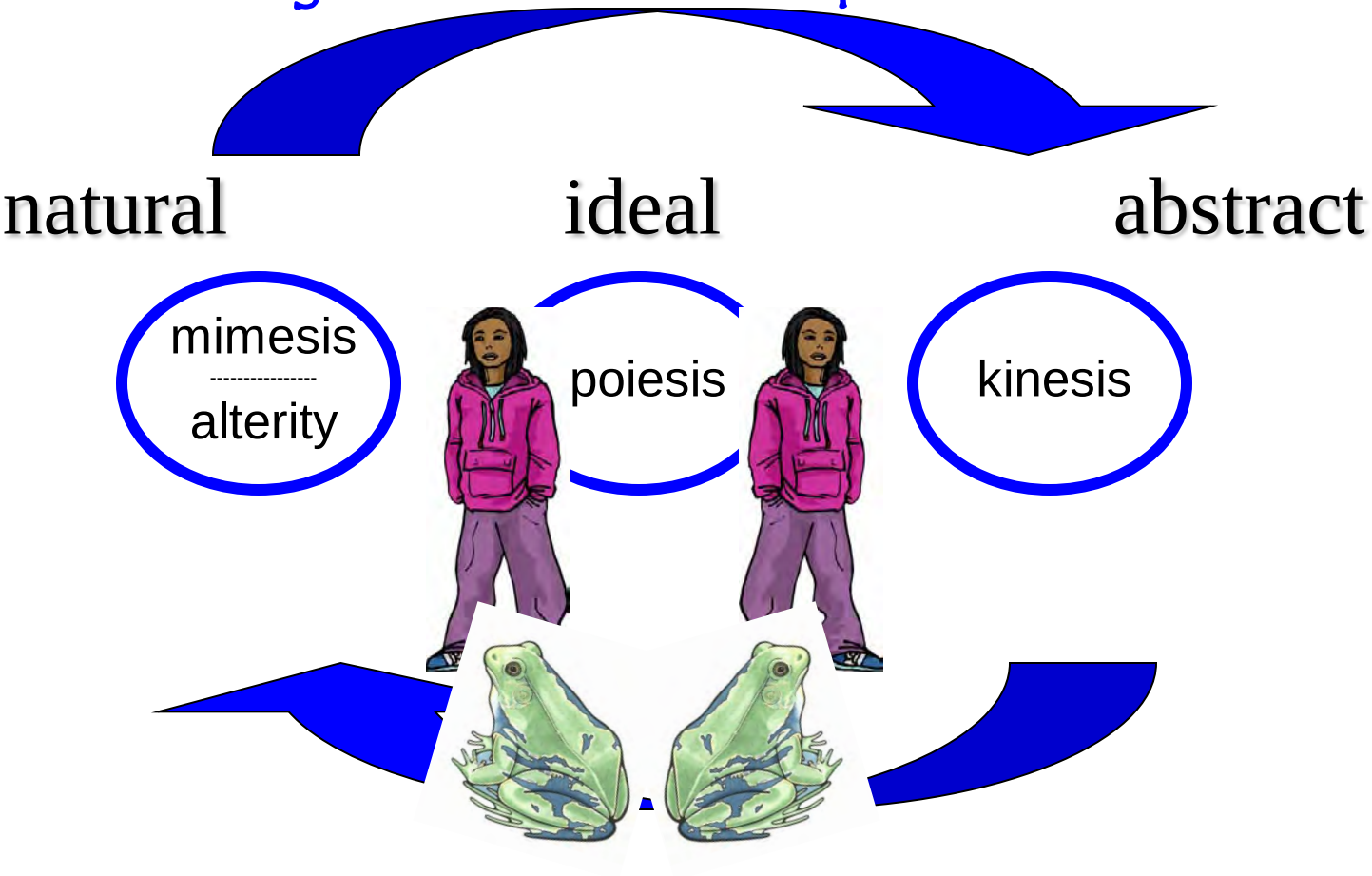
DO

- numbers (logical-mathematical)
- language (linguistic)
- music (musical)
- body (body-kinesthetic)
- spatial (spatial)
- other people (interpersonal)
- self (intrapersonal)
- naturalist (naturalist)
- spiritual / existential *

PATTERN RECOGNITION & TRANSFORMATION

conceptual space shifting

three piece iterative approach
for Integrative Science-implicated research



Co-learning our way to expanding wholeness through restoration of relationships with the land

