

CAPE BRETON
UNIVERSITY

Cheryl Bartlett, PhD
Marilyn Iwama, PhD

Institute for Integrative Science & Health

Knowledges Working Together: “Integrative Science”



“Two-Eyed Seeing”

National Aboriginal Policy Research Conference
Ottawa, 21-26 March 2006

“Integrative Science”, or “Two-Eyed Seeing”: Aboriginal and Western knowledges working together for communities in the 21st Century

ABSTRACT

Science and technology are dominant economic drivers within our modern multi-cultural societies, yet the teaching of science generally proceeds from a base in only one culture, namely the “Western or Eurocentric”. Indeed, Dr. Gregory Cajete (native educator and scientist at the University of New Mexico) has identified the teaching of science from one cultural perspective as the central dilemma in science education today, especially within the context of Aboriginal communities.

Acknowledging this, “Integrative Science” emerged at Cape Breton University (CBU) in Sydney, Nova Scotia in the late 1990's as a joint university-Mi'kmaq community initiative to “bring together Indigenous/Aboriginal and Western scientific knowledges” for the purpose of university level science education, and as part of an effort to attract more Mi'kmaq students into the post-secondary sciences and science-related areas. Since its beginnings in the science education arena, Integrative Science at CBU has broadened to include a Tier 1 Canada Research Chair with projects in the arenas of science research (e.g. Aboriginal health) and science applications (e.g. ecosystem management). Furthermore, the Integrative Science initiative has been given the descriptive label of “Two-Eyed Seeing” by Mi'kmaq Elder Albert Marshall of Eskasoni First Nation. His label points to the urgent need for modern Canadian society to learn to see from our one eye with the strengths of traditional Indigenous/Aboriginal knowledge and from our other eye with the strengths of modern scientific knowledge ... and, moreover, the deep need to have both eyes work together for the benefit of all.

Dr. Cheryl Bartlett (CBU) and Dr. Marilyn Iwama (Acadia University) are both heavily involved in aspects of Integrative Science research and will use the opportunity of the ACOA-sponsored workshop to share the insights of their co-learning journey with Mi'kmaq Elders and community organizations towards the "bringing together of Indigenous and Western scientific knowledges".

Dr. Bartlett will speak within the context of Integrative Science partnerships with community towards new opportunities. Such partnerships include that with the Unama'ki Institute of Natural Resources, the Mi'kmaq organization in Cape Breton that works on behalf of all five Mi'kmaq bands towards natural resource management efforts in Cape Breton ecosystems, as for example the Bras d'Or Lakes and Cape Breton Highlands. A second partnership exists with the Mi'kmawey Debert Cultural Project, an initiative of the Confederacy of Mainland Mi'kmaq towards development of a cultural interpretation centre for the Paleo-Indian archaeological site at Debert, NS. The significance of the Debert site is thought to rival that of the L'Anse aux Meadows world heritage site in Newfoundland.

Dr. Iwama will speak within the context of Integrative Science and its Aboriginal community-based participatory action research project funded by CIHR-IAPH (Canadian Institutes for Health - Institute for Aboriginal Peoples' Health). Her research within this project focuses on aspects of Mi'kmaq language that connect with healing and revitalization. Overall, the project is developing ways to help youth learn traditional Mi'kmaq and modern scientific understandings of our human relationships within nature. Through a focus on relationships that help foster our human sense of who we are (our sense of place, emergence, and participation), the project team hopes that various action-oriented sub-projects for youth can contribute to their growing and healthy sense of wholeness within their environment (family, community, and ecosystem).

The background is a detailed map of Cape Breton, Nova Scotia, rendered in a traditional style. The map is surrounded by various illustrations of local wildlife and flora, including birds, fish, and mammals. A large blue circle highlights a specific area on the map, with a line pointing to a white box containing the text 'Cape Breton - Unama'ki'.

CAPE BRETON UNIVERSITY

Cape Breton – Unama'ki

MI'KMA'KI

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

CAPE BRETON UNIVERSITY



Social Sciences and Humanities Research Council of Canada

Conseil des sciences

Canada Foundation for Innovation / Fondation canadienne pour l'innovation



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

IWK Health Centre Foundation

IAPH

NOVA SCOTIA Health Research FOUNDATION

UNAMA'KI INSTITUTE OF NATURAL RESOURCES



Mi'kmaq Elders

NSERC CRSNG

Mi'kmawey Debert



Royal Canadian Mounted Police

Gendarmerie royale du Canada

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



Artist Basma Kavanagh

Toqwa'tu'kl Kjjitaqnn Integrative Science

Science: stories of our interactions with and within Nature

Indigenous

our knowledges
our world views

Western

“bringing

our stories

together”

