

UPPER FRASER FISHERIES CONSERVATION ALLIANCE
3 MARCH 2010; PRINCE GEORGE, BC

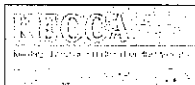
Integrative Science and Two-Eyed Seeing: Walking & Talking Together



Albert Marshall¹ and Cheryl Bartlett²

¹ Elder and HonDLitt, Eskasoni community, Mi'kmaq Nation

² Canada Research Chair in Integrative Science & Professor of Biology, CBU



albertdmarshall@ns.sympatico.ca cheryl_bartlett@cbu.ca

www.integrativescience.ca

Walking & Talking Together

Outline of Presentation

• Introduction: Integrative Science & TES

• Seven Lessons Learned

1. Acknowledge we need each other:
 - Co-Learning Journey
2. Adopt a Guiding Principle:
 - Two-Eyed Seeing (TES)
3. View "science" inclusive of two (or more) worldviews
4. Grow forward: together, we heal
5. Put our actions, values, and knowledges "out in front"
 - enter "ethical space" (*sensu* Willie Ermine)
6. Use visuals
7. Weave back and forth between our worldviews



Canada Research Chairs
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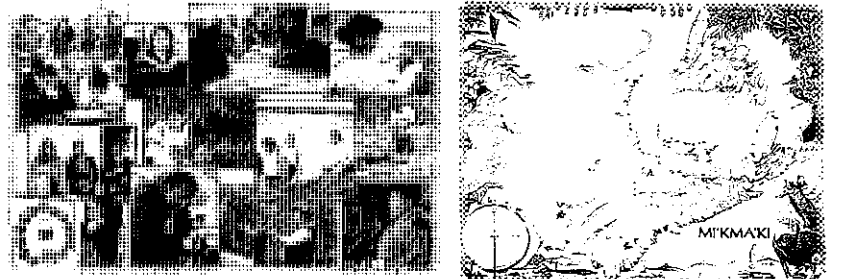
Thank you / Wela'liog

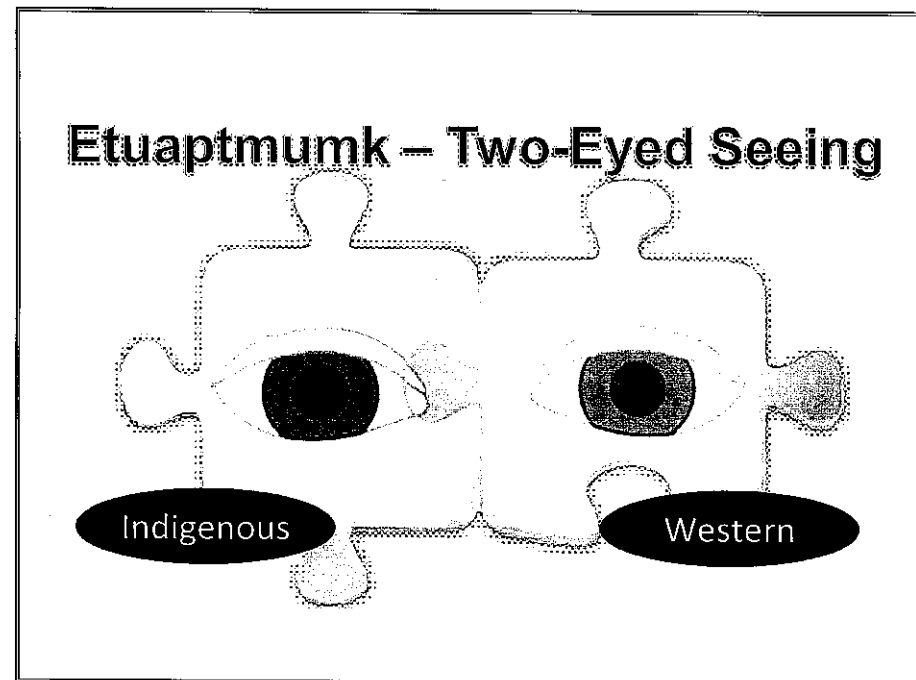
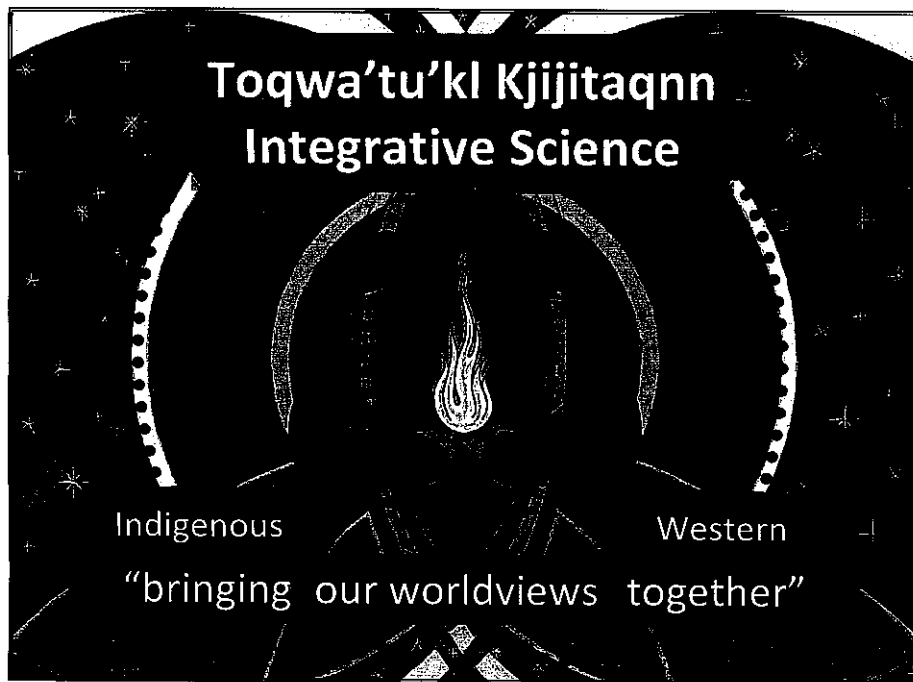