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

1. Key phrases & words

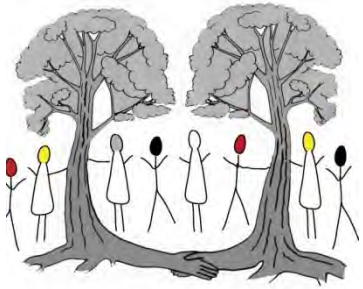
2. Biodiversity literacy

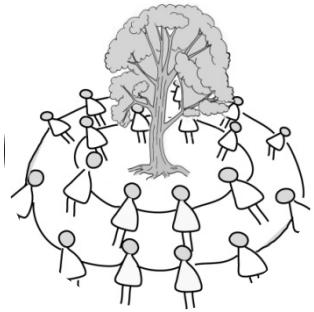
4. Mi'kmaq biocultural expression

5. Spiritual connectedness with the land

3. Ecosystem health literacy

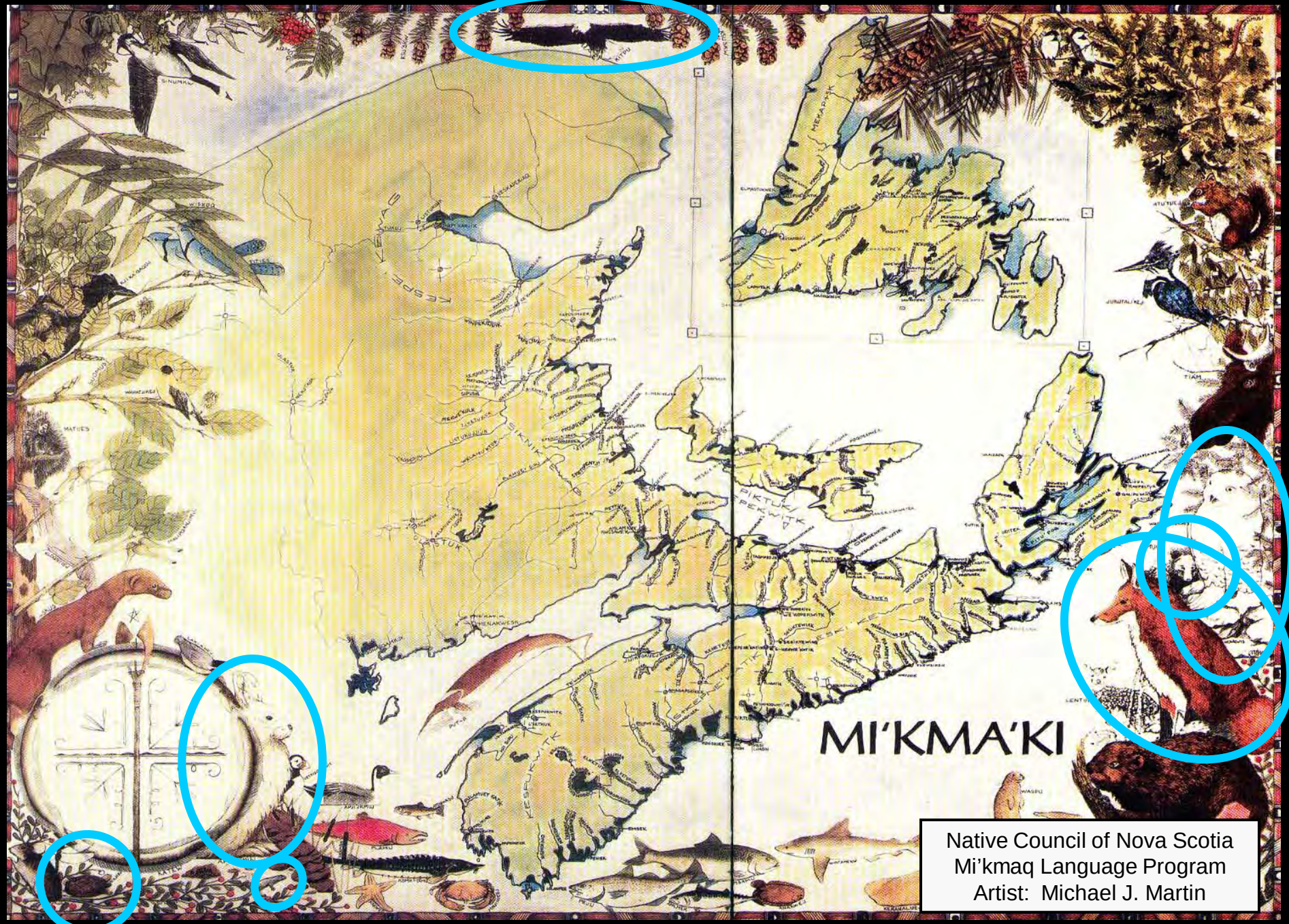
6. Integration of co-learnings into health care delivery systems