collaborative initiatives

CAPE BRETON
UNIVERSITY



post-secondary
science
education

collaborative initiatives

Mi'kmaq
Elders



**UNAMA'KI
INSTITUTE OF
NATURAL
RESOURCES**



collaborative initiatives

CAPE BRETON
UNIVERSITY

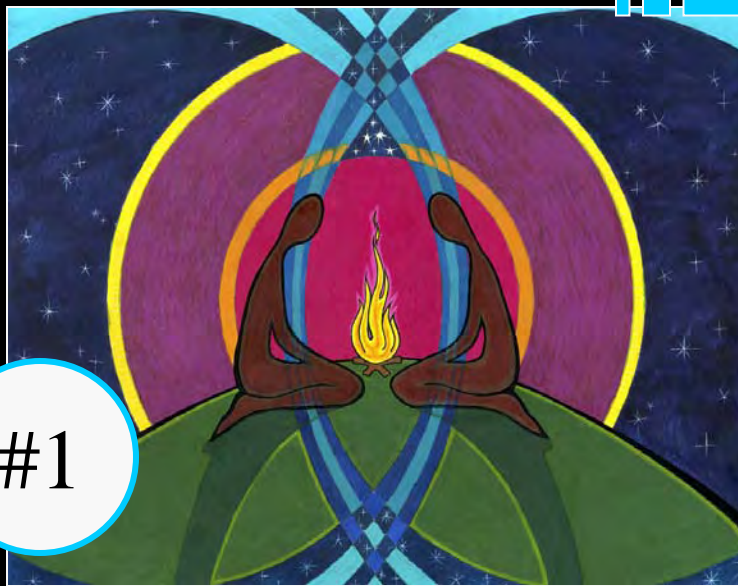
#2



CIHR IRSC

health research

#1



post-secondary
science
education

collaborative initiatives

CAPE BRETON
UNIVERSITY

#2



CIHR IRSC

health research



#1

post-secondary
science
education



Bras d'Or Lake

CEPI

#3

environmental
planning

collaborative initiatives

CAPE BRETON
UNIVERSITY

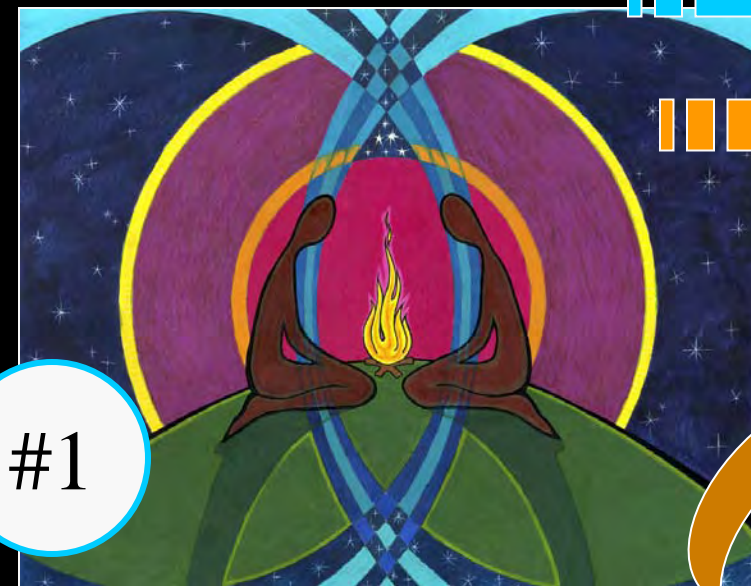
#2



CIHR IRSC

health research

#4
archaeological
interpretation



#1

post-secondary
science
education



Bras d'Or Lake

CEPI

#3

environmental
planning



Mi'kmawey Debert

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



Indigenous



Western



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

integrative framework

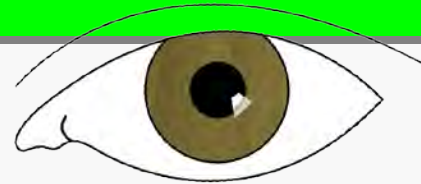
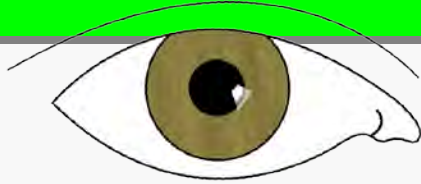


both Indigenous and Western, plus:

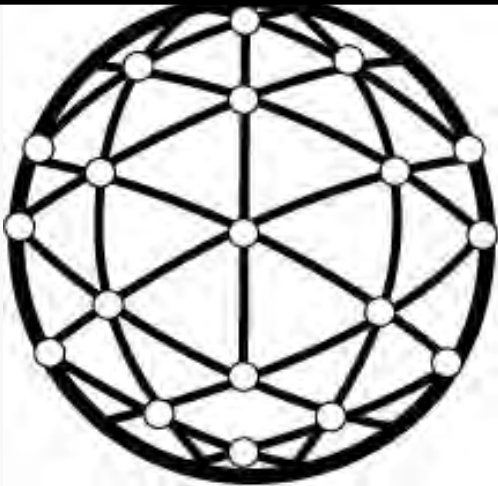
- role of me and you in “the knowing”
 - e.g. patterns: recognition & transformation
- our common ground
- our differences (and respect them)
- our journey ... forward & together

AVOID ... simply Western plus
bits and pieces of Indigenous

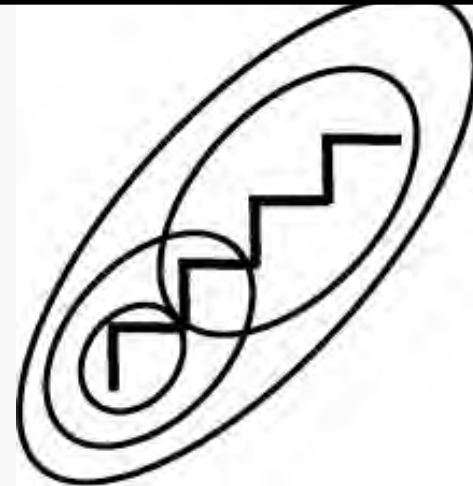
**“two-eyed seeing”
how our world is**



interconnected



parts & wholes

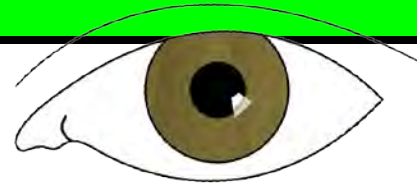


“two-eyed seeing”

our key concepts & actions

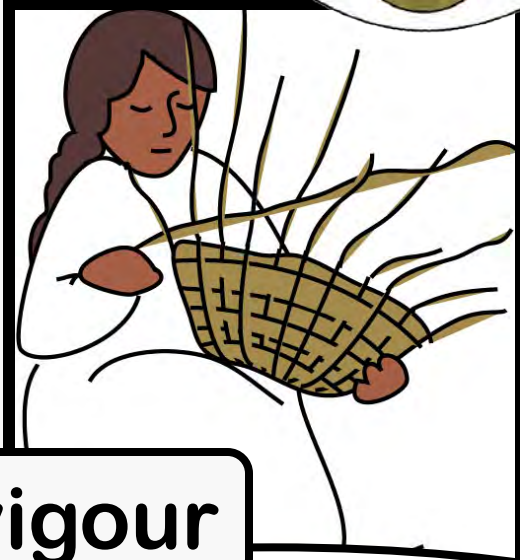


- **respect**
- **relationship**
- **reverence**
- **reciprocity**
- **ritual**
- **repetition**
- **responsibility**



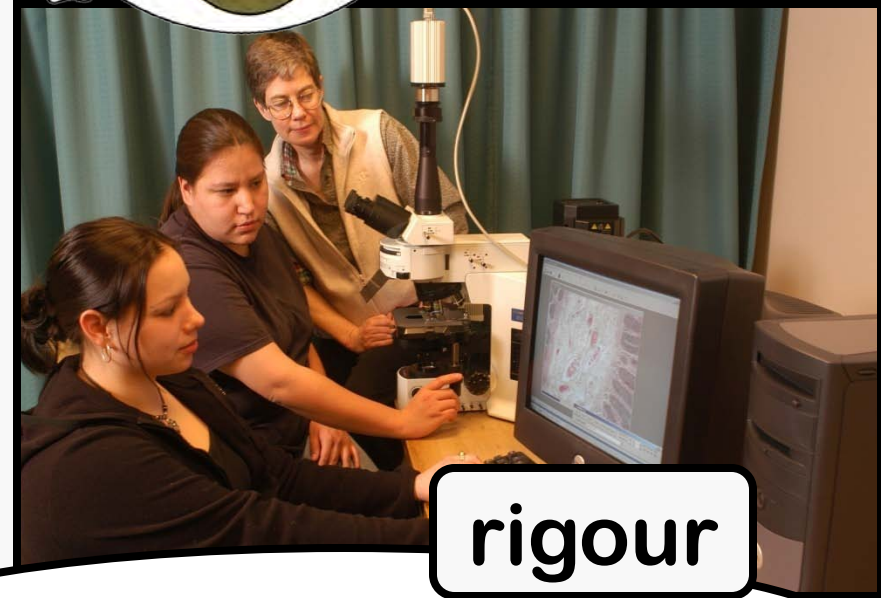
- **hypothesis**
(making & testing)
- **data collection**
- **data analysis**
- **model & theory
construction**