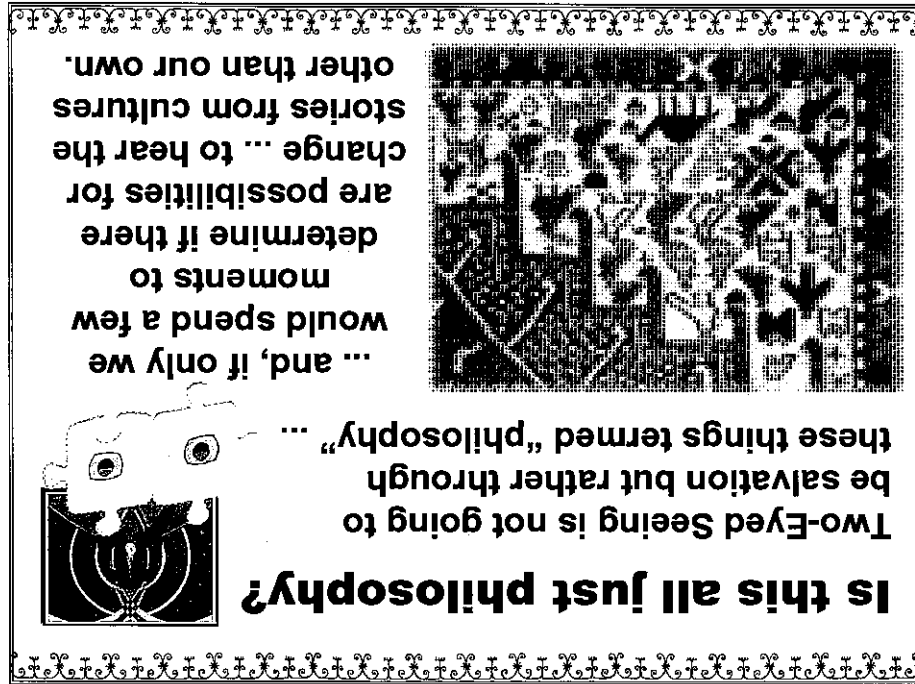
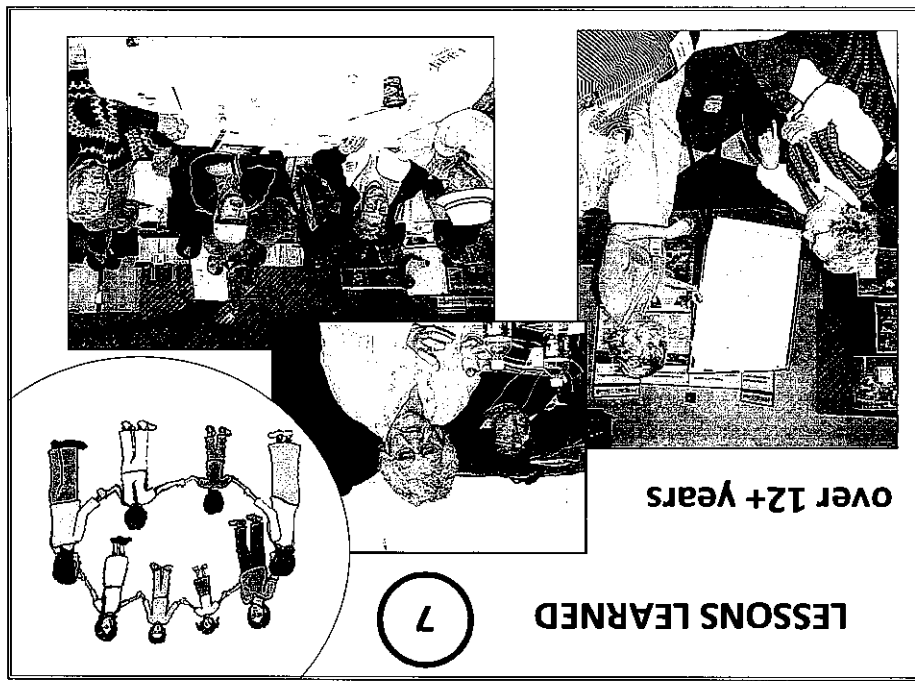
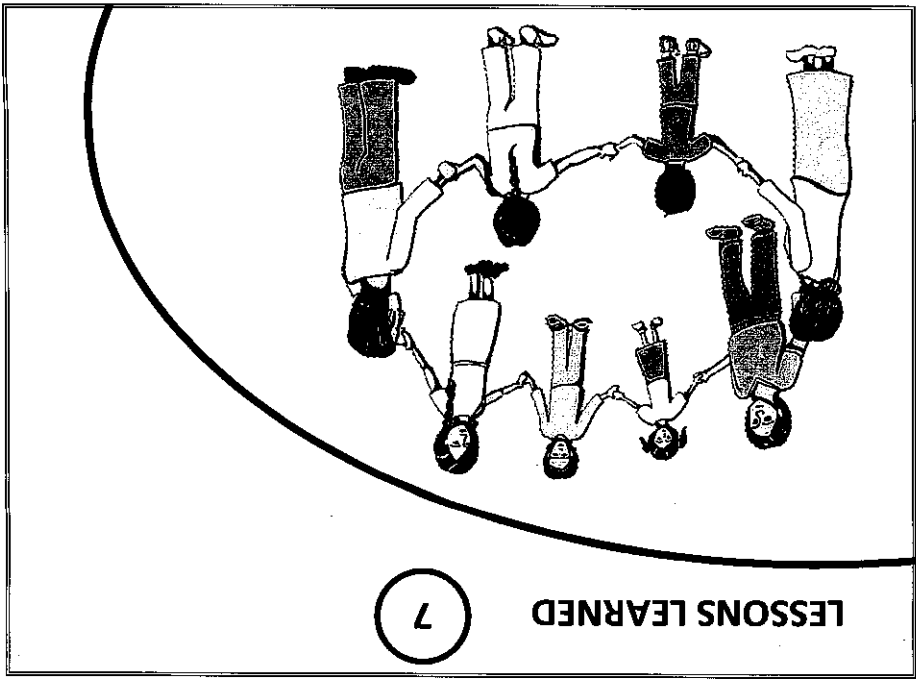
The support of various partners
and funding agencies
is gratefully acknowledged.



Mi'kmaq Elders & Students & Research Team



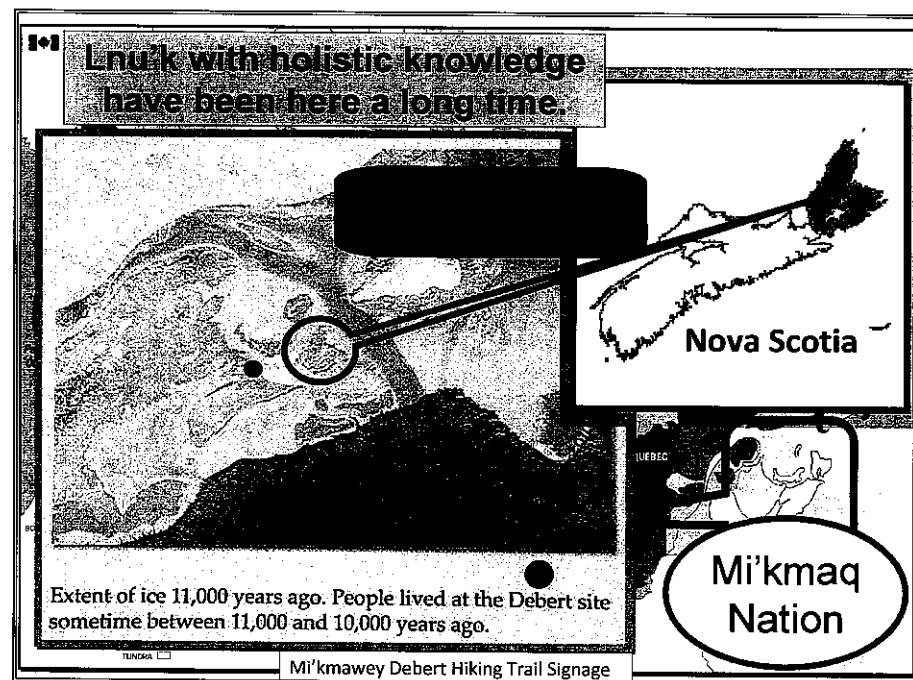
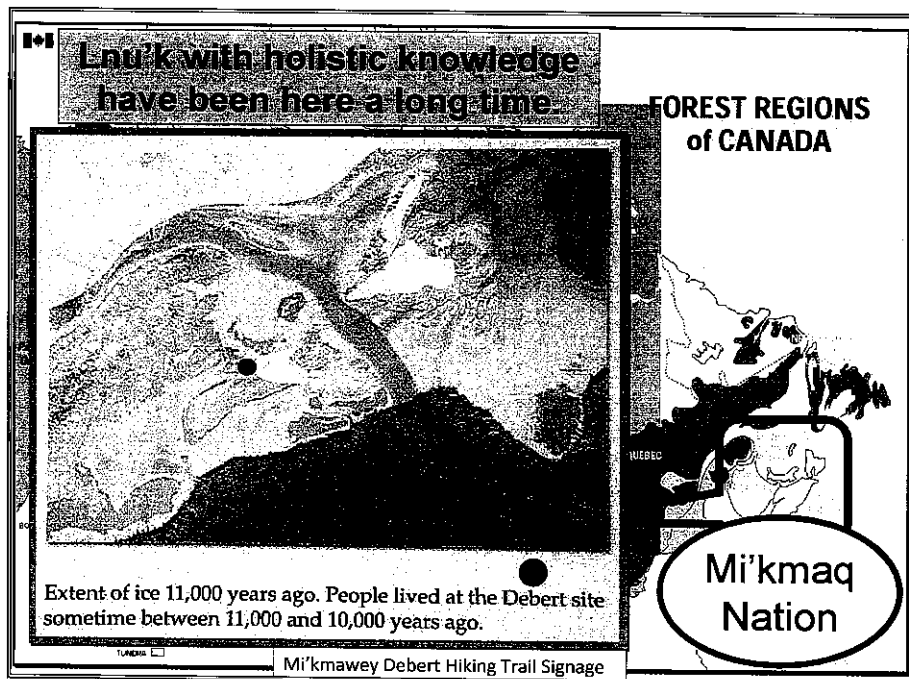




LESSONS LEARNED

#1

1. **ACKNOWLEDGE
WE NEED
EACH OTHER ...
co-learning journey**





Lnu'k with holistic knowledge have been here a long time.

Mi'kma'ki today

"Traditional Knowledge was never meant to be static and stay in the past ... but rather we must bring it into ... so that everything becomes meaningful in our lives and in our communities."

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

Lnu'k with holistic knowledge have been here a long time.

Mi'kma'ki 11,000 Years Ago

Artwork by Dozay Christmas, Mi'kma'wey Debert Hiking Trail Signage

Lnu'k with holistic knowledge have been here a long time.

Eskasoni First Nation

Nova Scotia

Mi'kmaq Nation

Mi'kma'wey Debert Hiking Trail Signage

Extent of ice 11,000 years ago. People lived at the Debert site sometime between 11,000 and 10,000 years ago.

Native American Prophecy

Only when the last tree has been cut down;
Only when the last river has been poisoned;
Only when the last fish has been caught;
Only then will you find that money cannot be eaten.



Nature has rights.

Humans have responsibilities.



