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in Integrative Science

Knowledge Inclusivity:



“Two-Eyed Seeing”
for Health Research Collaborations
(Aboriginal and Mainstream)
for the 21st Century

6th Conference of the Canadian Rural Health Research Society and
1st Conference of the Canadian Society for Circumpolar Health
Quebec City, QC, 27-29 October 2005

ABSTRACT: Contemporary Canada should be attempting to include Aboriginal peoples' knowledges in various science arenas; in this regard, human and ecosystem health are two of the most relevant. For the mainstream, however, knowledge inclusivity is largely unknown territory and efforts may easily falter. Based on my participation in three initiatives that involve a "learning journey of inclusion" of Aboriginal knowledge alongside Western science, I will outline some "lessons learned", in the spirit of sharing to help others with similar interests. These initiatives are in Cape Breton, Nova Scotia; they are separate yet related and each is a collaborative effort involving Mi'kmaq First Nations and the mainstream (e.g. university researchers, non-native community, government). The first, "Integrative Science" (www.integrativescience.ca), is a unique undergraduate science program at Cape Breton University; its overall objective is to include Aboriginal knowledges in new university science curricula. The second, "Integrative Health and Healing", is an Aboriginal community-based, participatory action, health research project funded by CIHR-IAPH (Canadian Institutes of Health Research - Institute of Aboriginal Peoples' Health); its overall objective is to co-learn ways to help Mi'kmaq youth re-establish aspects of tribal consciousness wherein connectedness with the land contributes to an expanding sense of wholeness (and improved mental health). The third, "CEPI" (collaborative environmental planning initiative), is an effort by Mi'kmaq First Nations in conjunction with non-native others to create a management plan for the Bras d'Or Lakes ecosystem which is greatly valued by all peoples in Cape Breton. Mr. Albert Marshall, Mi'kmaq Elder, Eskasoni First Nation, has coined the label "two-eyed seeing" for knowledge inclusivity efforts within these three initiatives; the label points to the need to learn to see from the one eye with the strengths of Aboriginal knowledges and from the other eye with the strengths of Western science ... with the overall intent that we go forward together, learning from and with each other. The presentation will also highlight "two-eyed seeing" as resonant with the "new commitment for Science for the 21st Century" envisioned by UNESCO and the 1999 World Conference on Science.

CAPE BRETON UNIVERSITY

Cape Breton – Unama'ki



**UNAMA'KI
INSTITUTE OF
NATURAL
RESOURCES**



MI'KMA'KI

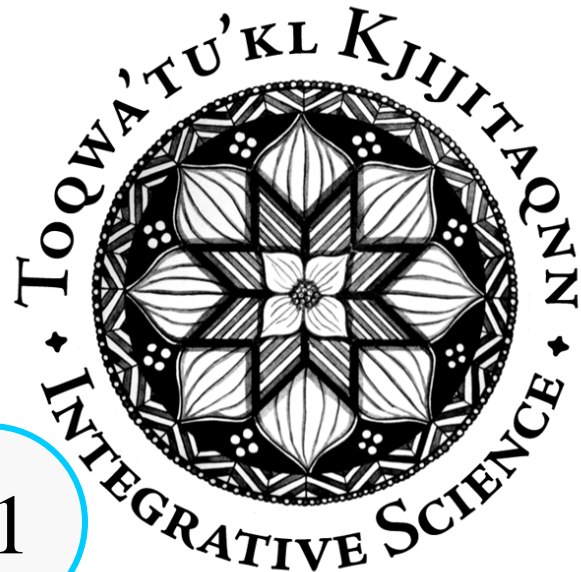
three collaborative initiatives

MI'KMAQ ELDERS



three collaborative initiatives

CAPE BRETON
UNIVERSITY



#1

post-secondary
science
education



#2

CIHR IRSC

health research
project

Bras d'Or Lake

CEPI

#3

environmental
planning initiative

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 Elders “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

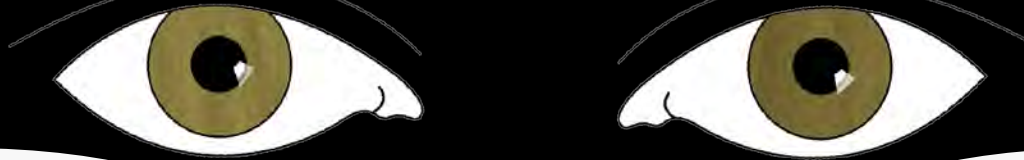
11 LESSONS LEARNED: (cont'd)