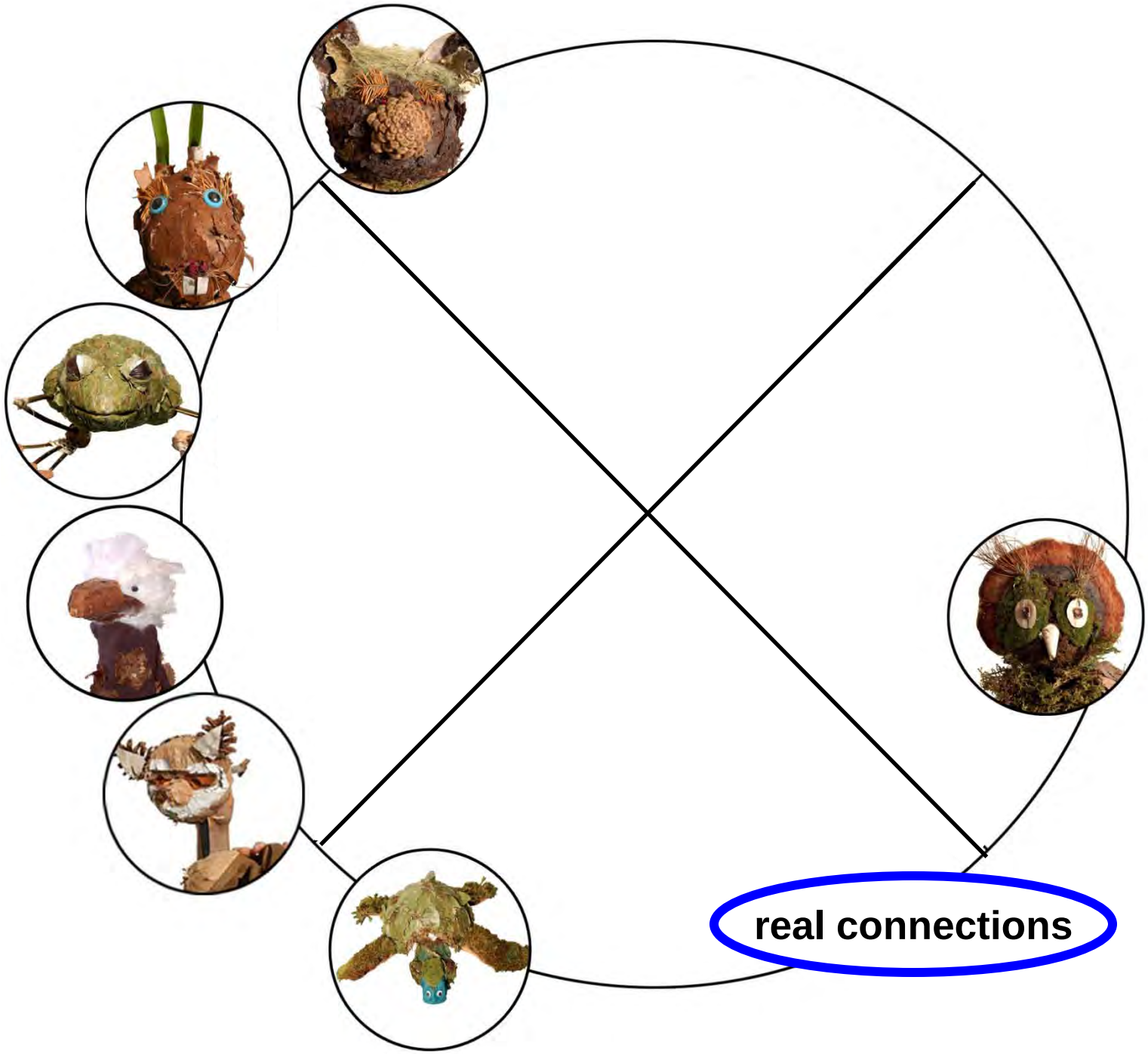


7. Extension of co-learnings into sustainable ventures

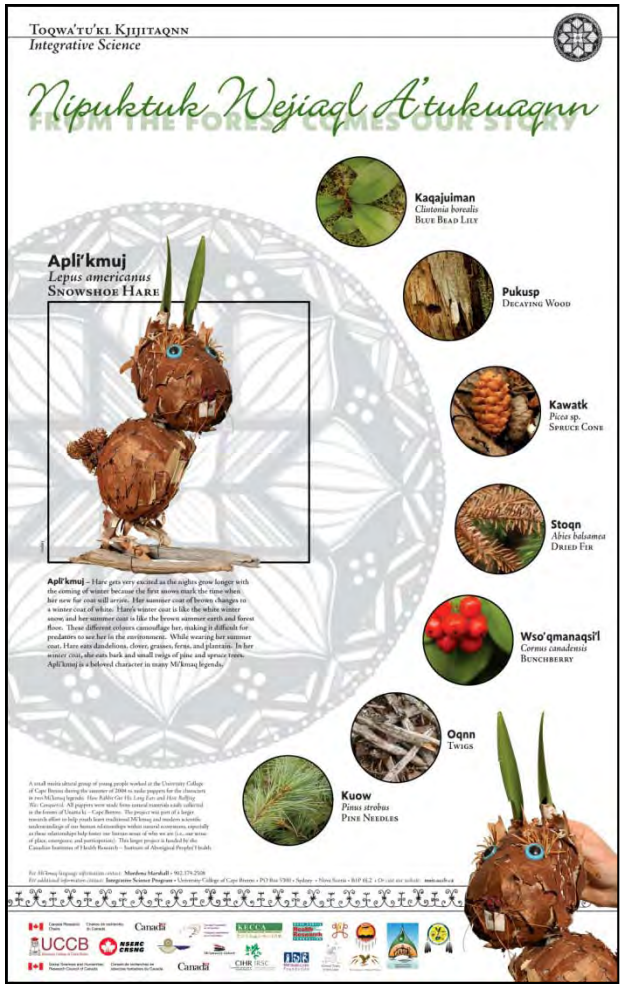
Themes



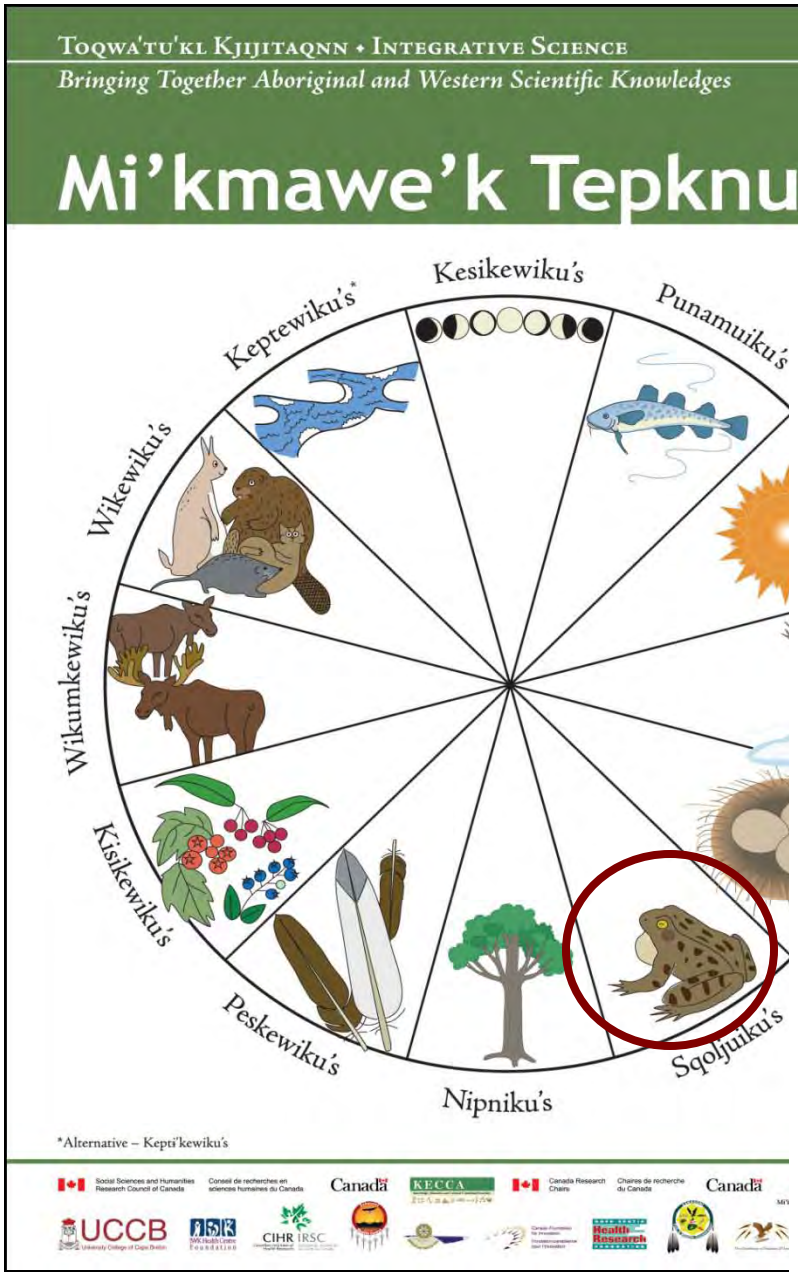
Native Council of Nova Scotia
Mi'kmaq Language Program
Artist: Michael J. Martin