**We must use all
the skills that we
have to preserve
and protect our
Natural World.**

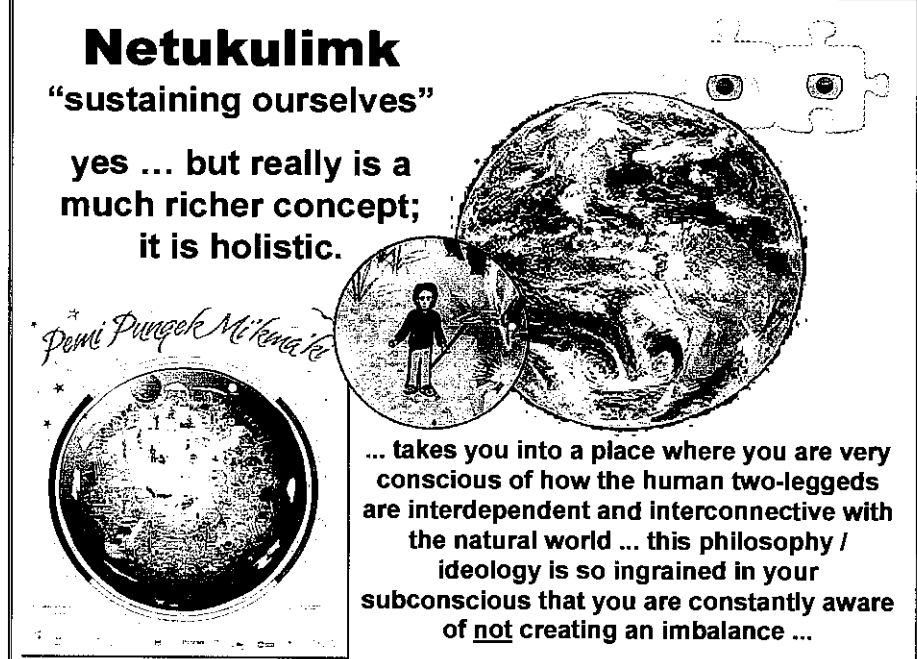
Netukulimk “sustaining ourselves”

yes ... but really is a
much richer concept;
it is holistic.

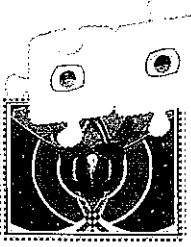


Netukulimk “sustaining ourselves”

yes ... but really is a
much richer concept;
it is holistic.



... takes you into a place where you are very
conscious of how the human two-leggeds
are interdependent and interconnective with
the natural world ... this philosophy /
ideology is so ingrained in your
subconscious that you are constantly aware
of not creating an imbalance ...

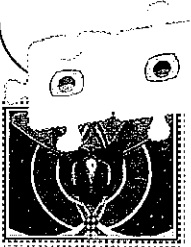


"Co-Learning" pioneered within Integrative Science research program at Cape Breton University in conjunction with Mi'kmaq Elders and educators ... our approach continues to evolve.

Why say: "continues to evolve"?

ONE REASON: Newhouse (2004) indicates the work of
grappling with each other's cognitive universes and
learning to see through the minds of others is the work of
generations to come.

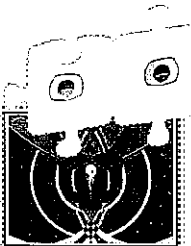
Newhouse, D. 2004. Indigenous knowledge in a multicultural world.
Native Studies Review 15(2): 139-154.



"Co-Learning" pioneered within Integrative Science research program at Cape Breton University in conjunction with Mi'kmaq Elders and educators ... our approach continues to evolve.

OUR APPROACH:

- participatory, action, and praxis-based research:
- side by side: Traditional knowledge and mainstream knowledge
within projects ... teach ourselves how ... use meaningful context
- integrative: respectful acknowledgement of distinct nature of each
knowledge system (content not "merged")
- knowledge systems: "big picture" understandings for
ontologies, epistemologies, axiologies, and methodologies
- appreciative: recognize strengths in both knowledge systems
- knowledge holders: recognize it is human-to-human dialogue



"Co-Learning" ... our way of working collaboratively

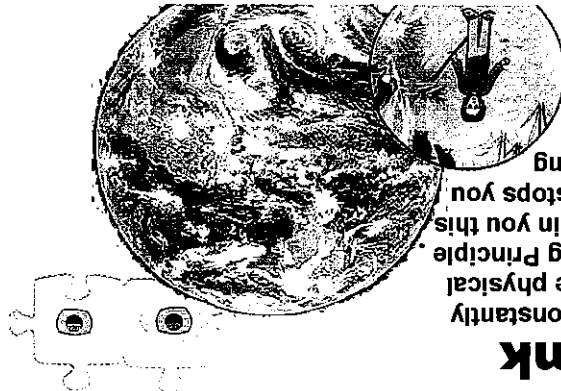
Three Basic Ways*

that transdisciplinary research teams
organize their collaboration
in order to reach integration:

1. deliberation among experts
2. work by subgroup or individual
3. common group learning

→ **"Co-Learning" = OUR WAY**

* Pohl, C., Kerckhoff, L., Hadom, G.H., Bammer, G. 2008. Integration. In: Hadom, G.H., Hoffman-
Riem, H., Biber-Klemm, S., Grossebacher-Mansuy, W., Joye, D., Pohl, C., Wiesmann, U., and Zemp,
E. (eds), Handbook of Transdisciplinary Research. (pp. 411-424). Heidelberg, Germany: Springer.

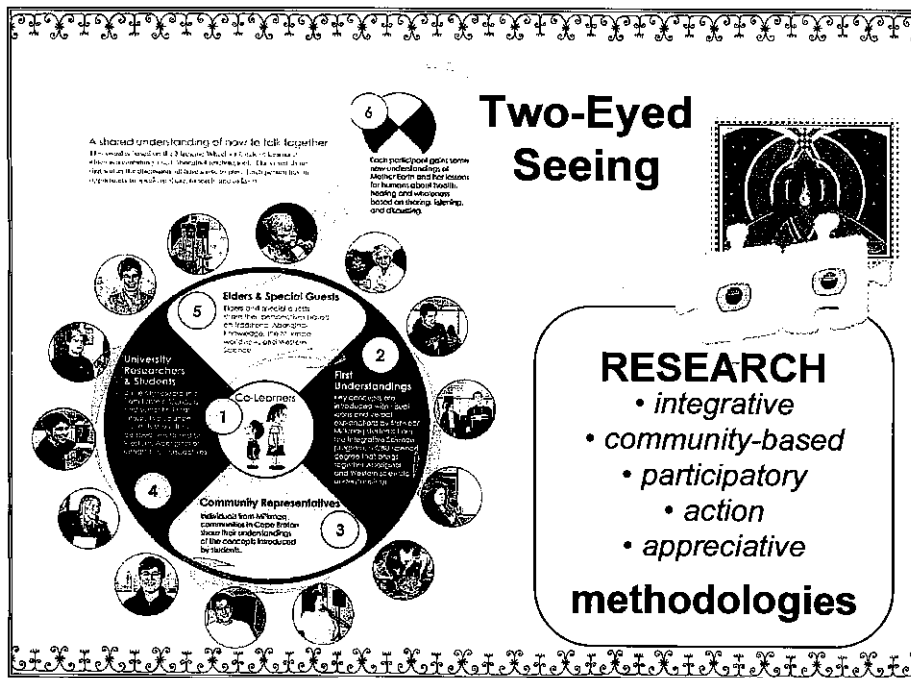



Netukulimk

Your consciousness is constantly
being challenged with the physical
part of you and the Guiding Principle
is the spirit which creates in you this
sense of balance which stops you
from overharvesting
or exploitation.

You are very cognizant of the fact that you
have to make sure that your actions today do
not compromise the next Seven Generations
... their opportunities and abilities to live in
harmony with the natural world. There is
this idea that you must always leave
something after you, for someone else
coming along.

artist Basma Kavanagh



LESSONS LEARNED

#2

Two-Eyed Seeing

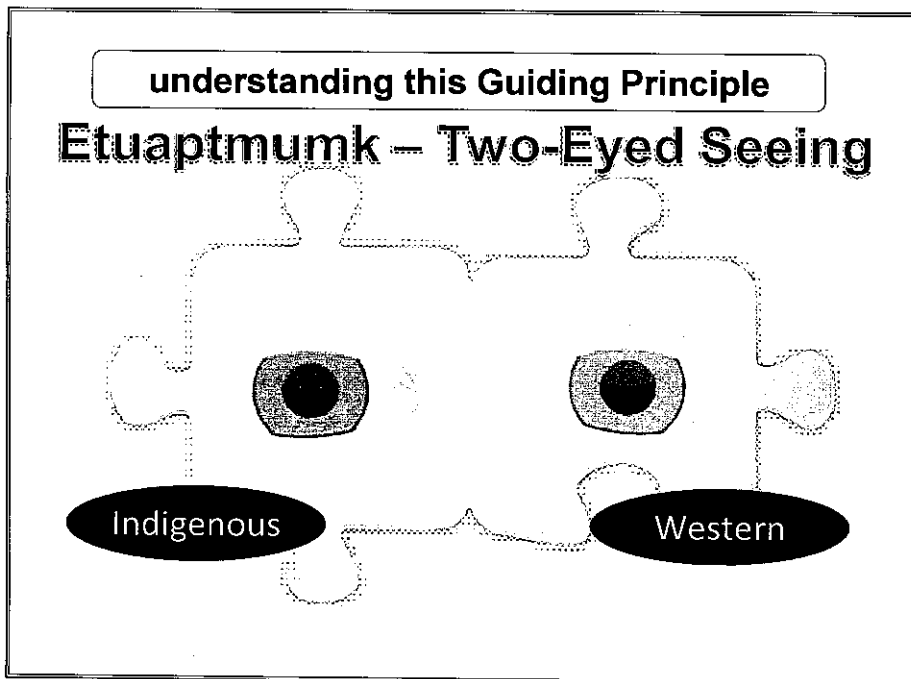
1.

