

THE BIRCH BARK CANOE

Navigating a New World

21ST CENTURY CURRICULUM CONNECTIONS AND VIDEO RESOURCE
FOR MANITOBA TEACHERS
(GRADES 5-9)

Pauline Broderick





“We offer our culture. We offer our heritage. We know it is different from yours. We are interested in your culture and your heritage; we want you to discover ours.”

Harold Cardinal
First Nations leader and author (1969)

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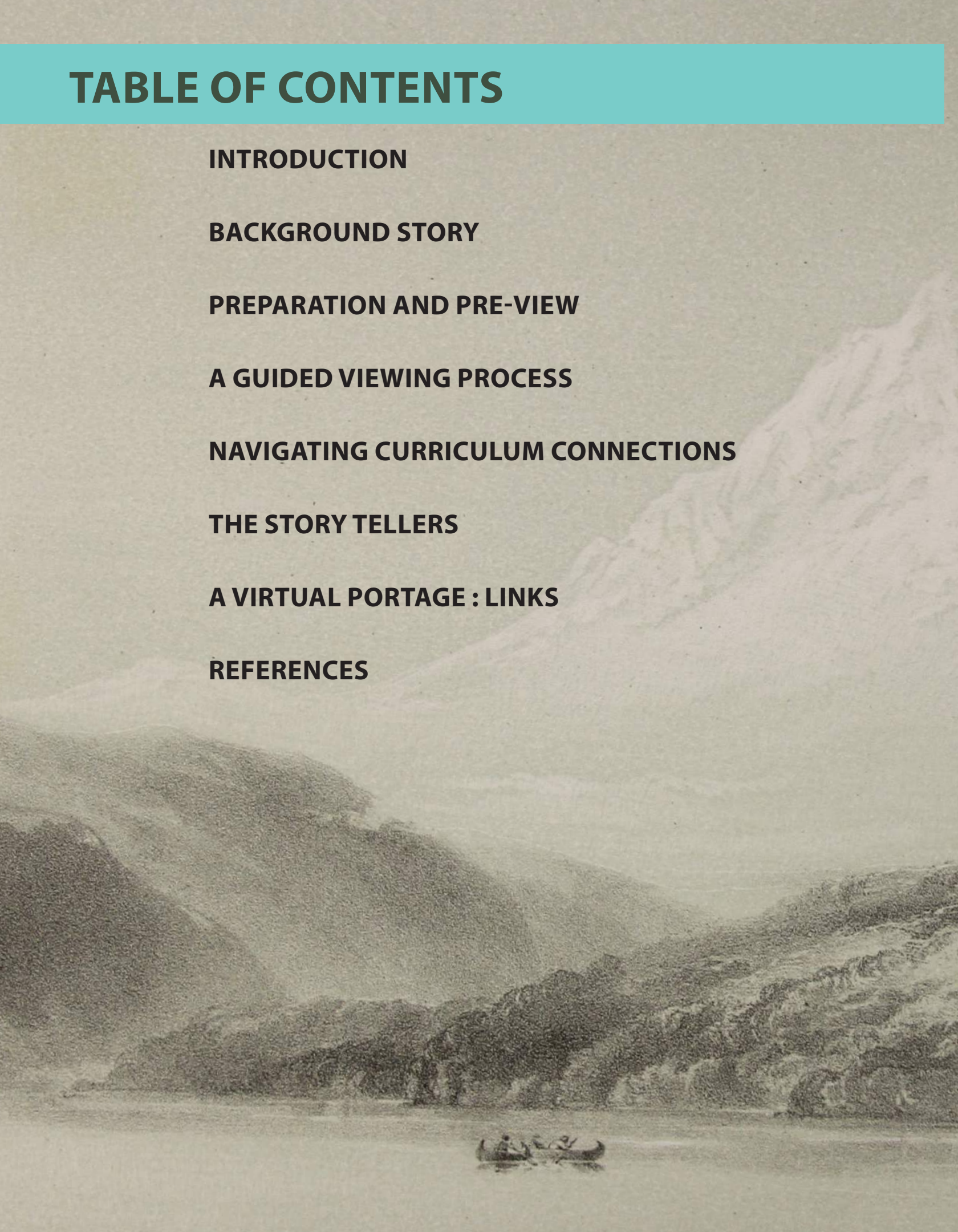
A GUIDED VIEWING PROCESS