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



learn and employ
TWO-EYED SEEING



Indigenous

Western



**Albert Marshall, Mi'kmaq Elder
Eskasoni First Nation**

Three collaborative initiatives

#1

post-secondary
science
education

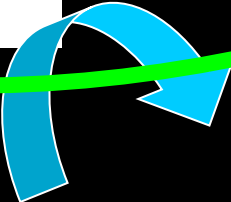
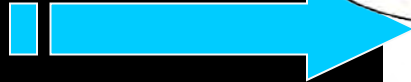
#2

health research
project

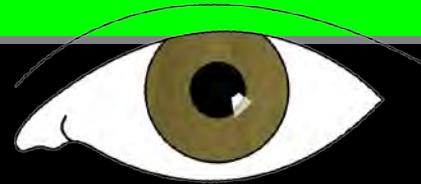
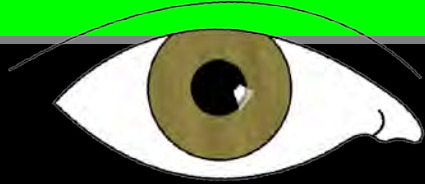


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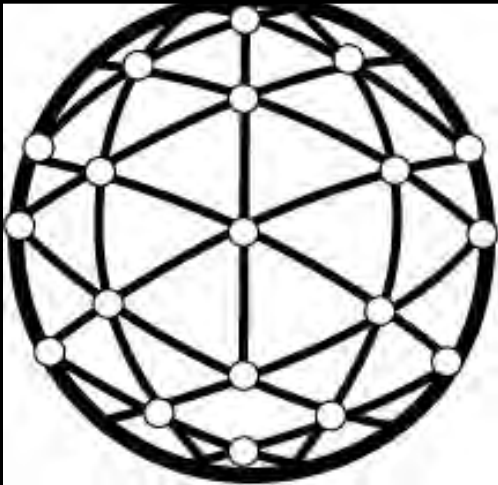
environmental
planning initiative