**ACKNOWLEDGE
WE NEED
EACH OTHER ...
co-learning journey**

2.



Albert Marshall, Elder, Mi'kmaq Nation

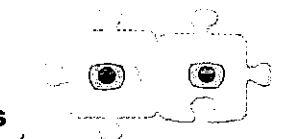
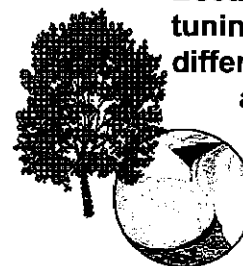


Two-Eyed Seeing

Hard to convey as does not fit into any particular subject area or discipline ... is about life ... what you do, what kind of responsibilities you have ... is a Guiding Principle for how one lives while on Earth that covers all aspects of our lives: social, economic, environmental, etc.

Advantage:

Because you are always fine tuning your mind into different places at once, you are always looking for another perspective and better way of doing things.

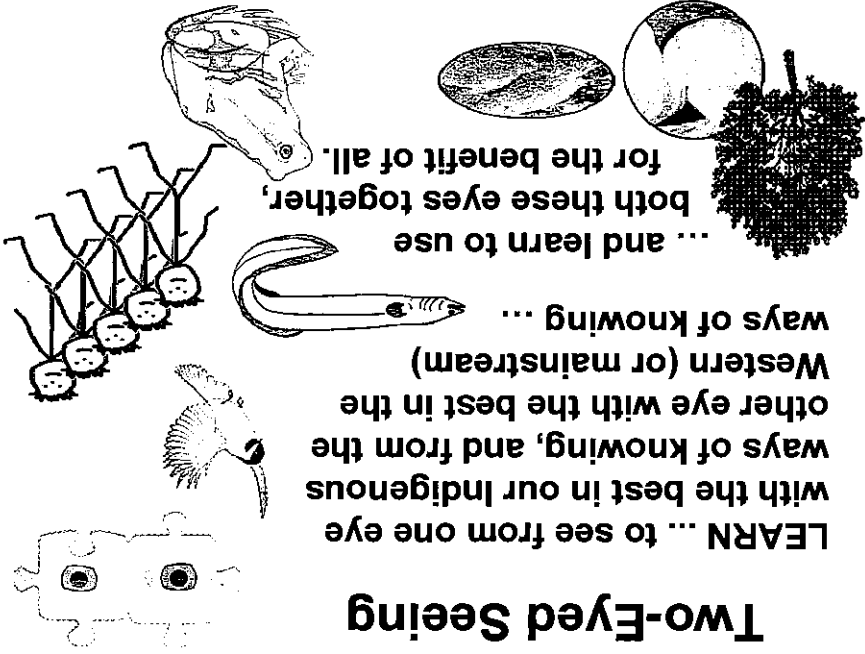


Two-Eyed Seeing

LEARN ... to see from one eye
with the best in our 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.



artist Basma Kavanagh



... our interdependence
on each other and
on Mother Earth

All people must learn
"Two-Eyed Seeing"
so that knowledge of the
physical is not separated
from wisdom
of the spiritual.

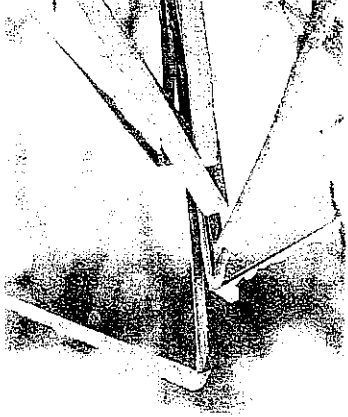
Consciousness of Knowing



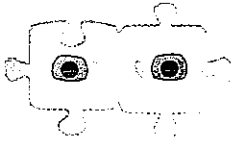
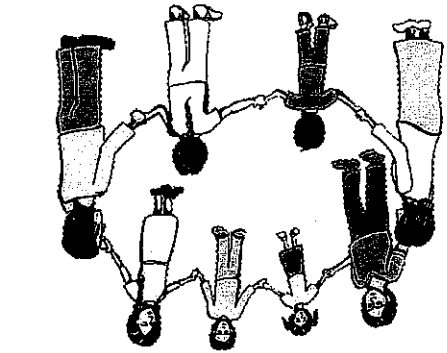
Our language teaches us
that everything alive is
both physical and spiritual.

The onus is on the
person to look at our
natural world with
two perspectives.
Modern science
sees objects,
but our language
teaches us to see
subjects.

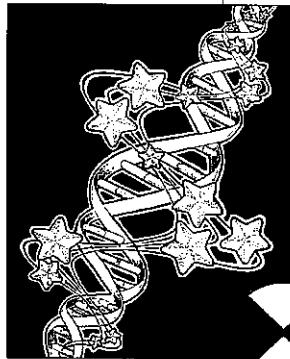
artist Basma Kavanagh



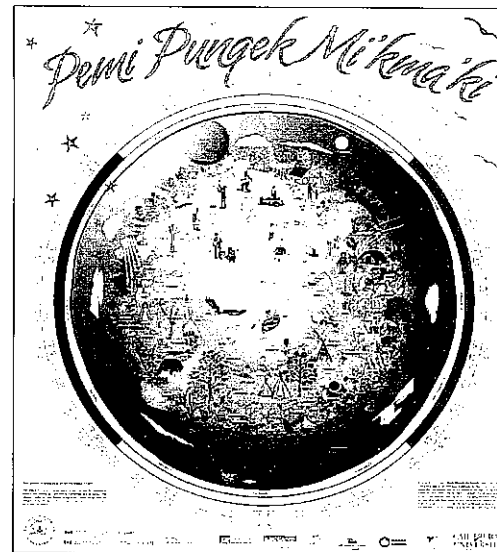
It is not
enough to go
through life
with one
perspective;
we must
embrace
all the tools
we have ...



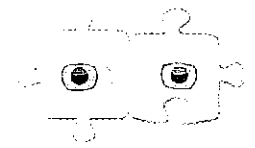
If rates of pollution exceed
the natural cleansing
capacity of our ecosystems ...



Artist
Basma
Kavanagh



If rates of
consumption
of resources
exceed the
carrying
capacity of our
ecosystems ...



Passenger
Pigeon

Extinction
of any
species
is forever.



Everything
that we do
to our natural
world ...

... we also do
to ourselves





We must, through example, inspire our students to be critical in their thinking.



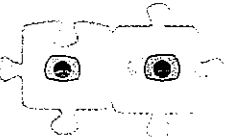
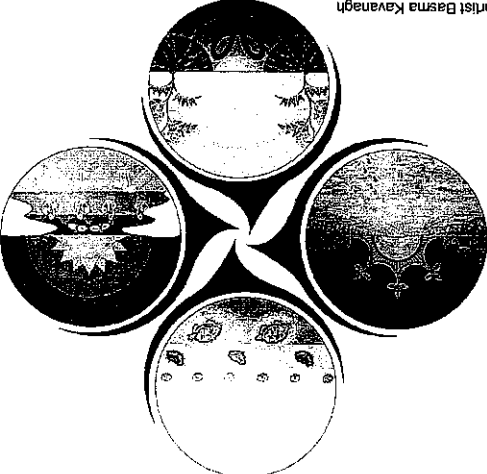


Education to our young has to be reflective of how to maintain balance and harmony with our natural world.



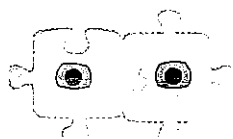


artist Basma Kavanagh
artwork: Eskasoni Elementary School Children

Our seasons follow the cycles of Mother Earth ...

artist Basma Kavanagh

... so that our children will always be reminded of the beauty of creation, and of our dependence on her.

Starving people do not care about environmental sustainability.

**Knowledge is not a tool
but rather it is a spirit.**

**It transforms the
holder. It also
reminds us that we
have responsibilities
to the spirit of that
knowledge.**

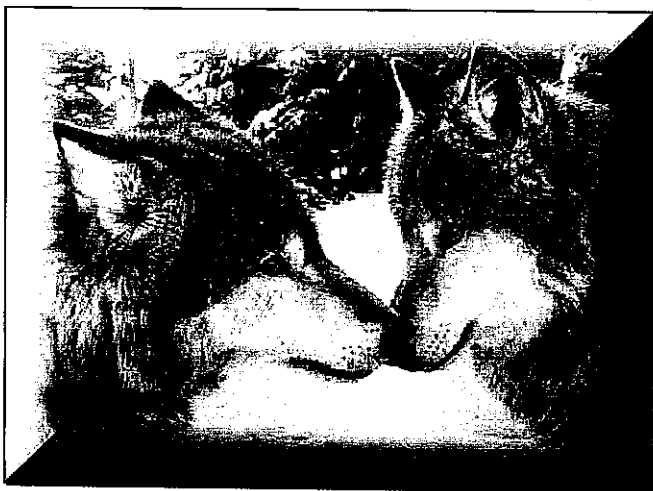
We must pass it on.



artist Basma Kavanagh

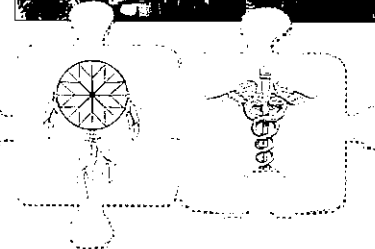


**Only humans have these
two consciousnesses ...**



As Elders in Our Time

**We seek to be a
conduit for wisdom of
our Ancestors. We
seek to see with “Two-
Eyes” ... to take the
accomplishments of
the white man’s ways
further by blending it
with the wisdom of our
Ancestors.**



LESSONS LEARNED

#3

1.