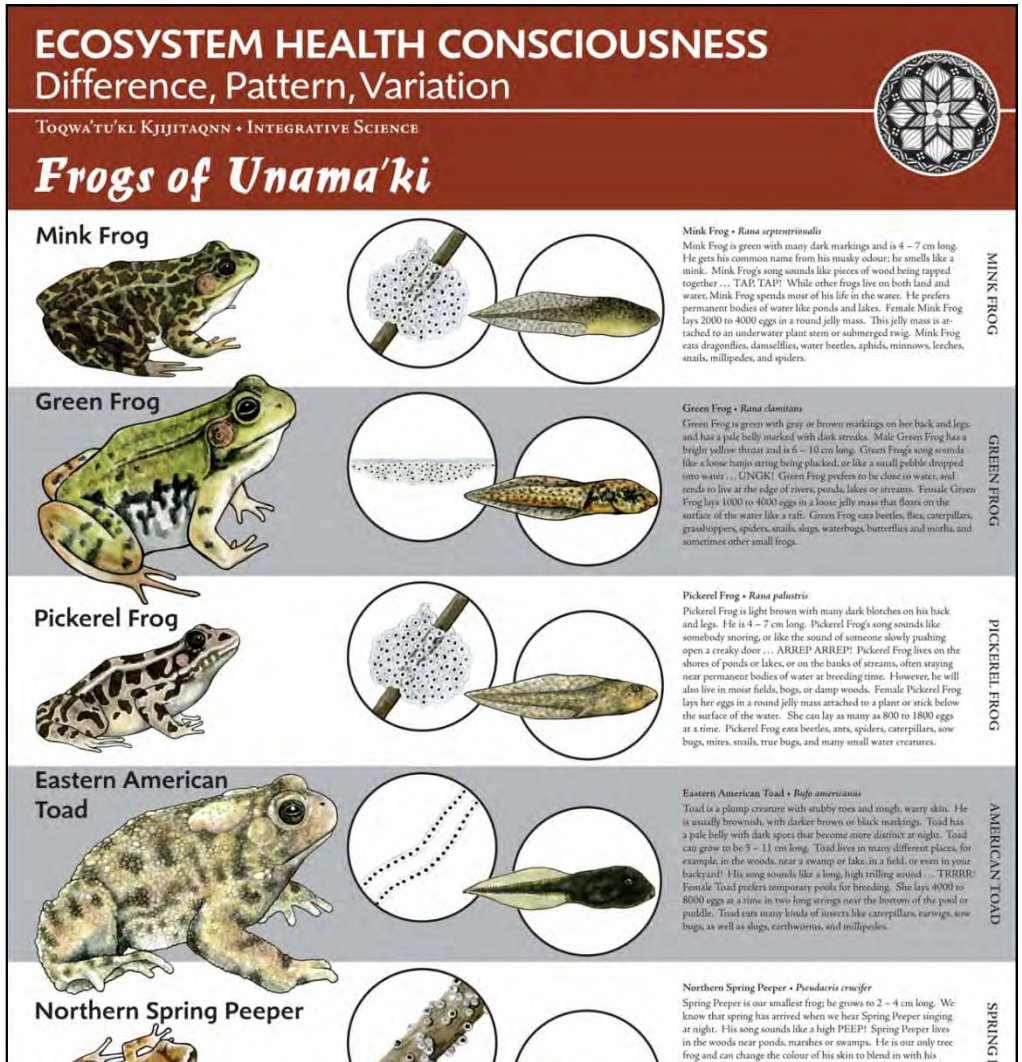

real connections

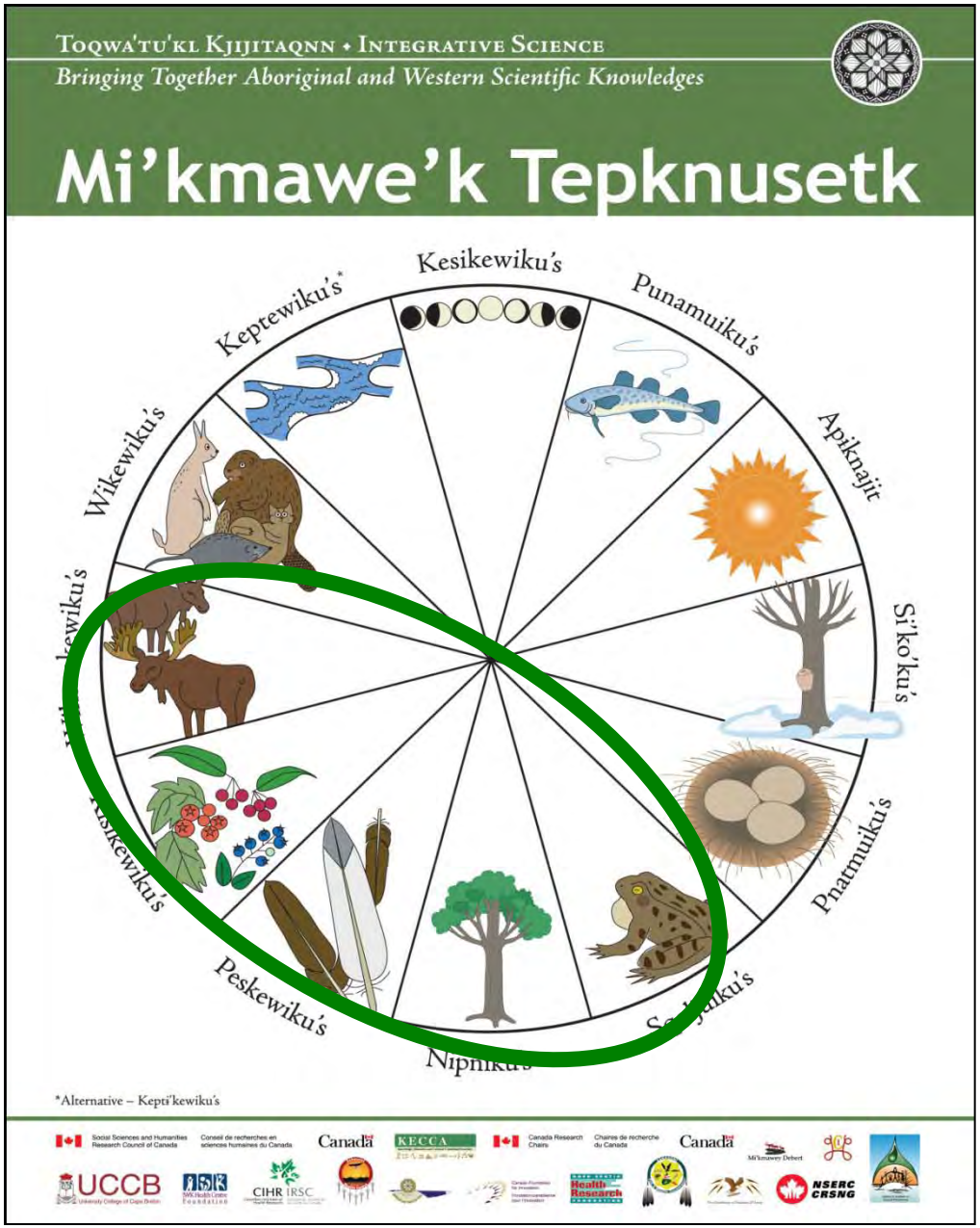
puppets made from the Earth



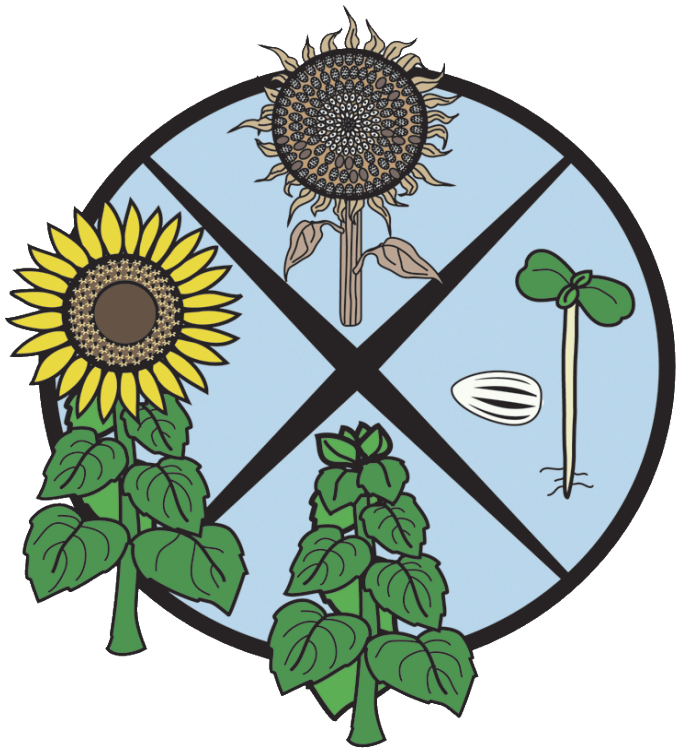