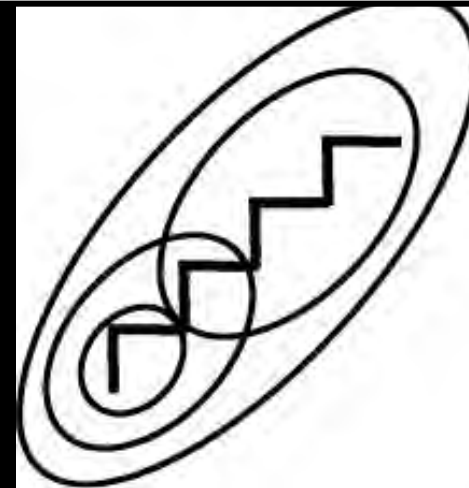
“two-eyed seeing”
how our world is



interconnected



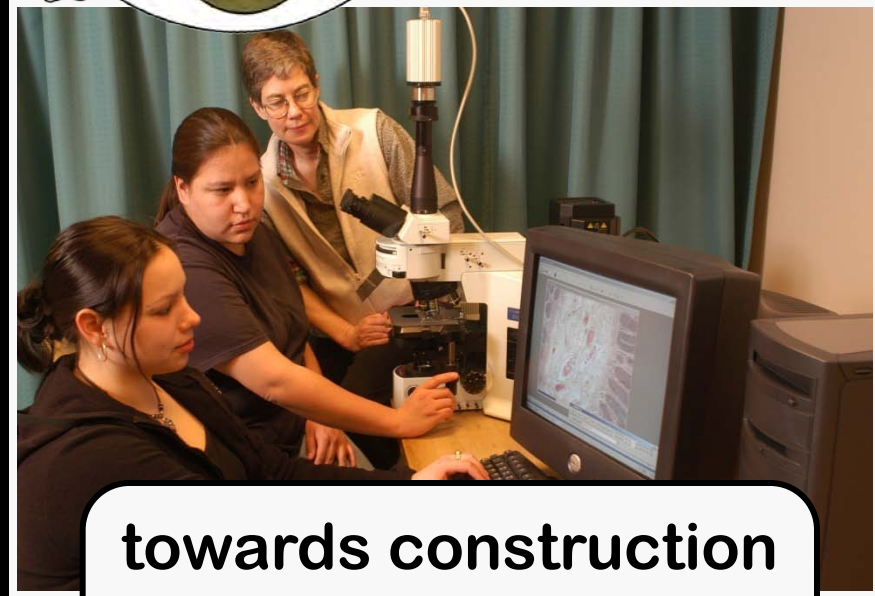
parts & wholes



“two-eyed seeing” our overall knowledge objectives



towards resonance
of understanding
within environment



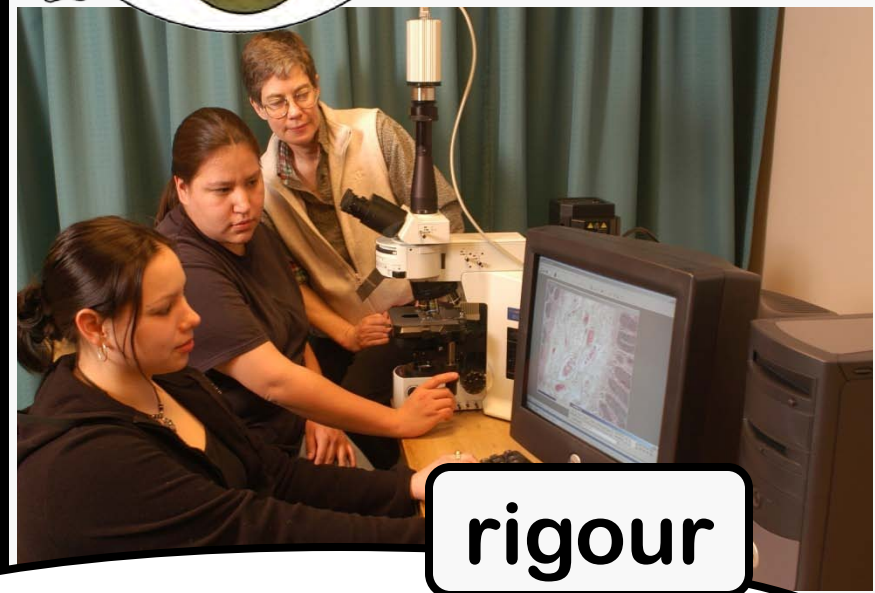
towards construction
of understanding
of environment

“two-eyed seeing”
our language & methodology



vigour

WEAVING

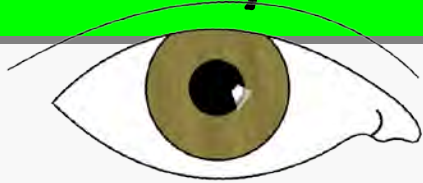


rigour

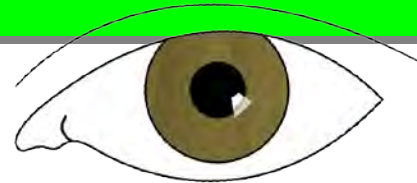
UN-WEAVING

“two-eyed seeing”

our key concepts & actions



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



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

Three collaborative initiatives

#1 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, Univ. of New Mexico

Toqwa'tu'kl Kijitaqnn Integrative Science



Indigenous our knowledges Western
our world views

“bringing our stories together”