**ACKNOWLEDGE
WE NEED
EACH OTHER ...
co-learning journey**

2.



3.

**view “SCIENCE”
inclusively**

Science?

stories of our interactions with and within nature

Science

- recognition
- transformation
- expression

pattern

• various pattern smarts

• various ways to connect the dots

• variety in our stories

Science?

Indigenous and Western
scientific knowledges are
based in observations
of the natural world.

view "SCIENCE"
inclusively

LESSONS LEARNED

#4

1. WE NEED
EACH OTHER ...
co-learning journey
- 2.
3. view "SCIENCE"
inclusively
4. DO ... in a CREATIVE,
GROW FORWARD
WAY

Murdena Marshall, Elder, Mi'kmaq Nation

Together We Heal & Grow

seeing & acknowledging my deeds

Indigenous and Western
scientific knowledges are
based in observations
of the natural world.

stories of our interactions
with and within nature
... stories created and understood
using our diverse
pattern smarts

Science is dynamic,
pattern-based knowledge.

view "SCIENCE"
inclusively

"See, in the Mi'kmaq world, in all Native worlds, you have to give recognition to everything: misdeeds, good deeds, past deeds, you know? Anything. You have to give that acknowledgement. Everything that you do, you have to acknowledge it."

5. put our *values + actions + knowledges* in front of us ...
like an object



Murdena Marshall, Elder, Mi'kmaq Nation

Together We Heal & Grow
seeing & acknowledging my deeds

"See, in the Mi'kmaq world, in all Native worlds, you have to give recognition to everything: misdeeds, good deeds, you know? Anything. You have to give that acknowledgement. Everything that you do, you have to acknowledge it."

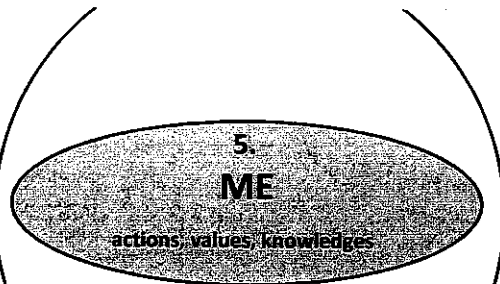
5. put our *values + actions + knowledges* in front of us ...
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Murdena Marshall, Elder, Mi'kmaq Nation

Together We Heal & Grow
seeing & acknowledging my deeds

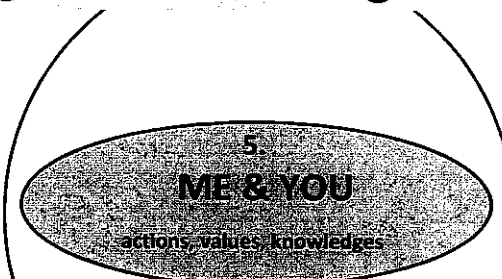
the "HEALING TENSE"



Murdena Marshall, Elder, Mi'kmaq Nation

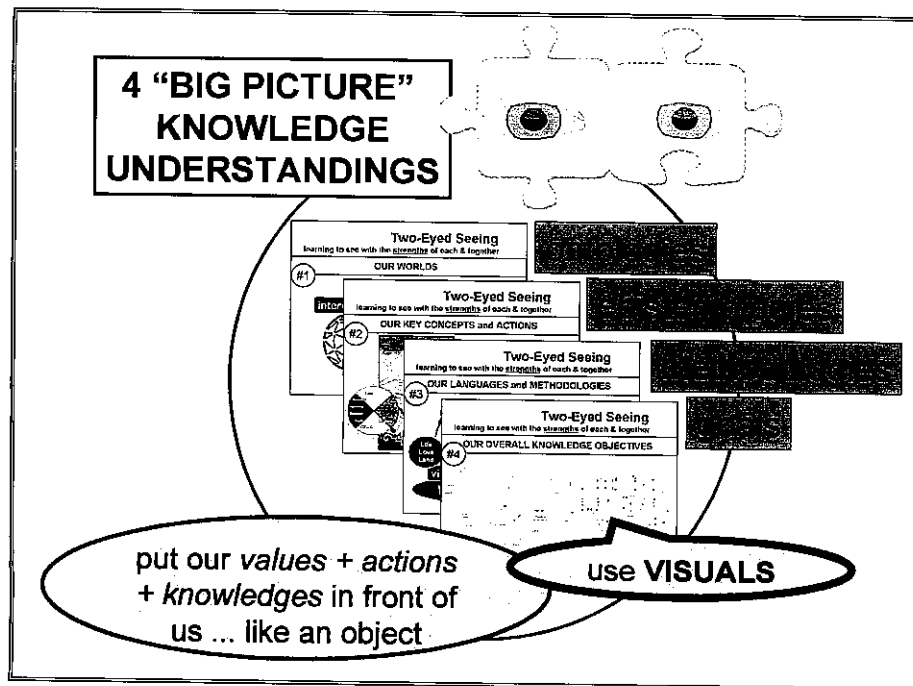
Together We Heal & Grow
seeing & acknowledging my deeds

"together we heal & grow"



Murdena Marshall, Elder, Mi'kmaq Nation

Together We Heal & Grow
seeing & acknowledging my deeds



Two-Eyed Seeing
learning to see with the strengths of each & together

#1 OUR WORLDS

BIG QUESTION

**What do we believe
the world or cosmos to be?
(ontology)**

Two-Eyed Seeing
learning to see with the strengths of each & together

#1 OUR WORLDS

BIG UNDERSTANDING ... IN WORDS

interconnective	parts & wholes
beings ... interconnective and animate: <i>spirit + energy + matter</i> with CONSTANT CHANGE within balance and wholeness	objects ... comprised of parts and wholes characterized by systems and emergences: <i>energy + matter</i> with EVOLUTION

Two-Eyed Seeing
learning to see with the strengths of each & together

#1 OUR WORLDS

BIG UNDERSTANDING ... IN VISUALS

interconnective	parts & wholes
CONSTANT CHANGE within balance and wholeness	EVOLUTION

Two-Eyed Seeing

learning to see with the strengths of each & together

OUR KEY CONCEPTS and ACTIONS

BIG UNDERSTANDING ... IN WORDS

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

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

J. Archibald, 2007, Can. J. Native Ed. 25(1):1-5

Two-Eyed Seeing

learning to see with the strengths of each & together

OUR KEY CONCEPTS and ACTIONS

BIG QUESTION

What do we value as "ways of coming to know" the cosmos? (epistemology)

Two-Eyed Seeing

learning to see with the strengths of each & together

OUR KEY CONCEPTS and ACTIONS

BIG UNDERSTANDING ... IN VISUALS

photo credit: NRC

Two-Eyed Seeing

learning to see with the strengths of each & together

OUR LANGUAGES and METHODOLOGIES

BIG QUESTION

What can remind us of the complexity within our ways of knowing?



Two-Eyed Seeing

learning to see with the strengths of each & together

#3

OUR LANGUAGES and METHODOLOGIES

BIG UNDERSTANDING ... IN WORDS

weaving of patterns within nature's patterns via creative relationships and reciprocities among **love, land, and life (vigour)** that are constantly reinforced and nourished by Aboriginal languages