Earth speaks: health indicators



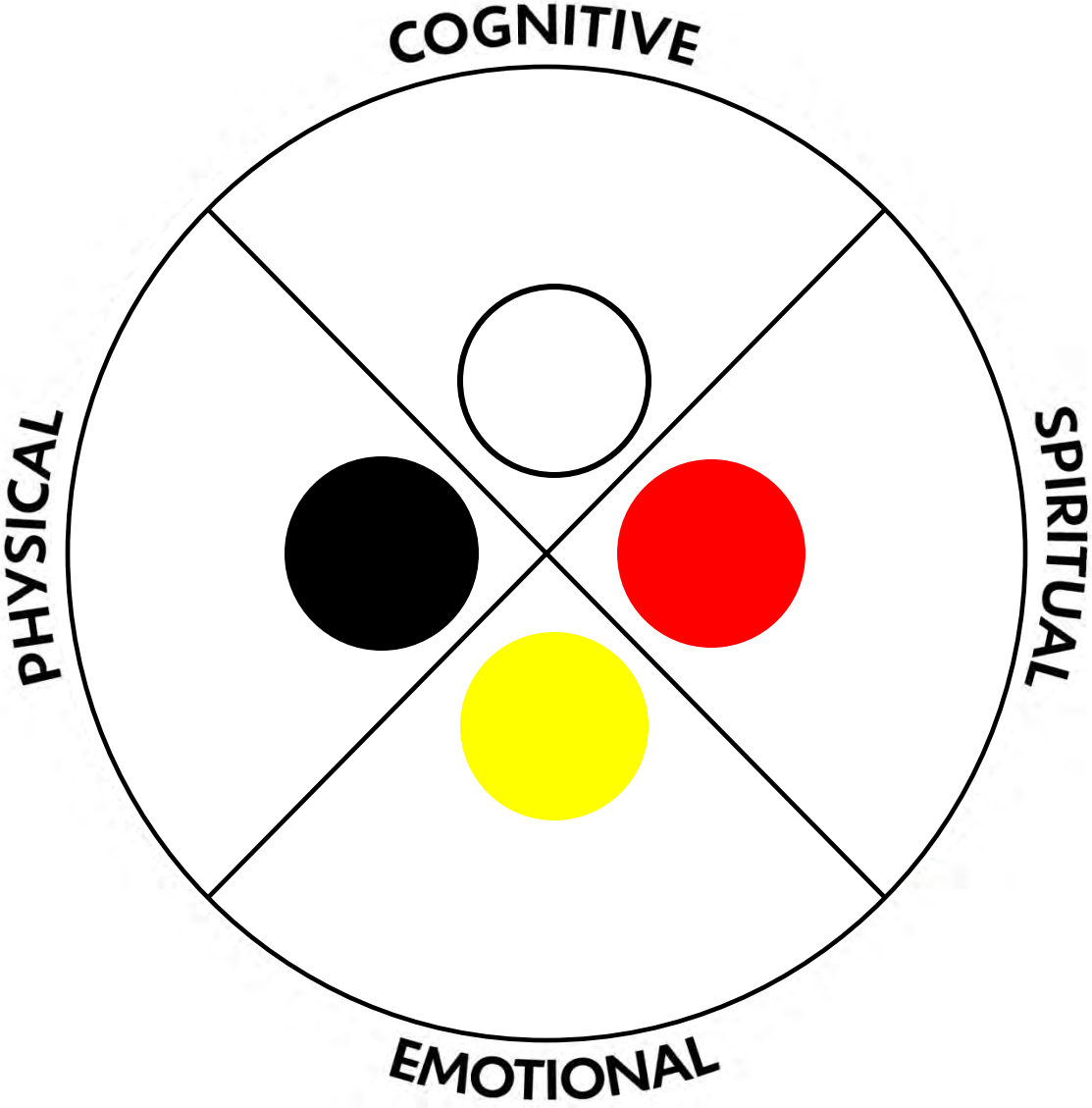




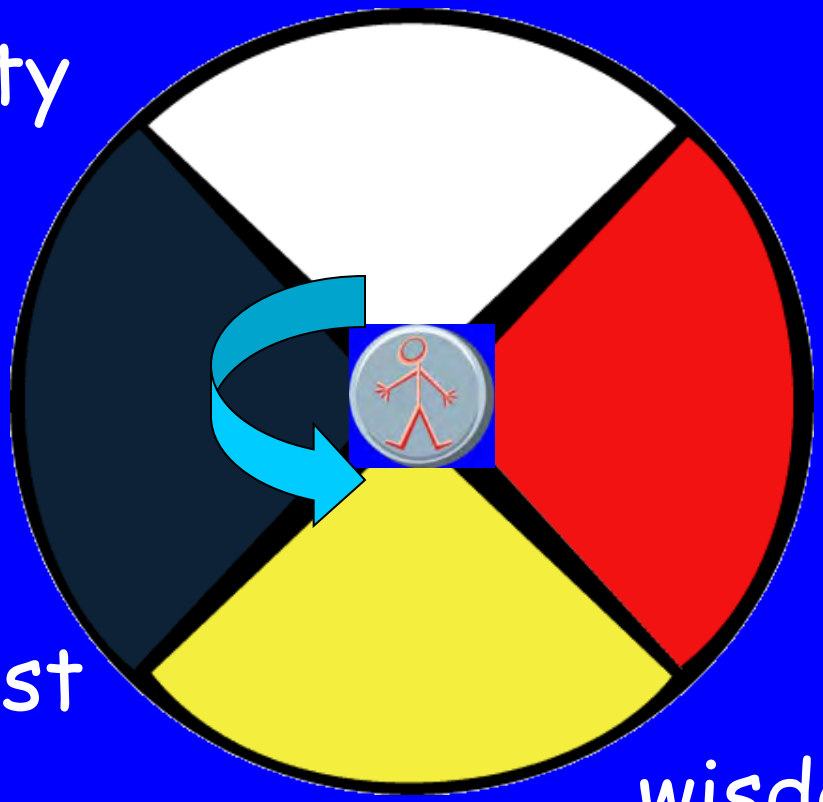
Earth speaks: voices of health in the land