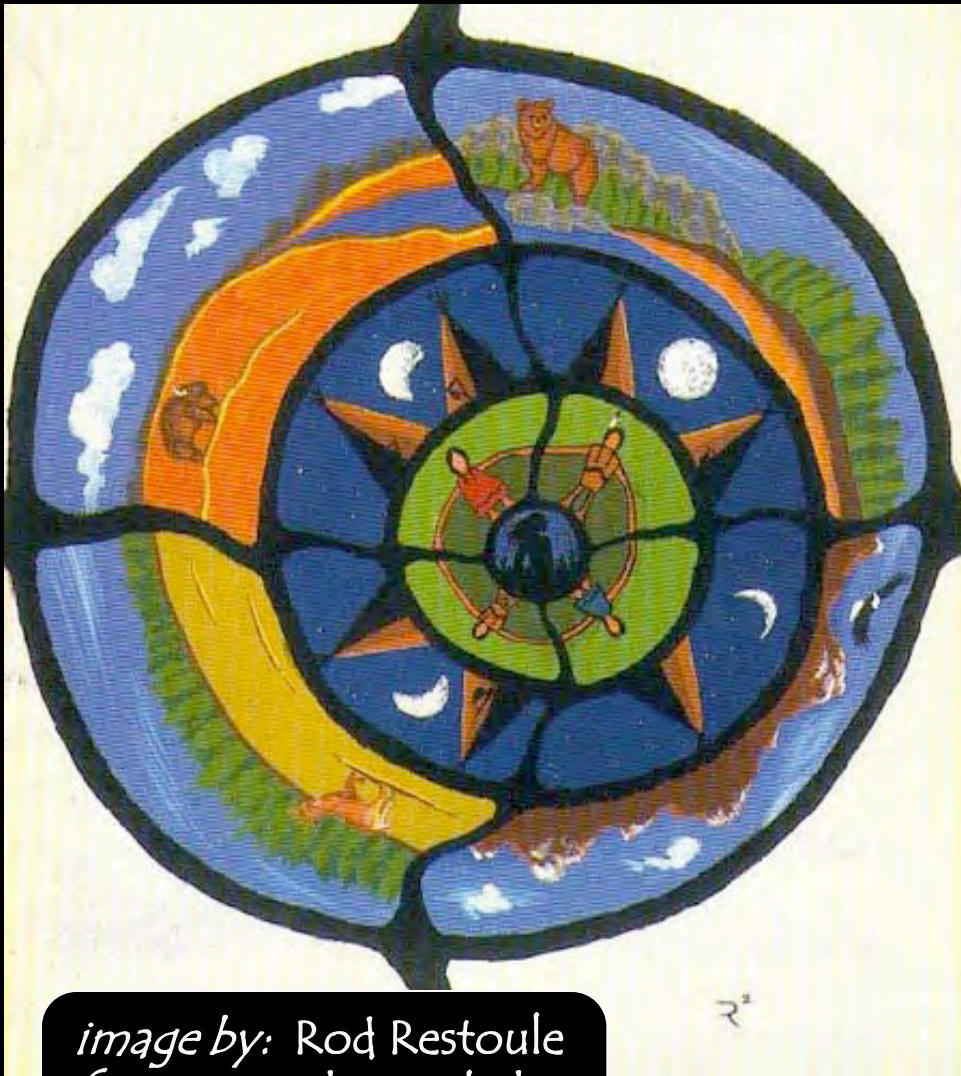
The voice of
our ancestors
is in the land.





We are
all inter-
connected.

image from:
Mi'kmaq Family
and
Children Services



*image by: Rod Restoule
from: Into the Daylight;
C. Morriveau, 1998*

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

Wjipenuk Etek Lnuimlkikno'ti

Spirit of the East



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CASTS

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East (sunrise)
... a place of
beginnings and
enlightenment
... where new
knowledge can be
created or received
to bring about
harmony or right
relations.