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



Two-Eyed Seeing

learning to see with the strengths of each & together

#3

OUR LANGUAGES and METHODOLOGIES

BIG UNDERSTANDING ... IN WORDS

Life
Love
Land

vigour

WEAVING

Math
&
Instruments

rigour

UN-WEAVING



Two-Eyed Seeing

learning to see with the strengths of each & together

#3

OUR LANGUAGES and METHODOLOGIES

BIG UNDERSTANDING ... IN VISUALS



Life
Love
Land

vigour

WEAVING



Math
&
Instruments

rigour

UN-WEAVING



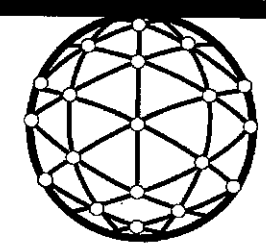
Two-Eyed Seeing

learning to see with the strengths of each & together

OUR WORLD VIEWS

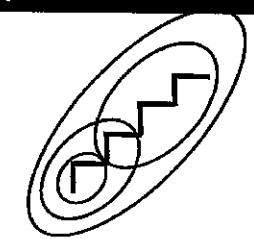
BIG UNDERSTANDING ... IN VISUALS

interconnective

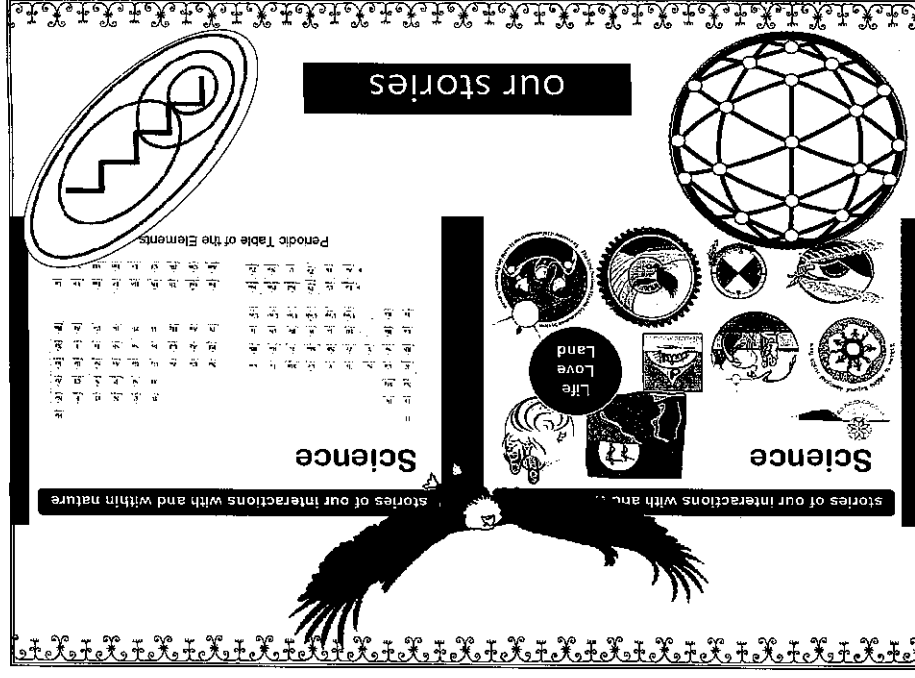
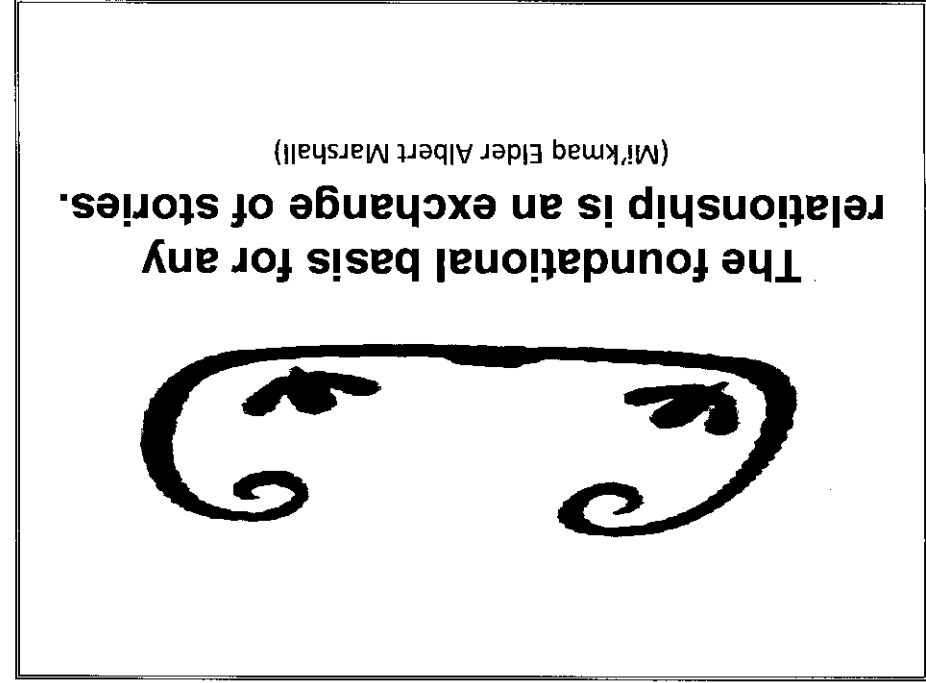
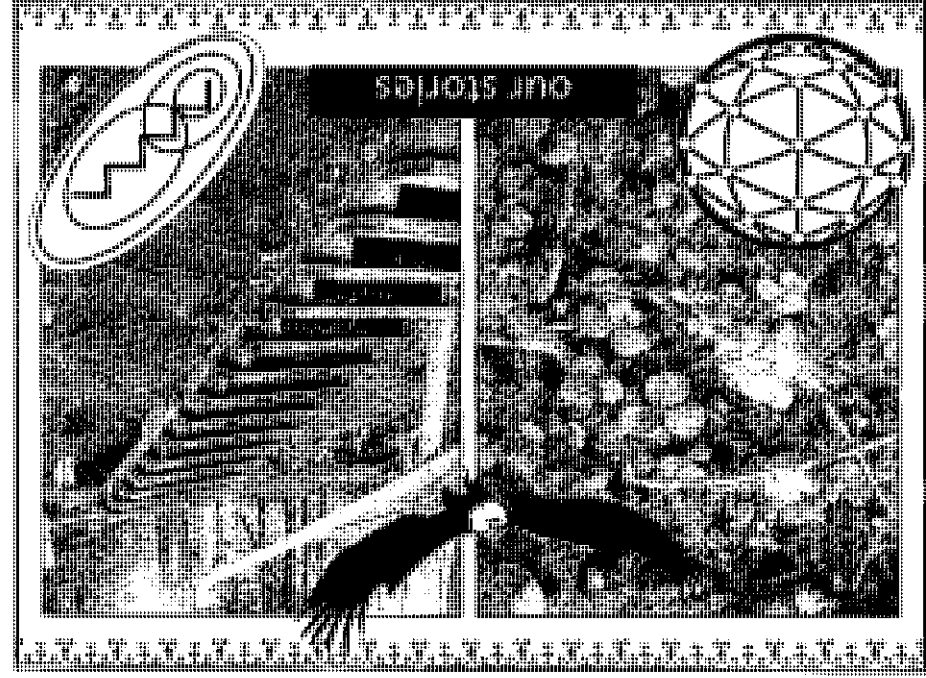


CONSTANT CHANGE
within balance and wholeness

parts & wholes



EVOLUTION



Western Science

Images from: Aboriginal organizations/artists, various sources

Western Science

photo credit: NRC

Indigenous Science

Life
Love
Land
Language

Images from: Aboriginal organizations/artists, various sources

Indigenous Science

Life
Love
Land
Language

Images from: Aboriginal organizations/artists, various sources



H Hydrogen																He Helium															
Li Lithium	Be Beryllium																	B Boron	C Carbon	N Nitrogen	O Oxygen	F Fluorine	Ne Neon								
Na Sodium	Mg Magnesium																	Al Aluminum	Si Silicon	P Phosphorus	S Sulfur	Cl Chlorine	Ar Argon								
K Potassium	Ca Calcium	Sc Scandium	Ti Titanium	V Vanadium	Cr Chromium	Mn Manganese	Fe Iron	Co Cobalt	Ni Nickel	Cu Copper	Zn Zinc	Ga Gallium	Ge Germanium	As Arsenic	Se Selenium	Br Bromine	Kr Krypton														
Rb Rubidium	Sr Strontium	Y Yttrium	Zr Zirconium	Nb Niobium	Mo Molybdenum	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver	Cd Cadmium	In Indium	Sn Tin	Sb Antimony	Te Tellurium	I Iodine	Xe Xenon														
Cs Cesium	Ba Barium	La Lanthanum	Hf Hafnium	Ta Tantalum	W Tungsten	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury	Tl Thallium	Pb Lead	Bi Bismuth	Po Polonium	At Astatine	Rn Radon														
Fr Francium	Ra Radium	Ac Actinium	Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium															

Universe: Visible Matter (levels of organization - biology)

-
- The diagram illustrates the hierarchy of Western Science, starting from the most fundamental particles at the bottom and moving up to the universe. The levels are as follows:
- fundamental particles (quarks & leptons)
 - baryons (neutrons & protons)
 - atoms (natural elements #1-92; artificial elements #93 & higher)
 - molecules & minerals
 - organelles
 - cells
 - tissues
 - organs
 - organ systems
 - organisms
 - populations
 - communities
 - ecosystems
 - planet Earth
 - star systems (Sun)
 - galaxies (Milky Way)
 - clusters (Local Group)
 - super clusters (Local)
 - Universe
- The text "Western Science" is displayed in a large, bold, black font within a white rectangular box on the right side of the diagram.

Western Science

Universe: Visible Matter (levels of organization - biology)

α	β	γ	δ	ϵ	ζ	η	θ	ι	κ	λ	μ	ν	ξ	\omicron	π	ρ	σ	τ	υ	ϕ	χ	ψ	ω
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120

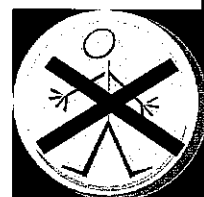
-
- The diagram illustrates a hierarchy of organization levels, starting from the most fundamental at the bottom and moving upwards through various scales of complexity. The levels are listed as follows:
- fundamental particles (quarks & leptons)
 - baryons (neutrons & protons)
 - atoms (natural elements #1-92; artificial elements #93 & higher)
 - molecules & minerals
 - organelles
 - cells
 - tissues
 - organs
 - organ systems
 - organisms
 - populations
 - communities
 - ecosystems
 - planet Earth
 - star systems (Sun)
 - galaxies (Milky Way)
 - clusters (Local Group)
 - super clusters (Local)
 - Universe
- A box labeled "Wester Science" is positioned on the right side of the diagram.