Medicine Wheel



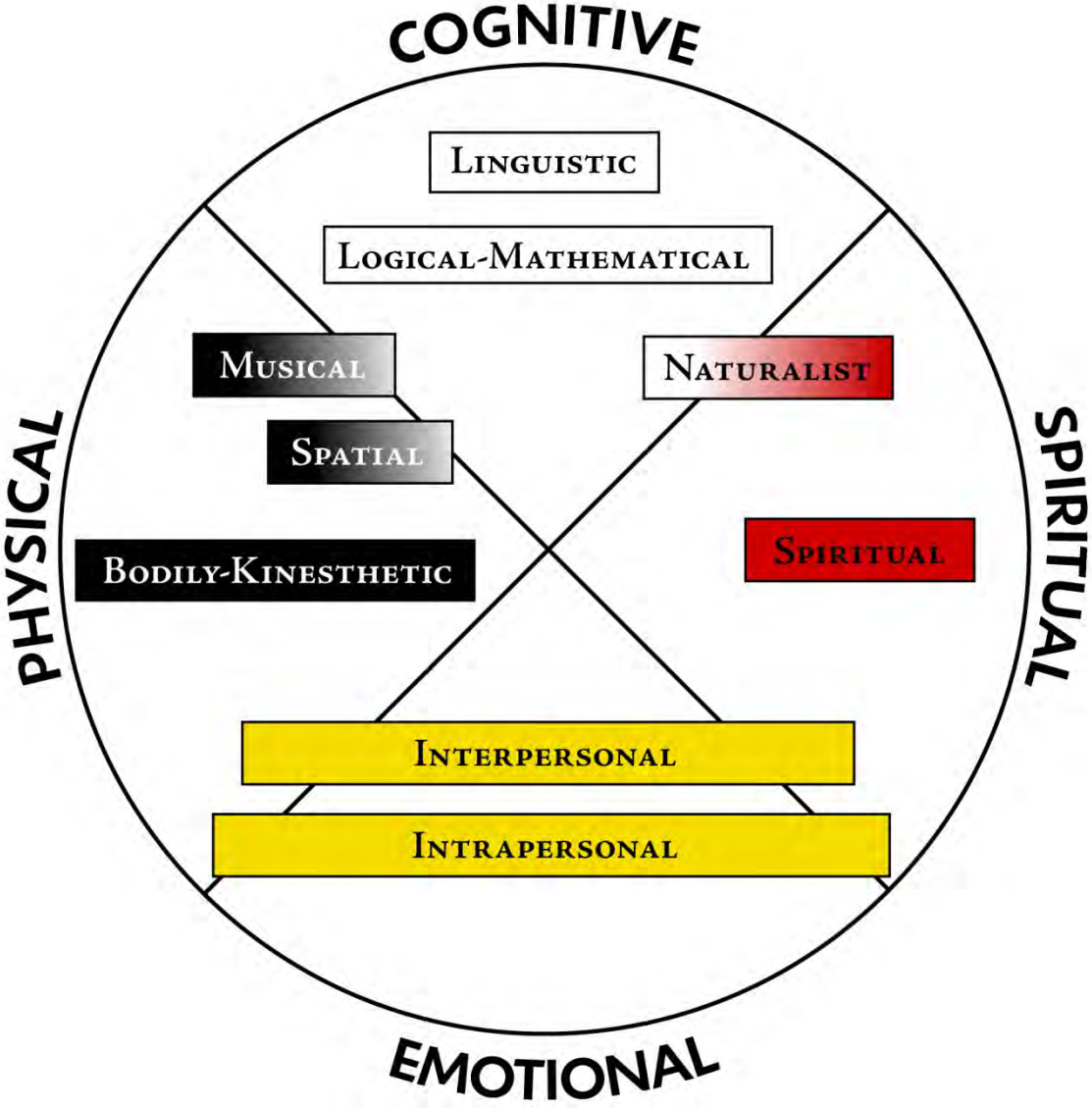
Seven Gifts Of Life



Teachings of Mi'kmaq Elder Murdena Marshall, Eskasoni First Nation, Unama'ki – Cape Breton