image by: Basmá Kavanagh

Three collaborative initiatives

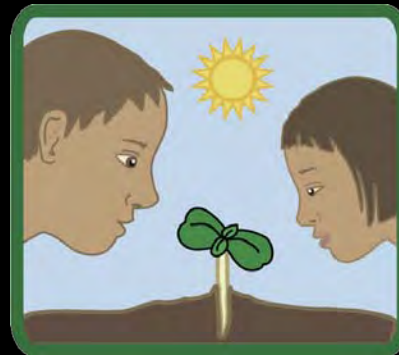
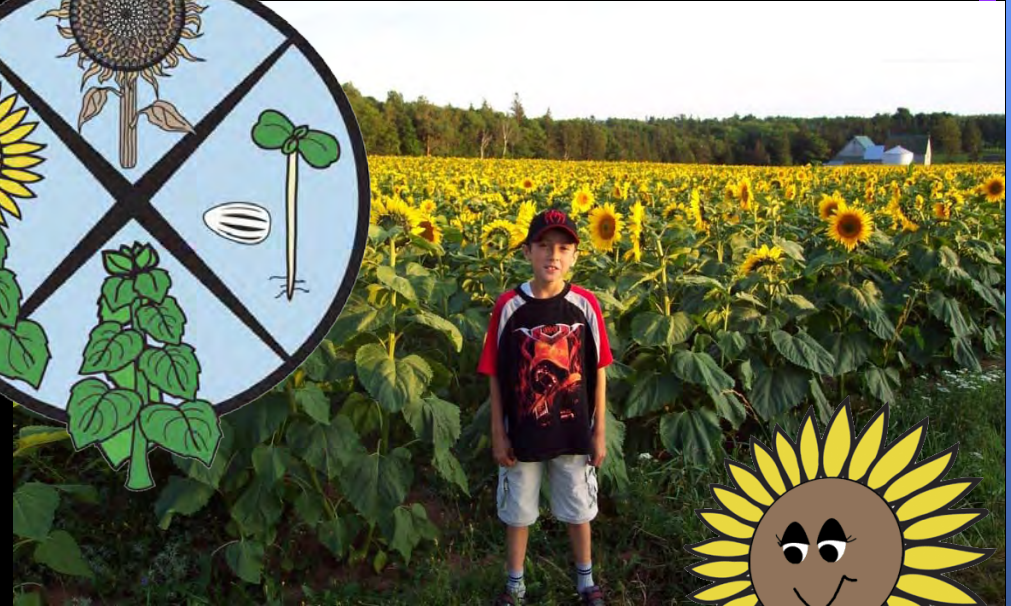
#2



IAPH



healthy young ... need TLC



healthy young need stories & creativity



puppets to teach the “healing tense” found in the Mi’kmaq language





Nipuktuk Wejiaql A'tukuaqnn

FROM THE FORESTS COMES OUR STORY

puppets made from the forest



Jikoqs
Fomes fomentarius
BRACKET FUNGUS



Kuow
Pinus strobus
PINE NEEDLES



Maskwi
Betula papyrifera
BIRCH BARK



Wisqasaw
Pinus strobus
PINE CONE



Pukusip
Dicranum sp.
MOSS



Qqnn
TWIGS



Ulnetkul
MOSS



T'i'tikli
Bubo virginianus
GREAT HORNED OWL



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 a 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: *How Rabbit Got His Long Ears* and *How Buffalo Was Conquered*. All puppets were made from natural materials easily collected



Nipuktuk Wejiaql A'tukuaqnn

FROM THE FORESTS COMES OUR STORY

Apl'ikmuj
Lepus americanus
SNOWSHOE HARE



Apl'ikmuj – Hare: gets very small in the winter, grows larger with the coming of winter because the first snows mask the hare's white fur. Hare snows far coat will arrive. Hare summer coat of brown changes to a winter coat of white. Hare's winter coat is like the white winter snow and hare summer coat is like the brown summer earth and forest floor. These different colors camouflage hare making it difficult for predators to see hare in the environment. White wearing hare summer coat. Hare eats deciduous, evergreen, grasses, ferns, and flowers. In late winter coat, sheds back and small ridge of pine and spruce trees. *Apl'ikmuj* is a beloved character in many Mi'kmaq legends.