**“two-eyed seeing”
our language & methodology**



vigour

WEAVING



rigour

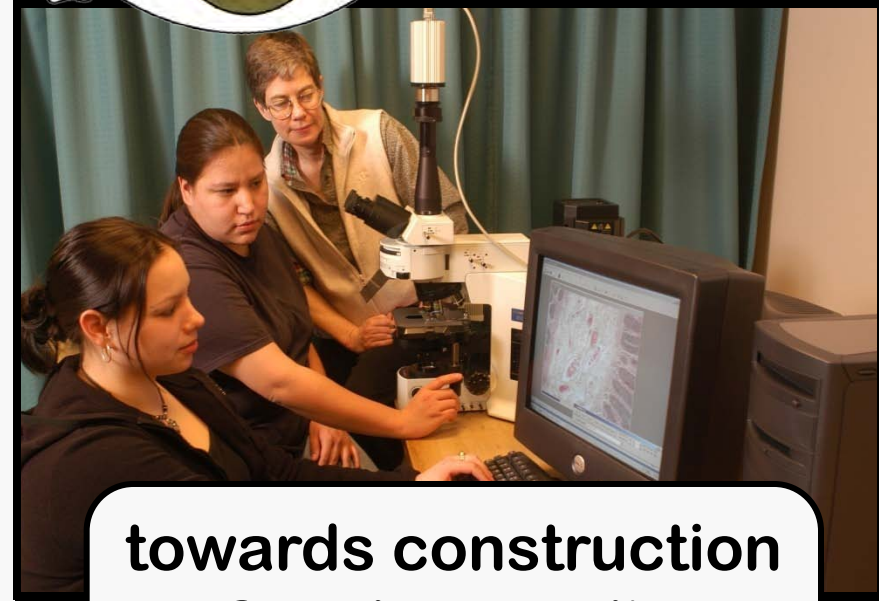
UN-WEAVING

“two-eyed seeing”

our overall knowledge objectives

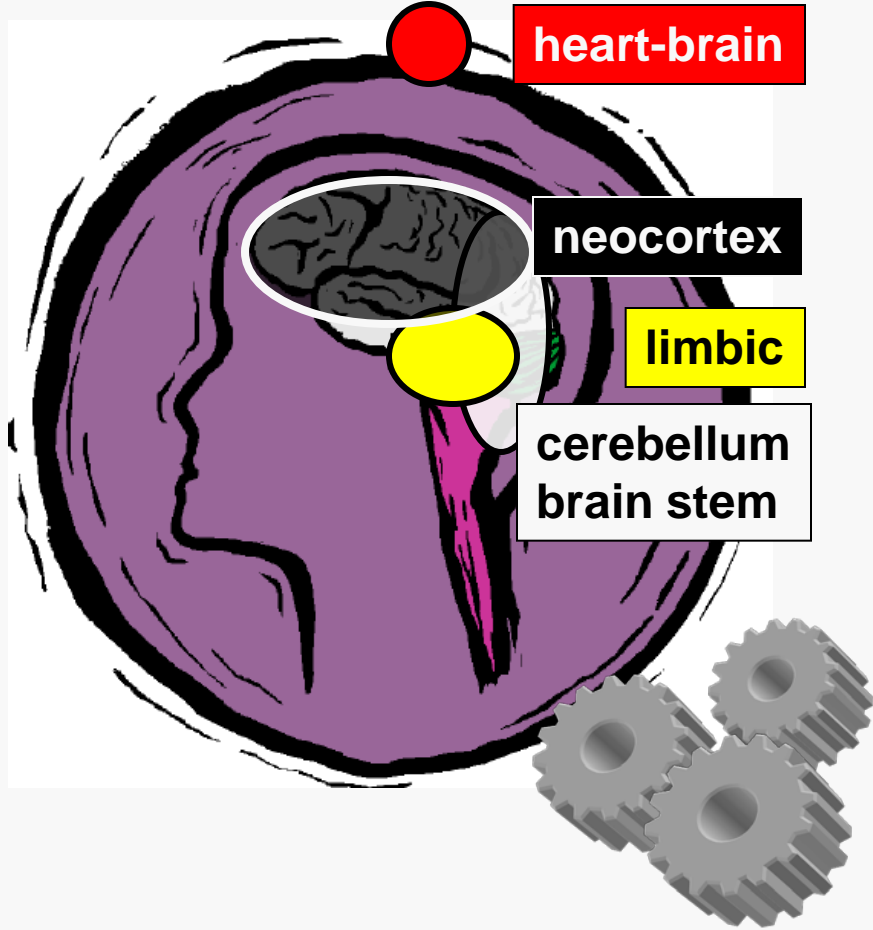
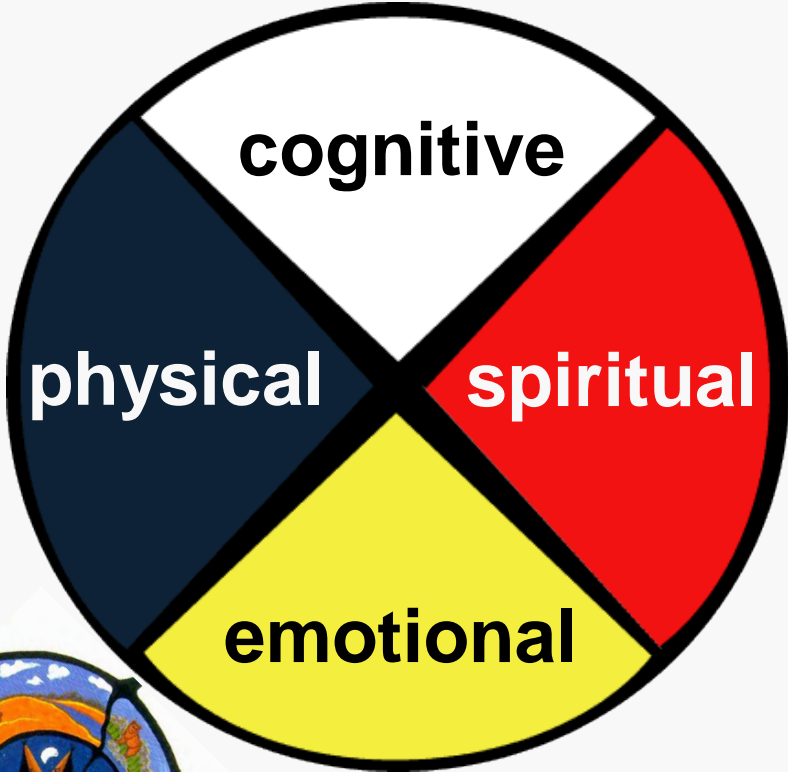
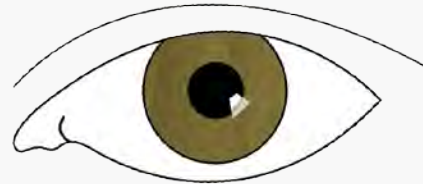
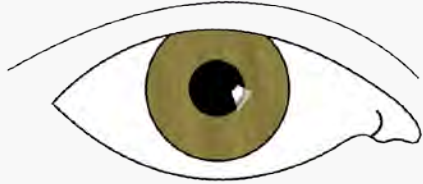