**Western
Science**

Universe: Visible Matter (levels of organization - biology)

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

-
- Universe
 ■ super clusters (Local)
 ■ clusters (Local Group)
 ■ galaxies (Milky Way)
 ■ star systems (Sun)
 ■ planet Earth
 ■ ecosystems
 ■ communities
 ■ populations
 ■ organisms
 ■ organ systems
 ■ organs
 ■ tissues
 ■ cells
 ■ organelles
 ■ molecules & minerals
 ■ atoms (natural elements #1-92)
 ■ baryons (neutrons & protons)
 ■ fundamental particles (quarks & leptons)
- 10²⁶ 10²⁵ 10²⁴ 10²³ 10²² 10²¹ 10²⁰ 10¹⁹ 10¹⁸ 10¹⁷ 10¹⁶ 10¹⁵ 10¹⁴ 10¹³ 10¹² 10¹¹ 10¹⁰ 10⁹ 10⁸ 10⁷ 10⁶ 10⁵ 10⁴ 10³ 10² 10¹ 10⁰ 10⁻¹ 10⁻² 10⁻³ 10⁻⁴ 10⁻⁵ 10⁻⁶ 10⁻⁷ 10⁻⁸ 10⁻⁹ 10⁻¹⁰ 10⁻¹¹ 10⁻¹² 10⁻¹³ 10⁻¹⁴ 10⁻¹⁵ 10⁻¹⁶ 10⁻¹⁷ 10⁻¹⁸ 10⁻¹⁹ 10⁻²⁰ 10⁻²¹ 10⁻²² 10⁻²³ 10⁻²⁴ 10⁻²⁵ 10⁻²⁶
- 10²⁶ 10²⁵ 10²⁴ 10²³ 10²² 10²¹ 10²⁰ 10¹⁹ 10¹⁸ 10¹⁷ 10¹⁶ 10¹⁵ 10¹⁴ 10¹³ 10¹² 10¹¹ 10¹⁰ 10⁹ 10⁸ 10⁷ 10⁶ 10⁵ 10⁴ 10³ 10² 10¹ 10⁰ 10⁻¹ 10⁻² 10⁻³ 10⁻⁴ 10⁻⁵ 10⁻⁶ 10⁻⁷ 10⁻⁸ 10⁻⁹ 10⁻¹⁰ 10⁻¹¹ 10⁻¹² 10⁻¹³ 10⁻¹⁴ 10⁻¹⁵ 10⁻¹⁶ 10⁻¹⁷ 10⁻¹⁸ 10⁻¹⁹ 10⁻²⁰ 10⁻²¹ 10⁻²² 10⁻²³ 10⁻²⁴ 10⁻²⁵ 10⁻²⁶
- 10²⁶ 10²⁵ 10²⁴ 10²³ 10²² 10²¹ 10²⁰ 10¹⁹ 10¹⁸ 10¹⁷ 10¹⁶ 10¹⁵ 10¹⁴ 10¹³ 10¹² 10¹¹ 10¹⁰ 10⁹ 10⁸ 10⁷ 10⁶ 10⁵ 10⁴ 10³ 10² 10¹ 10⁰ 10⁻¹ 10⁻² 10⁻³ 10⁻⁴ 10⁻⁵ 10⁻⁶ 10⁻⁷ 10⁻⁸ 10⁻⁹ 10⁻¹⁰ 10⁻¹¹ 10⁻¹² 10⁻¹³ 10⁻¹⁴ 10⁻¹⁵ 10⁻¹⁶ 10⁻¹⁷ 10⁻¹⁸ 10⁻¹⁹ 10⁻²⁰ 10⁻²¹ 10⁻²² 10⁻²³ 10⁻²⁴ 10⁻²⁵ 10⁻²⁶
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- 10²⁶ 10²⁵ 10²⁴ 10²³ 10²² 10²¹ 10²⁰ 10¹⁹ 10¹⁸ 10¹⁷ 10¹⁶ 10¹⁵ 10¹⁴ 10¹³ 10¹² 10¹¹ 10¹⁰ 10⁹ 10⁸ 10⁷ 10⁶ 10⁵ 10⁴ 10³ 10² 10¹ 10⁰ 10⁻¹ 10⁻² 10⁻³ 10⁻⁴ 10⁻⁵ 10⁻⁶ 10⁻⁷ 10⁻⁸ 10⁻⁹ 10⁻¹⁰ 10⁻¹¹ 10⁻¹² 10⁻¹³ 10⁻¹⁴ 10⁻¹⁵ 10⁻¹⁶ 10⁻¹⁷ 10⁻¹⁸ 10⁻¹⁹ 10⁻²⁰ 10⁻²¹ 10⁻²² 10⁻²³ 10⁻²⁴ 10⁻²⁵ 10⁻²⁶
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- 10²⁶ 10²⁵ 10²⁴ 10²³ 10²² 10²¹ 10²⁰ 10¹⁹ 10¹⁸ 10¹⁷ 10¹⁶ 10¹⁵ 10¹⁴ 10¹³ 10¹² 10¹¹ 10¹⁰ 10⁹ 10⁸ 10⁷ 10⁶ 10⁵ 10⁴ 10³ 10² 10¹ 10⁰ 10⁻¹ 10⁻² 10⁻³ 10⁻⁴ 10⁻⁵ 10⁻⁶ 10⁻⁷ 10⁻⁸ 10⁻⁹ 10⁻¹⁰ 10⁻¹¹ 10⁻¹² 10⁻¹³ 10⁻¹⁴ 10⁻¹⁵



SCIENCE stories of:
parts & wholes

my world is many “its” (objects)



Two-Eyed Seeing

learning to see with the strengths of each & together

#4

OUR OVERALL KNOWLEDGE OBJECTIVES

BIG UNDERSTANDING ... IN WORDS

collective, living
knowledge to enable
nourishment of one's journey
within expanding sense of
"place, emergence and
participation" for collective
consciousness and
interconnectiveness

towards resonance of
understanding within environment

dynamic, testable,
published knowledge
independent of
personal experience
that can enable
prediction and control
(and "progress")

towards construction of
understanding of environment



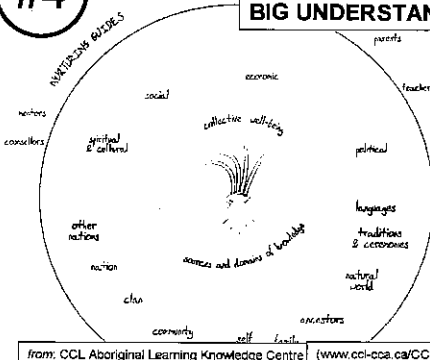
Two-Eyed Seeing

learning to see with the strengths of each & together

#4

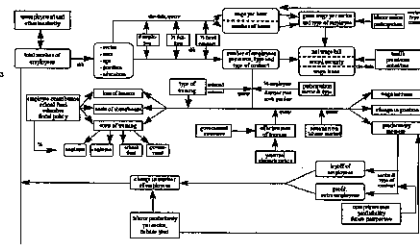
OUR OVERALL KNOWLEDGE OBJECTIVES

BIG UNDERSTANDING ... IN VISUALS



from: CCL Aboriginal Learning Knowledge Centre | www.ccl-aca.ca/CCL

towards resonance of
understanding within environment

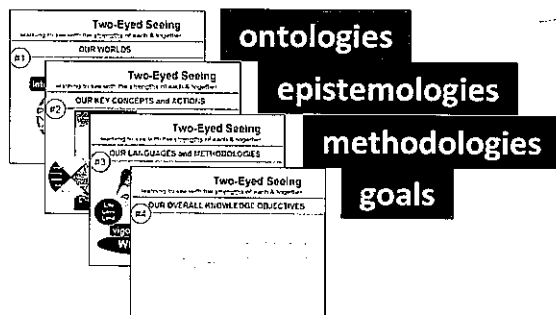
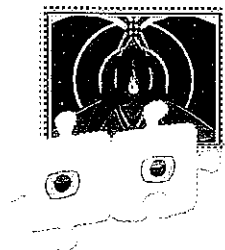


from: www.leads.ac.uk

towards construction of
understanding of environment

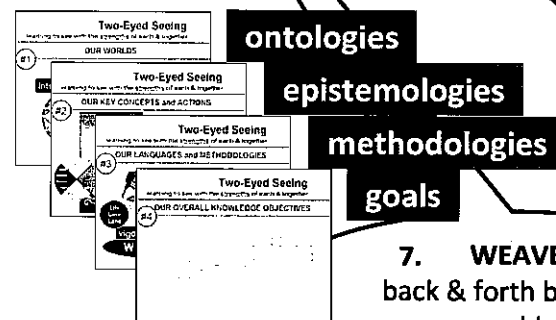
Four Big Patterns for Integrative Science & TES

recognize and affirm our need to
enter ethical space ...
and learn to take first steps