Kaqajulman
Clintonia borealis
BLUE BEAD LILY



Pukusp
DECAYING WOOD



Kawatk
Picea sp.
SPRUCE CONE



Stoqn
Alces betulae
DEAD ELK



Wso'qmanasit
Cornus canadensis
BOWBERRY



Qqnn
TWIGS



Kuow
Pinus strobus
PINE NEEDLES



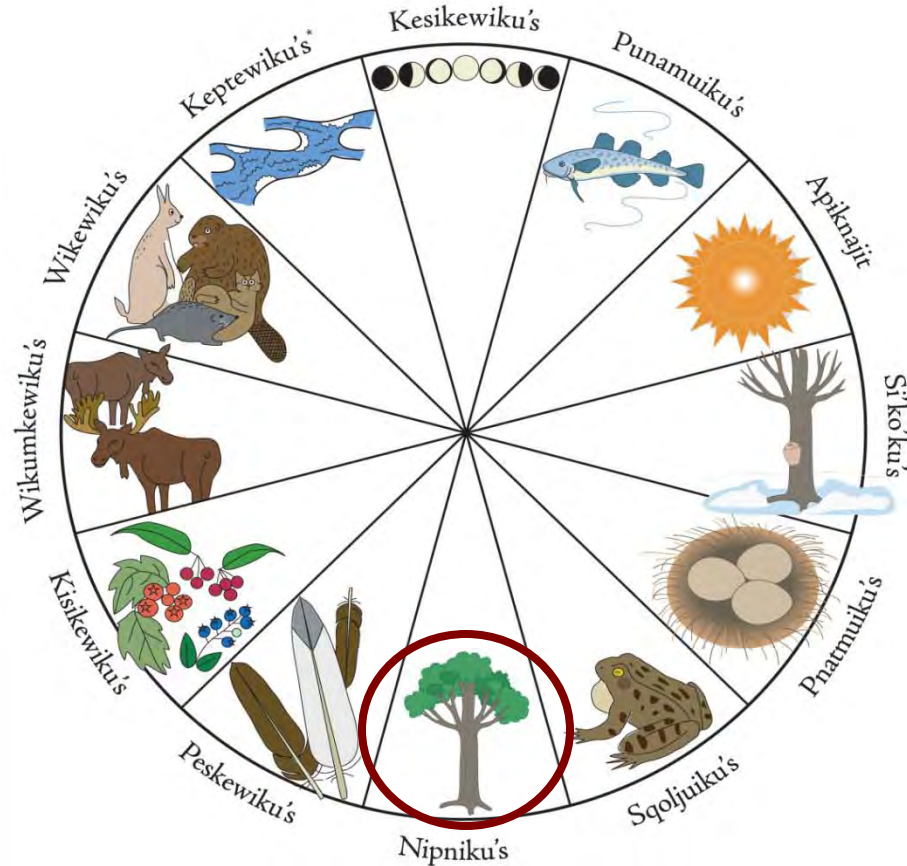
A small multicultural group of young people worked at the University College of Cape Breton during the summer of 2004 to make puppets for the characters in two Mi'kmaq legends: *How Rabbit Got His Long Ears* and *How Buffalo Was Conquered*. All puppets were made from natural materials easily collected in the forests of Nova Scotia (Cape Breton). The project was part of a large research effort to help people learn traditional Mi'kmaq and modern scientific understanding of our forests and ecosystems while creating awareness, especially as the relationship between our human world and the natural world is ever more of a global, cross-generational and cross-cultural. This large project is funded by the Canadian Institutes of Health Research - Institute of Aboriginal Peoples' Health.

For Mi'kmaq language information contact: Marlene MacIsaac | 902.739.2200
For additional information contact: Integrative Science Program | University College of Cape Breton | 250 Blue 17000 - Sydney - Nova Scotia - B1P 6L2 | Or visit our website: www.uccb.ca