**towards resonance
of understanding
within environment**



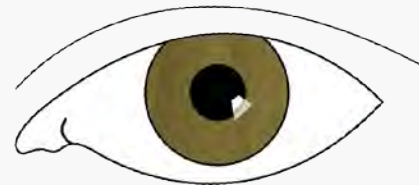
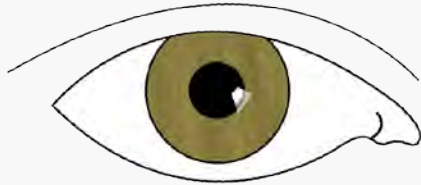
**towards construction
of understanding
of environment**

Human



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

Family

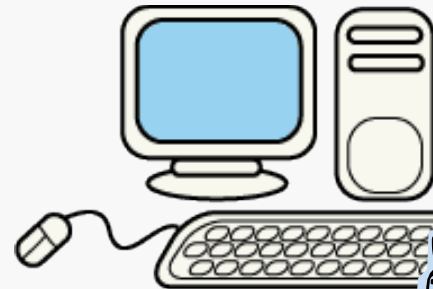
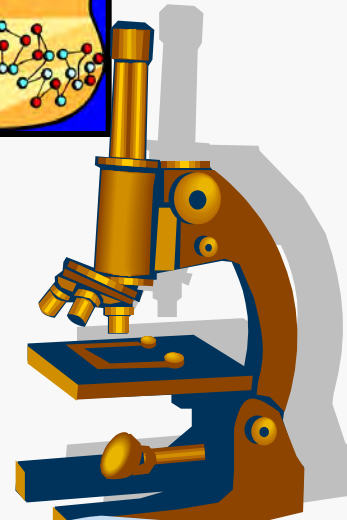
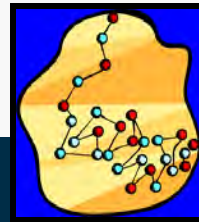
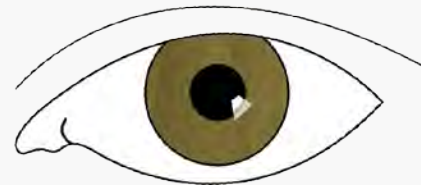
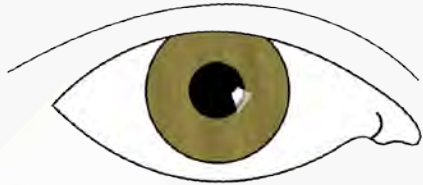


from:
Mi'kmaq Family
& Children's
Services



from:
Society of Obstetricians
and Gynaecologists
of Canada

Health



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

Earth



Artist Basma Kavanagh



Location: W060 11, N46 09

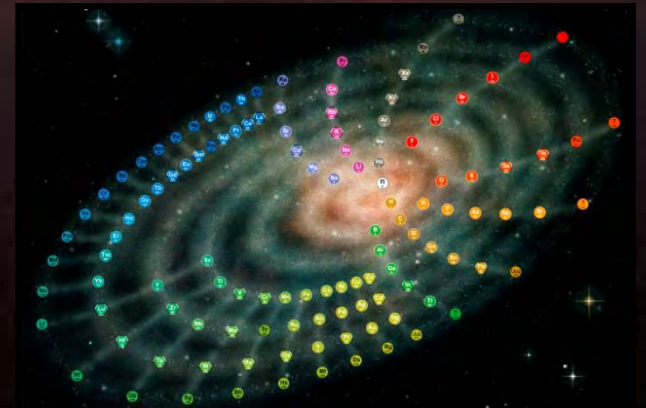
SYDNEY, NS
Rise and Set for the Sun for 2004

Astronomical Applications Dept.
U. S. Naval Observatory
Washington, DC 20392-5420