Gardner's Multiple Intelligences
in association with Medicine Wheel

(cross-mapping possibility while recognizing "non-fit" challenges)



Co-learning our way to <u>expanding wholeness</u> through restoration of relationships with the land

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

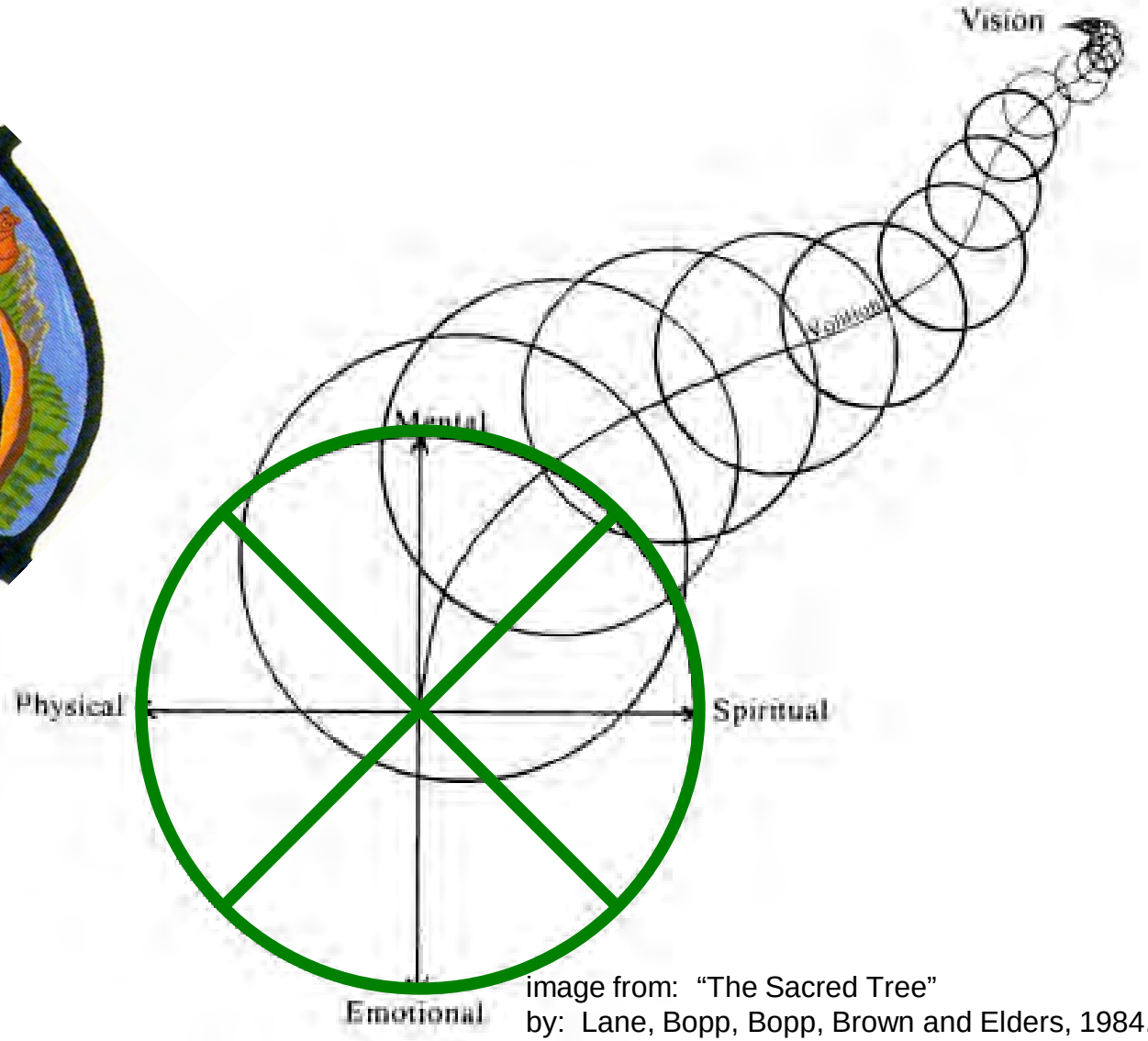
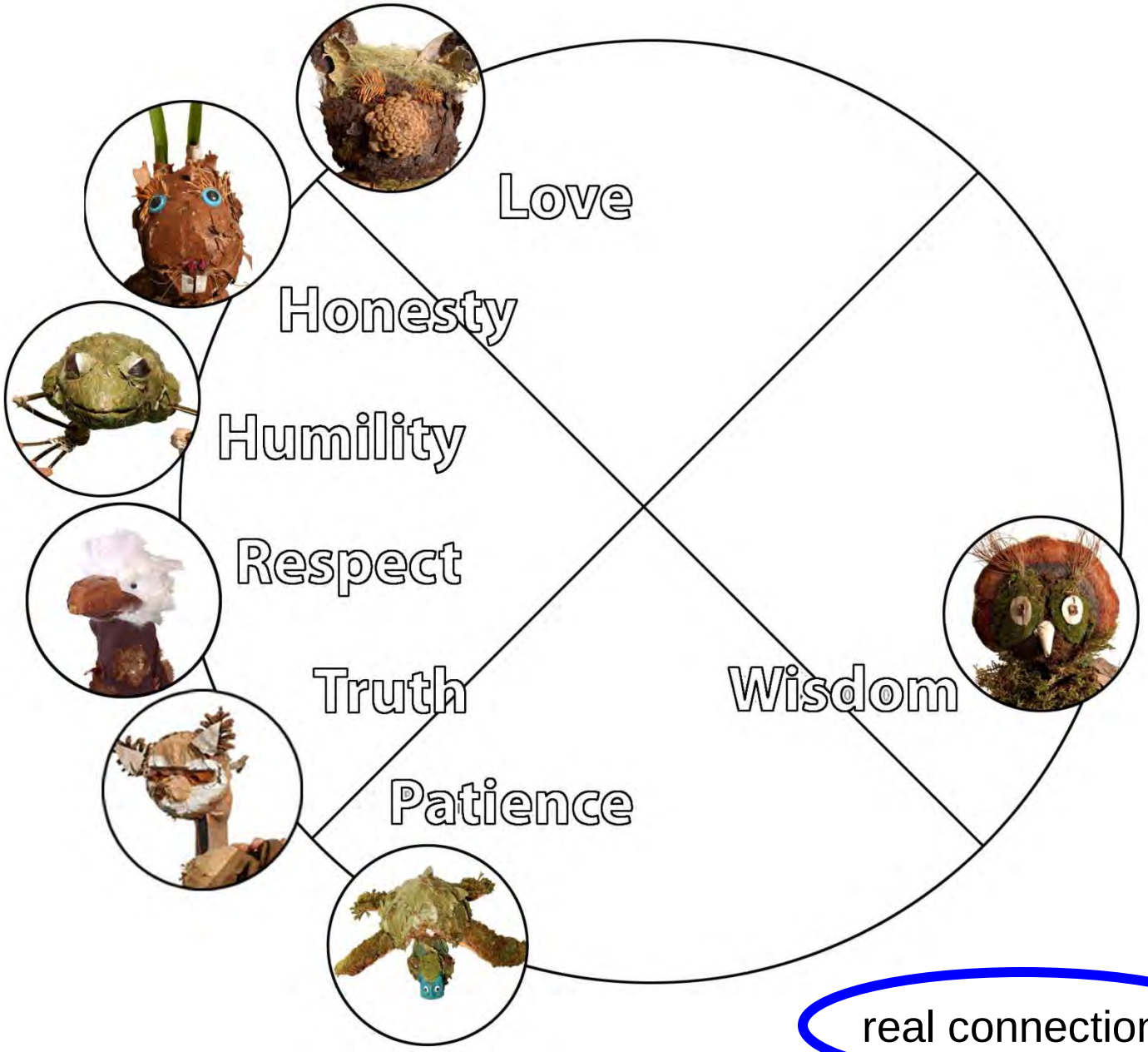
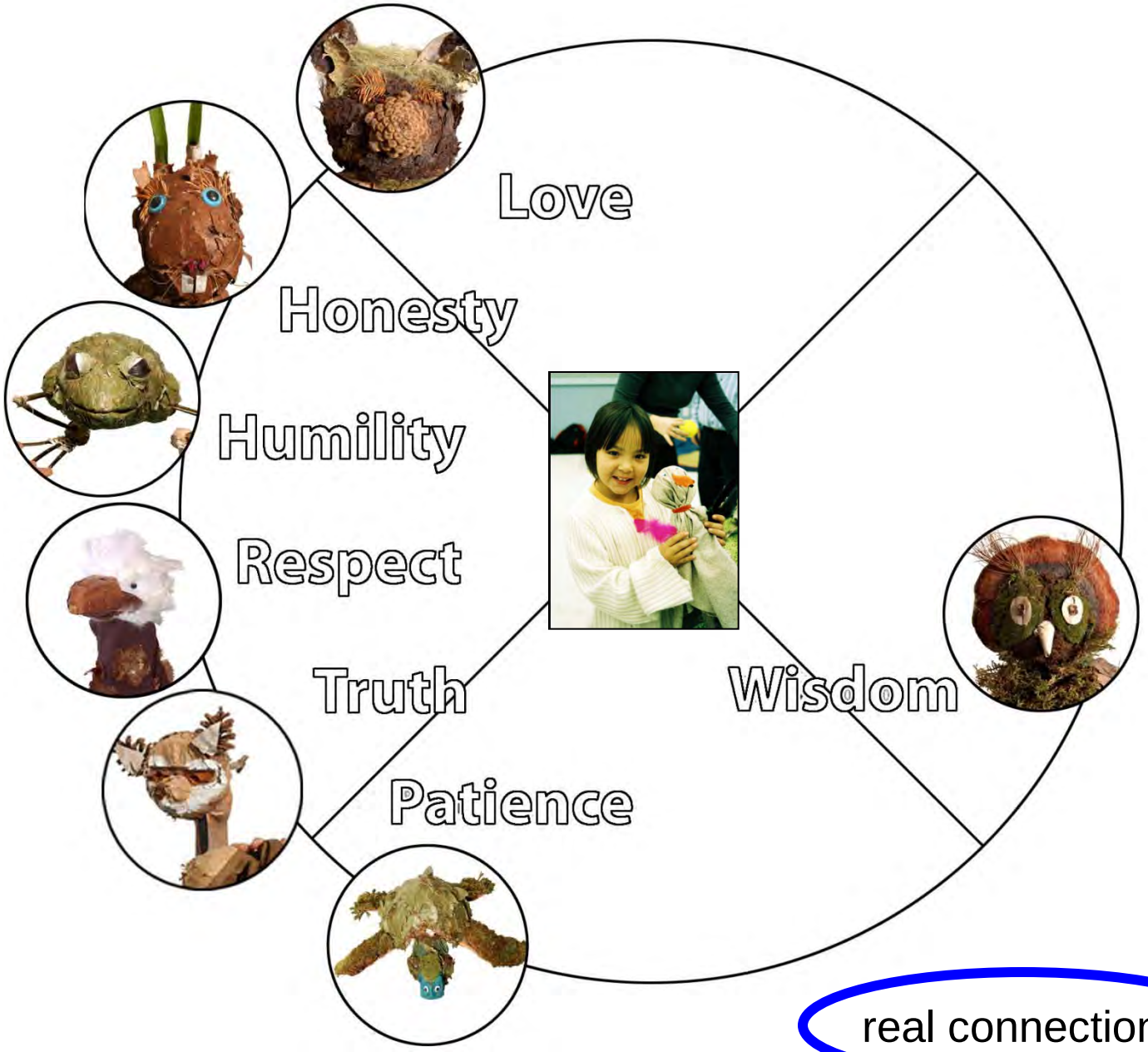


image from: "The Sacred Tree"
by: Lane, Bopp, Bopp, Brown and Elders, 1984.
published by: Four Worlds International Institute



real connections



real connections

It is not enough to just value the links between the experiences, disciplines, creativity, and ideas (as in inter & multi disciplinarity) …

… one has to develop methods, strategies, and practices that will transform those links to the real connections

[paraphrase of Ron Burnett at http://www.chocuk.net/troupe/isih_

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CIHR IRSC

Canadian Institutes of Health Research

Instituts de recherche en santé du Canada

IAPH

IWK Health Centre Foundation

NOVA SCOTIA Health Research FOUNDATION

UNAMA'KI INSTITUTE OF NATURAL RESOURCES

THANK YOU

NSERC CRSNG

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Royal Canadian Mounted Police

Gendarmerie royale du Canada