Mi'kmawe'k Tepknusetk



*Alternative - Kepti'kewiku's

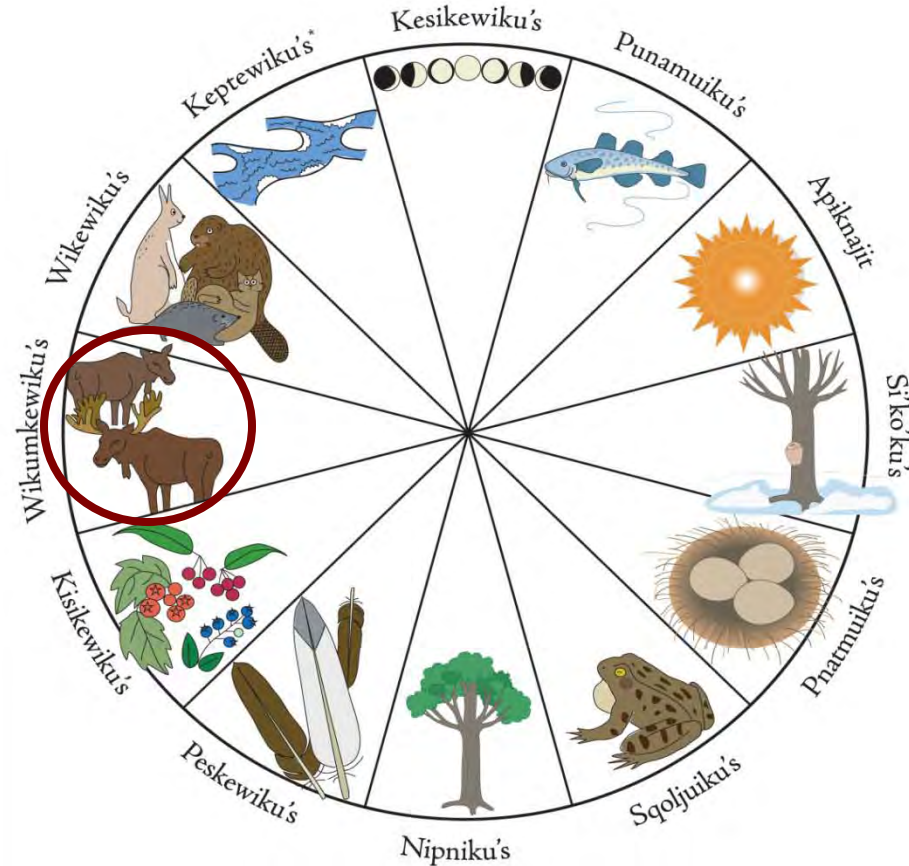


Earth speaks: forest time





Mi'kmawe'k Tepknusetk



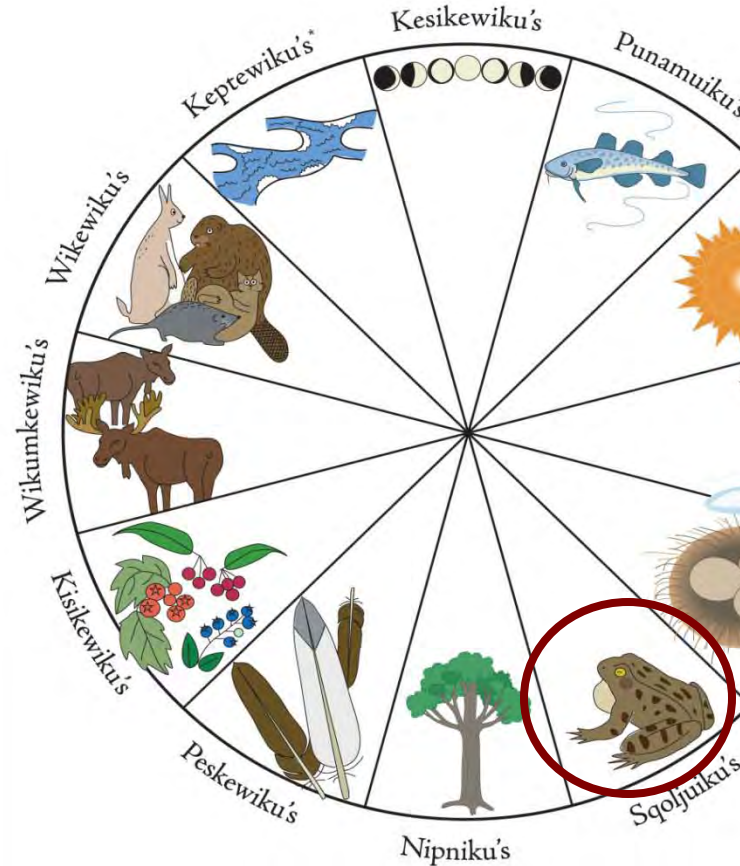
*Alternative - Kepti'kewiku's

Earth speaks: animal time





Mi'kmawe'k Tepknusetk



*Alternative – Kepti'kewiku's



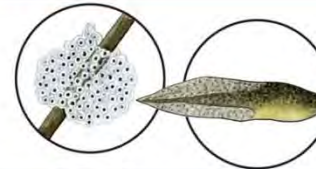
Earth speaks: health indicators

ECOSYSTEM HEALTH CONSCIOUSNESS Difference, Pattern, Variation

TOQWA'TU'KL KJIJITAQNN • INTEGRATIVE SCIENCE

Frogs of Unama'ki

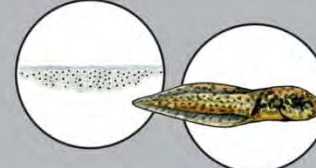
Mink Frog



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 tapped 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