Zone: 4h West of Greenwich

Day	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
01	0743	1625	0724	1705	0639	1748	0540	1830	0447	1910	0413	1945	0413	1956	0443	1930	0522	1839	0600	1740	0642	1646	0723	1617
02	0743	1626	0723	1706	0637	1749	0538	1831	0445	1911	0412	1946	0414	1955	0444	1929	0523	1837	0601	1738	0644	1644	0724	1616
03	0743	1627	0722	1708	0635	1750	0536	1833	0444	1912	0412	1947	0415	1955	0446	1927	0524	1835	0602	1736	0645	1643	0725	1616
04	0743	1628	0720	1709	0634	1752	0534	1834	0442	1913	0411	1947	0415	1955	0447	1926	0525	1833	0604	1734	0646	1642	0727	1616
05	0743	1629	0719	1711	0632	1753	0532	1835	0441	1915	0411	1948	0416	1954	0448	1925	0527	1831	0605	1732	0648	1640	0728	1615
06	0743	1630	0718	1712	0630	1755	0530	1837	0439	1916	0410	1949	0417	1954	0449	1923	0528	1829	0606	1730	0649	1639	0729	1615
07	0743	1631	0716	1714	0628	1756	0528	1838	0438	1917	0410	1950	0418	1953	0450	1922	0529	1827	0607	1729	0651	1638	0730	1615
08	0743	1632	0715	1715	0626	1757	0527	1839	0437	1919	0410	1950	0418	1953	0452	1920	0530	1825	0609	1727	0652	1636	0731	1615
09	0742	1633	0714	1717	0624	1759	0525	1841	0435	1920	0409	1951	0419	1952	0453	1919	0532	1823	0610	1725	0654	1635	0732	1615
10	0742	1635	0712	1718	0622	1800	0523	1842	0434	1921	0409	1952	0420	1952	0454	1917	0533	1821	0611	1723	0655	1634	0733	1615
11	0742	1636	0711	1720	0620	1802	0521	1843	0433	1922	0409	1952	0421	1951	0455	1915	0534	1819	0612	1721	0657	1633	0734	1615
12	0741	1637	0709	1721	0619	1803	0519	1845	0431	1924	0409	1953	0422	1951	0457	1914	0535	1817	0614	1719	0658	1631	0734	1615
13	0741	1638	0708	1723	0617	1804	0517	1846	0430	1925	0409	1953	0423	1950	0458	1912	0537	1815	0616	1717	0659	1630	0735	1615
14	0740	1640	0706	1724	0615	1806	0515	1847	0429	1926	0409	1954	0424	1949	0459	1911	0538	1813	0617	1716	0701	1629	0736	1615
15	0740	1641	0705	1726	0613	1807	0514	1848	0428	1927	0409	1954	0424	1948	0500	1909	0539	1811	0618	1714	0702	1628	0737	1615
16	0739	1642	0703	1727	0611	1808	0512	1850	0427	1928	0409	1954	0425	1948	0502	1907	0541	1809	0620	1712	0704	1627	0737	1616
17	0738	1643	0701	1729	0609	1810	0510	1851	0425	1930	0409	1955	0426	1947	0503	1906	0542	1807	0621	1710	0705	1626	0738	1616
18	0738	1645	0700	1730	0607	1811	0508	1852	0424	1931	0409	1955	0427	1946	0504	1904	0543	1805	0622	1708	0706	1625	0739	1616
19	0737	1646	0658	1732	0605	1812	0507	1854	0423	1932	0409	1955	0428	1945	0505	1902	0544	1803	0624	1707	0708	1624	0739	1617
20	0736	1648	0657	1733	0603	1814	0505	1855	0422	1933	0409	1956	0430	1944	0507	1900	0546	1802	0625	1705	0709	1623	0740	1617
21	0735	1649	0655	1735	0601	1815	0503	1856	0421	1934	0409	1956	0431	1943	0508	1859	0547	1800	0627	1703	0710	1623	0741	1618
22	0735	1650	0653	1736	0559	1817	0501	1858	0420	1935	0410	1956	0432	1941	0509	1857	0548	1758	0628	1702	0712	1622	0741	1618
23	0734	1652	0651	1738	0557	1818	0500	1859	0419	1936	0410	1956	0433	1941	0510	1855	0549	1756	0629	1700	0713	1622	0741	1619
24	0733	1653	0650	1739	0555	1819	0458	1900	0418	1937	0410	1956	0434	1940	0512	1853	0551	1754	0631	1658	0714	1620	0742	1619
25	0732	1655	0648	1740	0553	1821	0456	1902	0418	1938	0411	1956	0435	1939	0513	1852	0552	1752	0632	1657	0716	1620	0742	1620
26	0731	1656	0646	1742	0551	1822	0455	1903	0417	1939	0411	1956	0436	1938	0514	1850	0553	1750	0634	1655	0717	1619	0742	1621
27	0730	1658	0644	1743	0550	1823	0453	1904	0416	1940	0411	1956	0437	1936	0515	1848	0554	1748	0635	1653	0718	1618	0743	1622
28	0729	1659	0643	1745	0548	1825	0451	1906	0415	1941	0412	1956	0438	1935	0517	1846	0556	1746	0636	1652	0720	1618	0743	1622
29	0728	1700	0641	1746	0546	1826	0450	1907	0415	1942	0412	1956	0440	1934	0518	1844	0557	1744	0638	1650	0721	1617	0743	1623
30	0727	1702			0544	1827	0448	1908	0414	1943	0413	1956	0441	1933	0519	1842	0558	1742	0639	1649	0722	1617	0743	1624
31	0725	1703			0542	1829			0413	1944			0442	1931	0520	1840			0641	1647			0743	1625

Sun





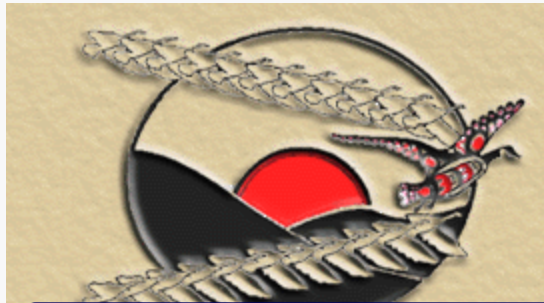
Science: stories of our interactions with and within Nature