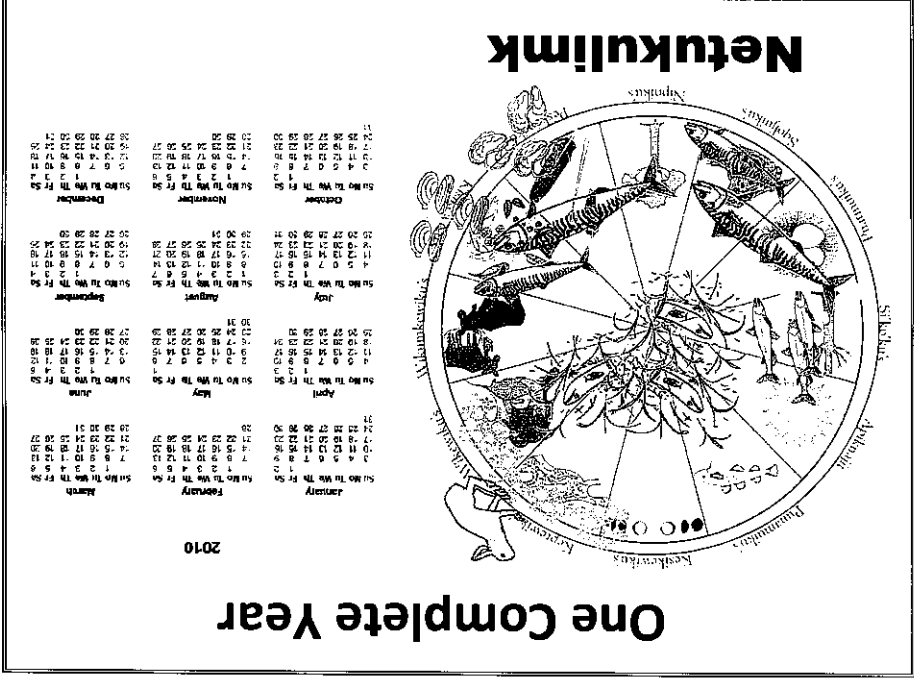
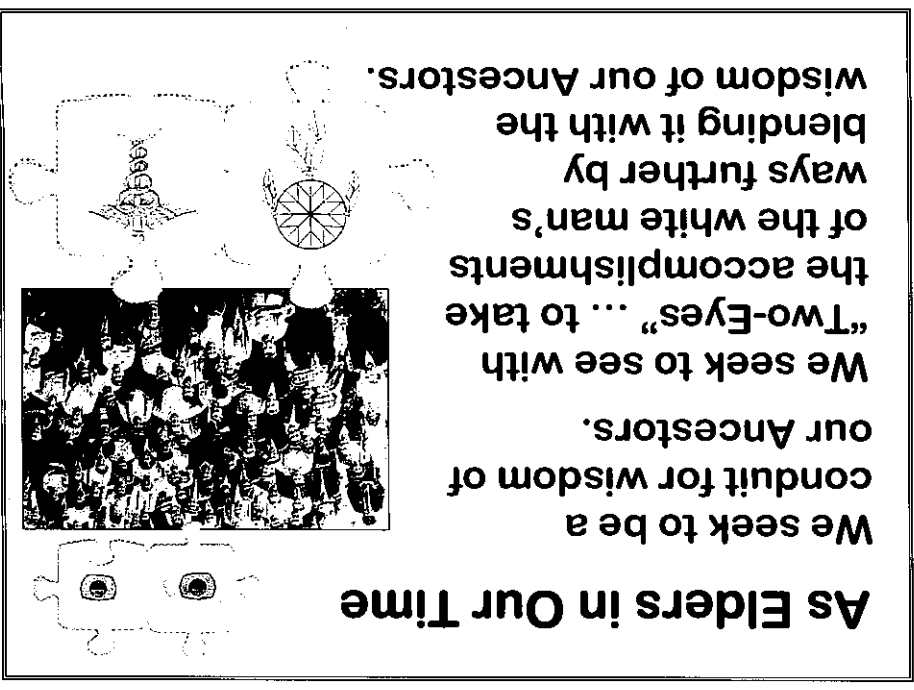
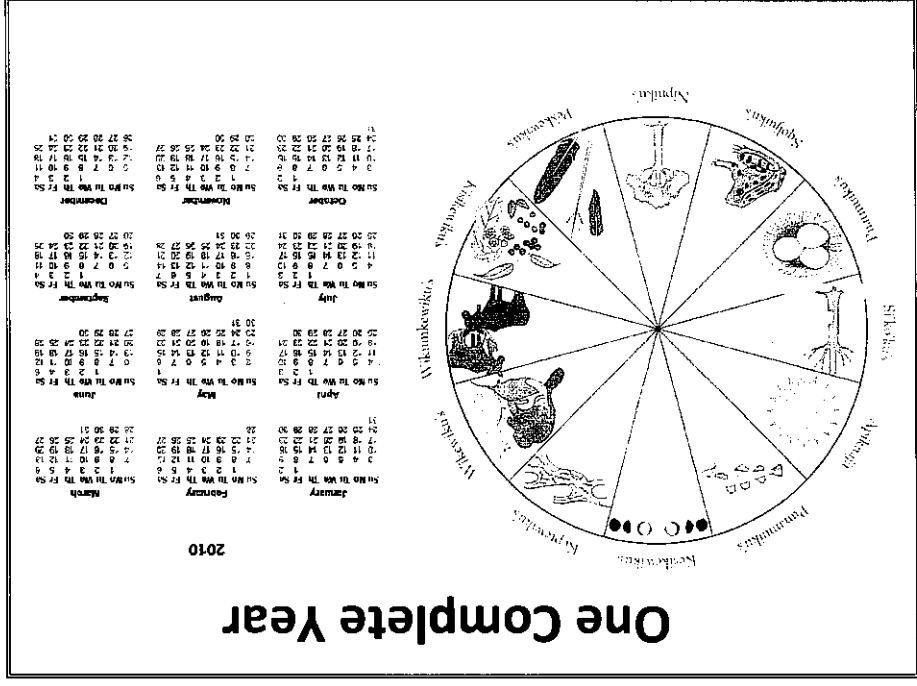
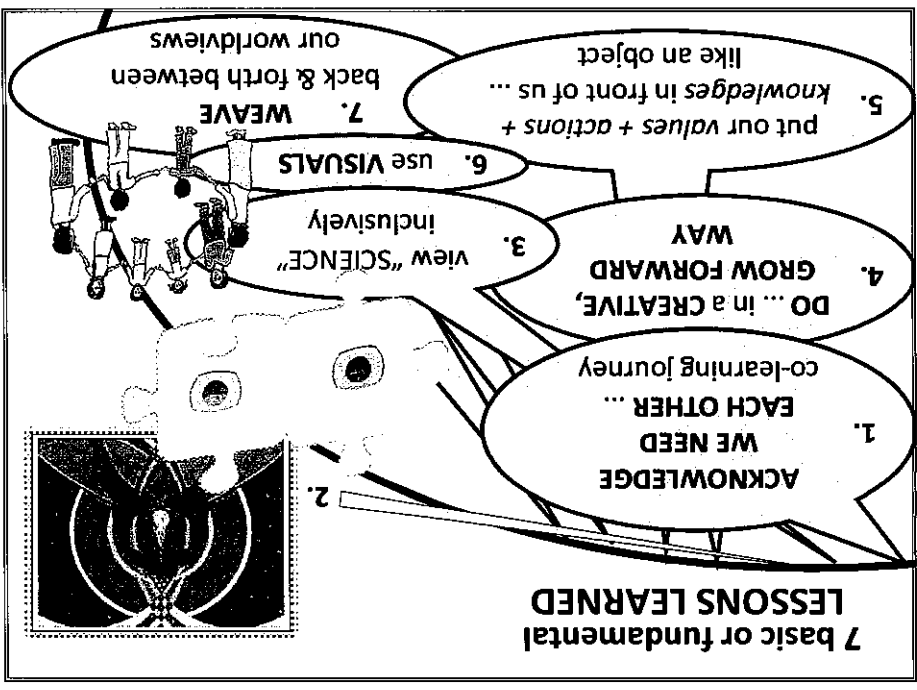


LESSONS LEARNED

#7



7. WEAVE
back & forth between
our worldviews





Canada Research
Chairs

Chaires de recherche
du Canada



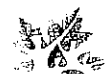
Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada
Canada

Thank you / Wela'liog

IAPH



CIHR IRSC
Canadian Institutes of
Health Research



NSERC
CRSNG

Canada Foundation
for Innovation

Fondation canadienne
pour l'innovation



Mi'kma'wey Debert

Health
Research
FOUNDATION



IWK Health Centre
Foundation

ABORIGINAL
Health Research Program

SABLE
OFFSHORE ENERGY
INCORPORATED



Mermaid Theatre
of Nova Scotia



Eskasoni First Nation Detachment
Royal Canadian Mounted Police
Gendarmerie royale
du Canada



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

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and funding agencies
is gratefully acknowledged.