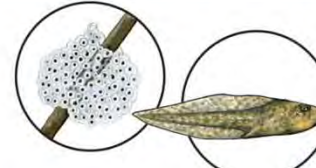
Green Frog



Green Frog • *Rana clamitans*
 Green Frog is green with grey 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 1800 to 4000 eggs in a loose jelly mass that floats on the surface of the water like a raft. Green Frog eats beetles, flies, caterpillars, grasshoppers, spiders, snails, algae, 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, sow bugs, mites, 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... TRRRR! Female Toad prefers temporary pools for breeding. She lays 8000 to 80000 eggs at a time in two long strings near the bottom of the pool or puddle. Toad eats many kinds of insects like caterpillars, earwigs, sow bugs, as well as slugs, earthworms, and millipedes.

AMERICAN TOAD

Northern Spring Peeper

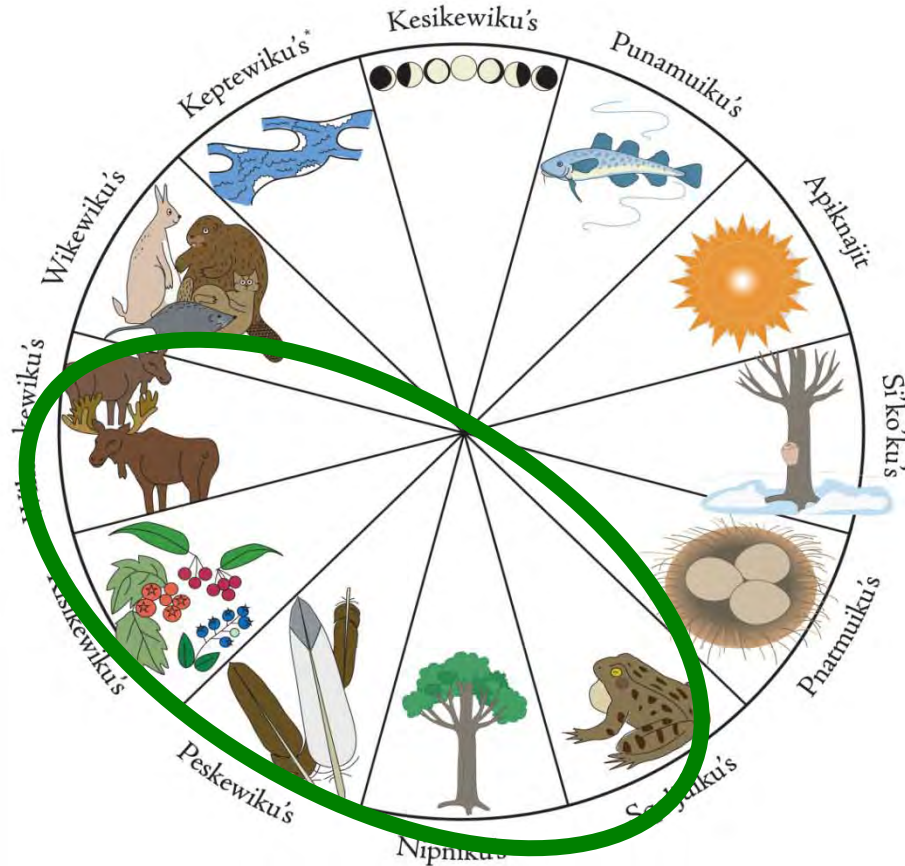


Northern Spring Peeper • *Pseudacris crucifer*
 Spring Peeper is our smallest frog; he grows to 2 – 4 cm long. We know that spring has arrived when we hear Spring Peeper singing at night. His song sounds like a high PEEEP! Spring Peeper lives in the woods near ponds, marshes or swamps. He is our only 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: voices of health in the land

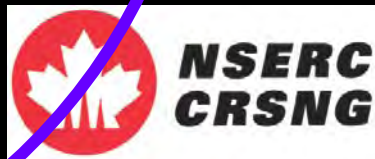




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Thank you



Royal Canadian Mounted Police / Gendarmerie royale du Canada