Science: stories of our interactions with and within Nature



Land Language Life

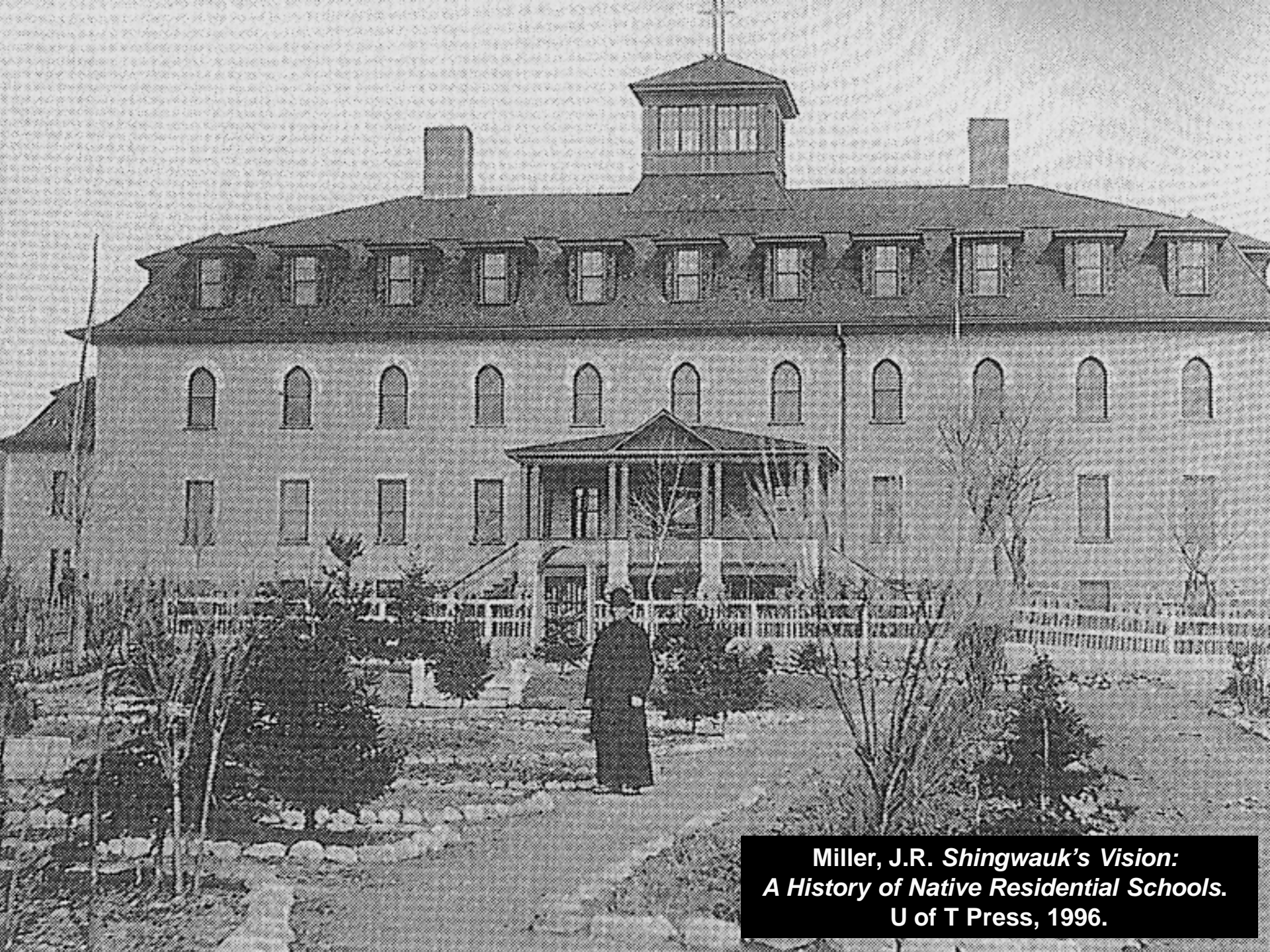


Science: stories of our interactions with and within Nature

HERITAGE







**Miller, J.R. *Shingwauk's Vision:
A History of Native Residential Schools.*
U of T Press, 1996.**



Ring, Dan, Trevor Harriet & Robert Stacey.
Qu'Appelle: Tales of Two Valleys.
Saskatoon: Mendel Art Gallery, 2002.



Ring, Dan, Trevor Harriet & Robert Stacey. *Qu'Appelle: Tales of Two Valleys*. Saskatoon: Mendel Art Gallery, 2002.

Aboriginal Community-Based Participatory Action Research



**Integrative Health & Healing:
co-learning our way
to expanding wholeness
through restoration
of relationships with the land**

“It’s time you learned about
the healing tense.”



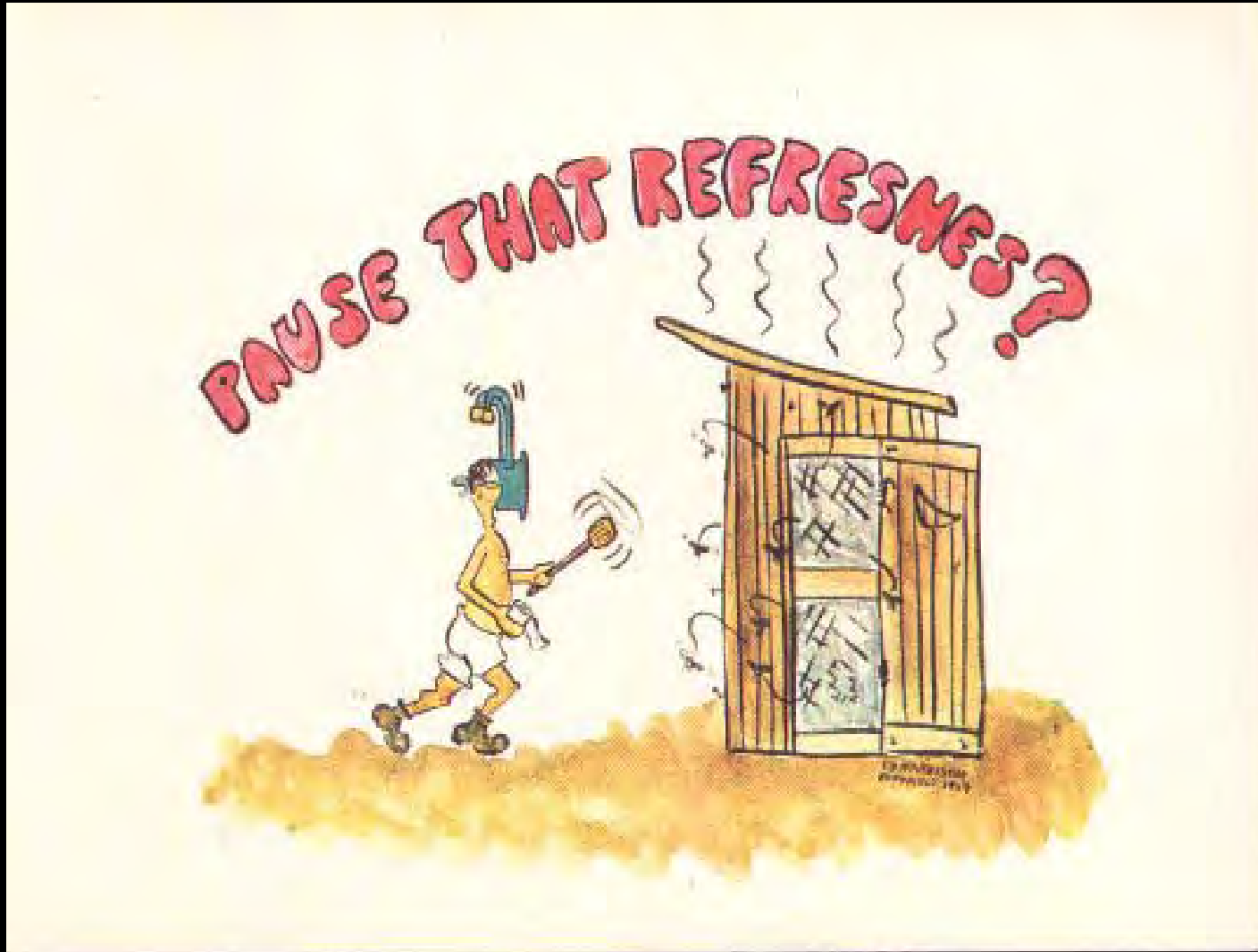
Decolonizing Research

- happens within and about Indigenous traditions beliefs and values
- adheres to Aboriginal protocols
- recognizes Elders and Knowledge-holders as “national treasures” and decision-makers
- engages Aboriginal researchers as investigators
- collaborative in design
- uses appropriate Aboriginal methodologies

Opportunities in Aboriginal Research.

Social Sciences and Humanities Research Council. 2003

Theoretical Pause



Integrative Health & Healing

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





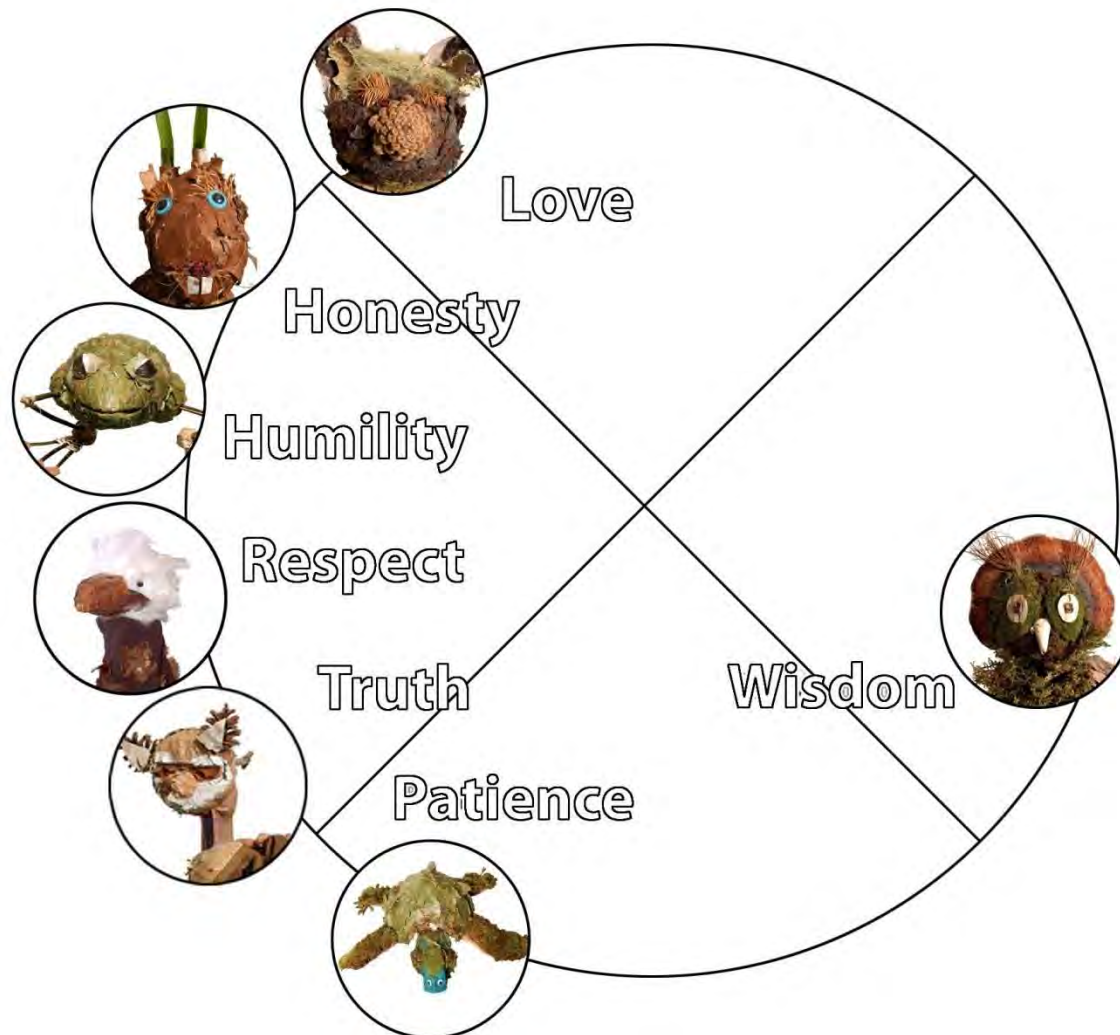


L
2004

Mutual Commitment

- to the primacy of relationship
- to shared goals
- to shared ways of doing
- to new patterns of applied creativity

Animal Puppets for the 7 Teachings in association with Medicine Wheel



Our Mi'kmaq youth seem lost.

There's everything in the language that you want to know about yourself.

There's something called the healing tense.

Conjugation

“to be drunk”

- ketkiay (present)
- ketkiayop (simple past)
- ketkiayasa*nek* (healing)

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

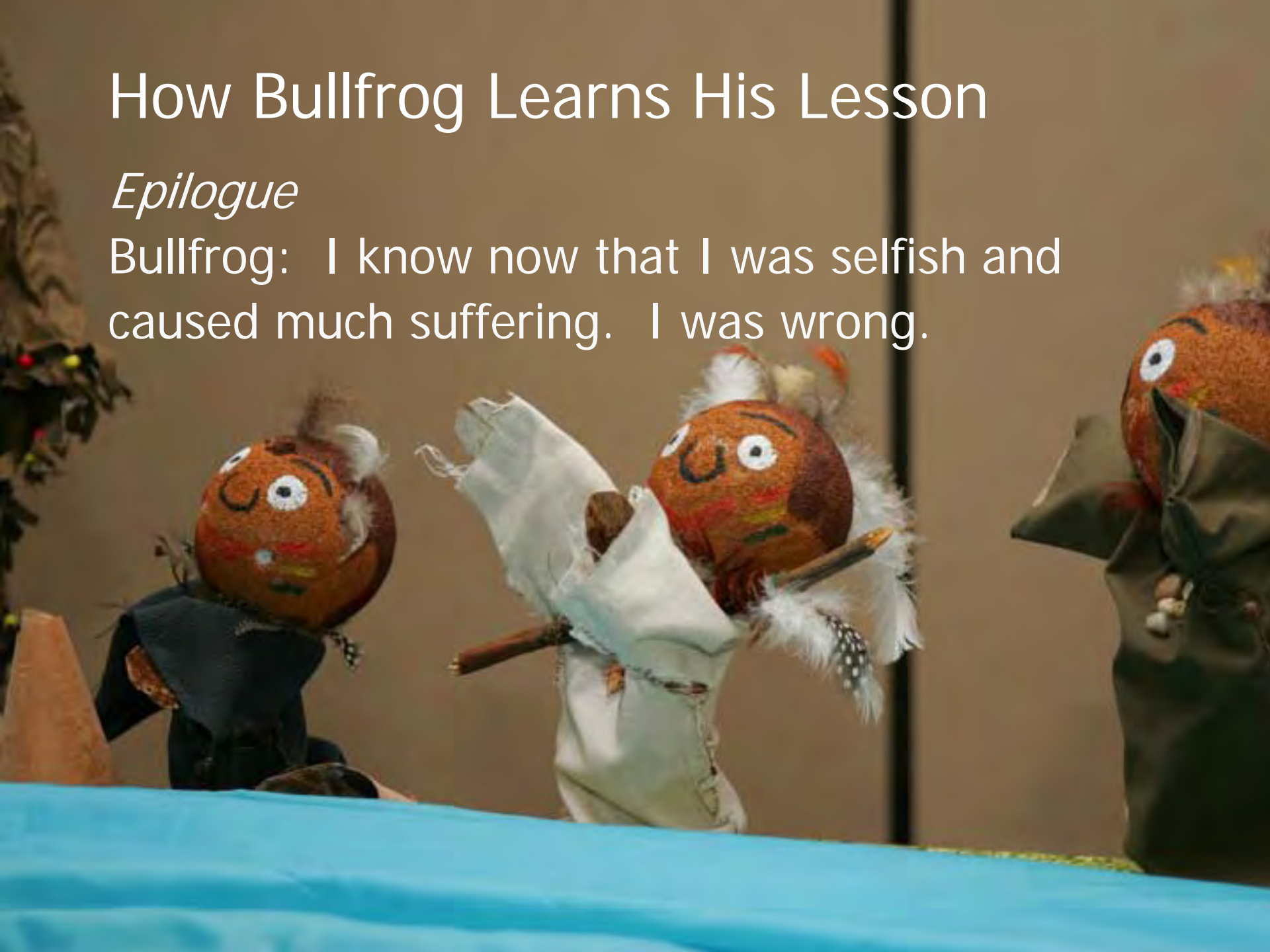
How Bullfrog was Conquered



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 Ivar Mendez)

How Bullfrog Learns His Lesson

Epilogue

Bullfrog: Meskey keskna oqmeyas*nek*



Hypothesis

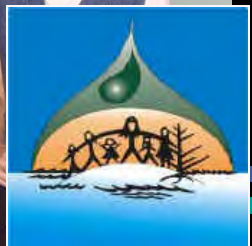
There's something called the healing tense.

Testing, Sample #1



Testing, Sample #2





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,
in conversation with Ivar Mendez)*

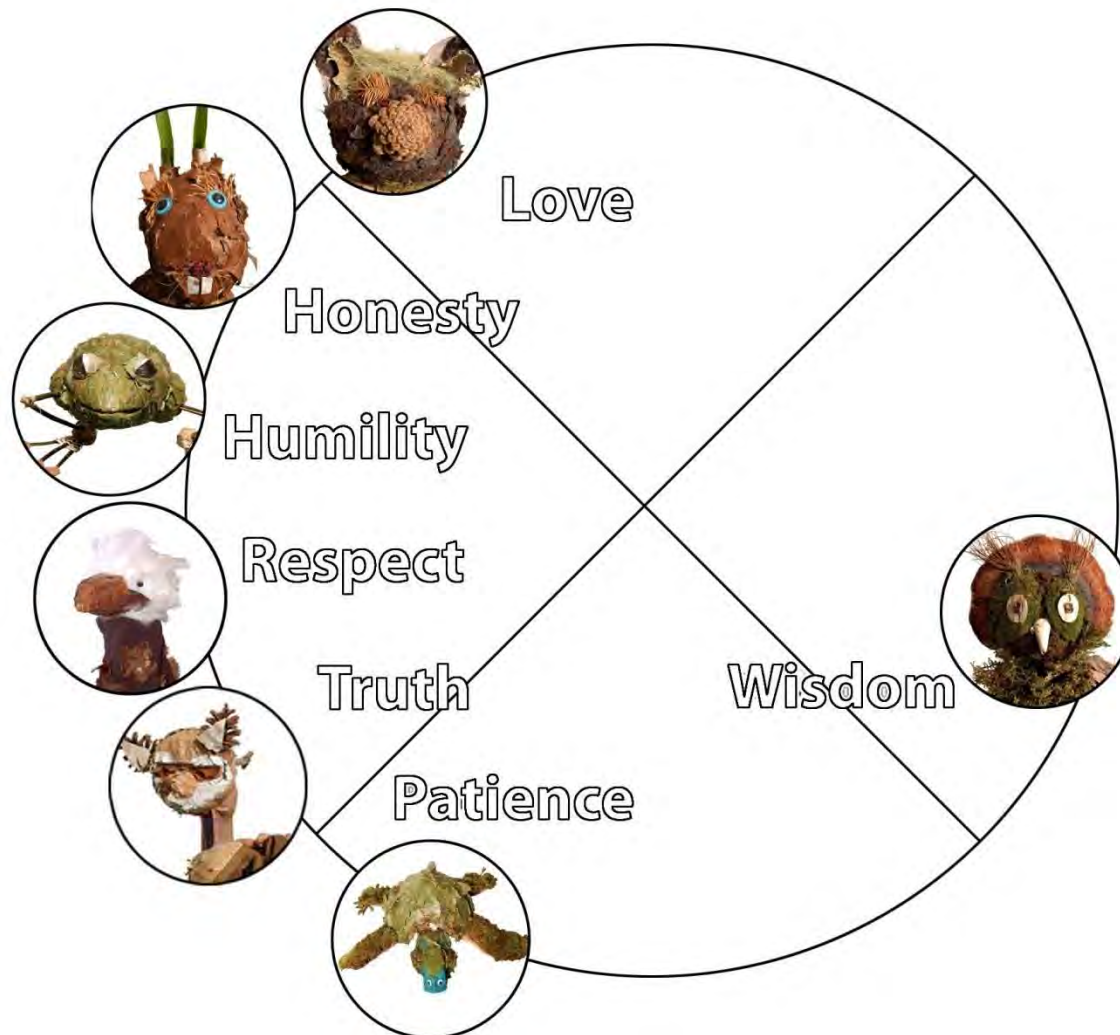
Generalize

kesnukwiap – I was sick

kesnukwias*nek* – I was sick



Animal Puppets for the 7 Teachings in association with Medicine Wheel





“Love is the main ingredient of wellness.”

- *Murdena Marshall*

“The voice of our language is in the land.”

- *Albert Marshall*

Canada Research Chairs / Chaires de recherche du Canada / Canada

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

Canada Foundation for Innovation / Fondation canadienne pour l'innovation

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

IAPH

SABLE OFFSHORE ENERGY INCORPORATED

UNAMA'KI INSTITUTE OF NATURAL RESOURCES

Mi'kmawey Debert

Royal Canadian Mounted Police / Gendarmerie royale du Canada



Mi'kmaq Elders

CAPE BRETON UNIVERSITY

IWK Health Centre Foundation

NOVA SCOTIA Health Research FOUNDATION

NSERC CRSNG