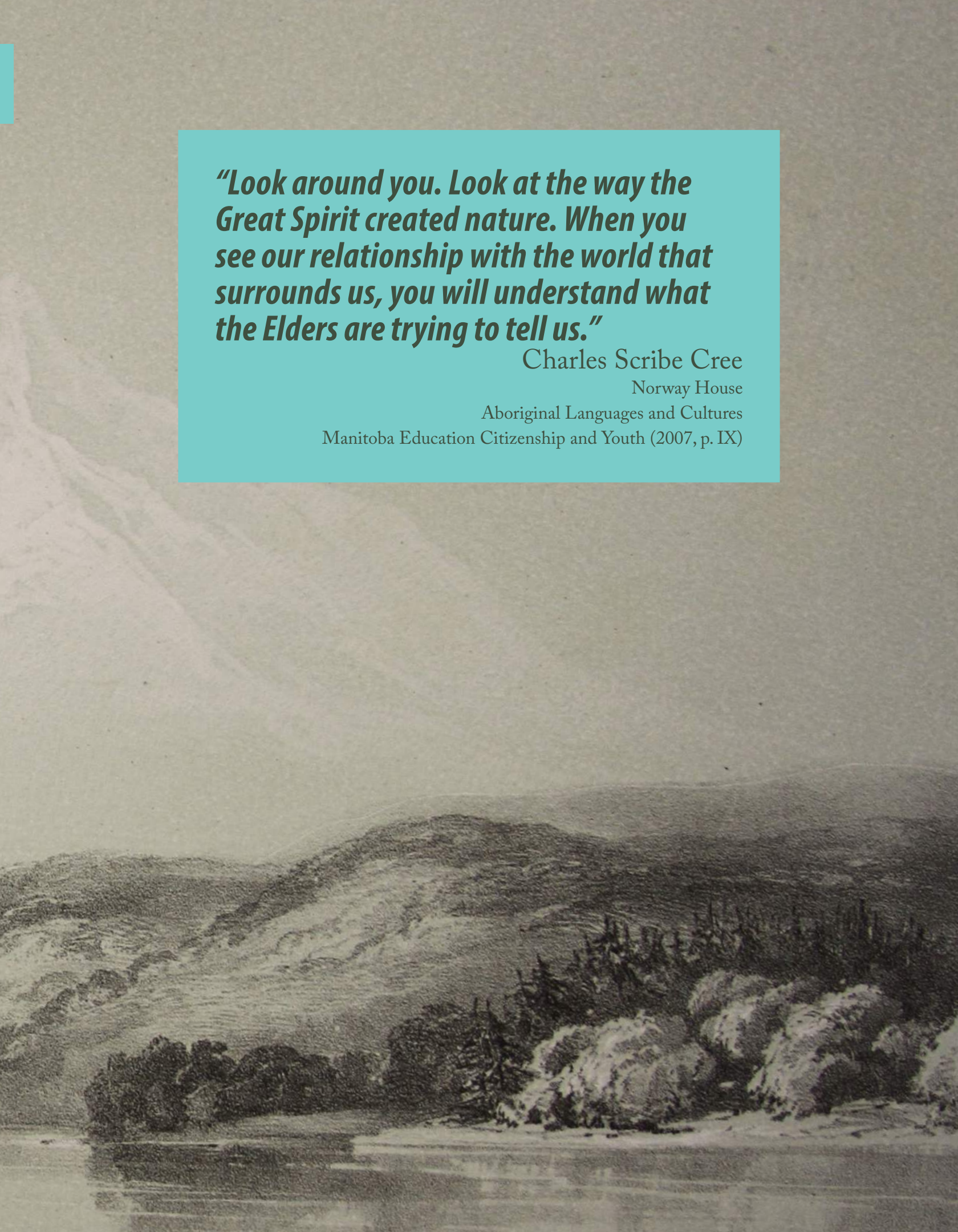
NAVIGATING CURRICULUM CONNECTIONS

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“Look around you. Look at the way the Great Spirit created nature. When you see our relationship with the world that surrounds us, you will understand what the Elders are trying to tell us.”

Charles Scribe Cree

Norway House

Aboriginal Languages and Cultures

Manitoba Education Citizenship and Youth (2007, p. IX)

INTRODUCTION

The Birch Bark Canoe: Navigating a New World

The birch bark canoe is an iconic artifact shaped from the bounty of our wilderness. It inspires **poetry** and **song**, **painting** and **story**. It works with our **geography** to navigate river routes that connect the people for **trading** and **sharing**. The shapes and patterns of each craft reflect individual personality, local culture and various functions but the general principles of design and construction are often the same. The gifts of nature are borrowed to build a craft that epitomizes **balance**, **strength**, **beauty**, **function** and **adaptability**. Its design is handed down through generations to builders who infuse the structure with spirit and responsible connections to a **sustainable environment**.

In days gone by, it increased our reach to shape the Canada we know today. The birch bark canoe carried the men and women of **history** to landscapes that were inaccessible in any other way. It was a gift from First Nations to the immigrants from faraway places whose displaced modes of transport were reflective of a different worldview. It was a gift that allowed the newcomers to flourish and grow. Most certainly, the birch bark canoe played a pivotal role in our collective past but it also has a significant role to play in the classrooms of our future. In today's technological world, the birch bark canoe continues to teach us.

When the birch bark canoe enters the classroom of the 21st century, it does so with intention and purpose. As an example of ingenuity, technology and design, it offers us an opportunity to understand and



celebrate the accomplishments and contributions of First Nations peoples. These contributions have long been absent from our historical narratives. Today's classroom seeks out opportunities to expand the narrow story of the past and make meaningful connections between First Nations perspectives and discipline based curricular outcomes.

As a cultural legacy, the birch bark canoe embodies the intersect of art, engineering and science. It invites authentic questions and encourages connected thinking in a variety of different ways. It can serve as a catalyst (Edwards, 2008) for a trans-disciplinary, holistic approach that links to numerous curricular intentions. Math, Science, Social Studies, English Language Arts, Drama, Art, Music and Language can be studied through the canoe to offer shades of meaning and insight into the values and worldviews of the people who created it. It provides opportunities to learn about each other and ourselves as we consider education, not only as discreet fragments to be memorized but as an interconnected, living process in which we all play a part.

The birch bark canoe has a curriculum story to tell. It is a story of the present and the future as much as it is one of the past. As a starting point for designing **inquiry based learning experiences**, it offers the potential to invite engagement and provoke curiosity. These are essential qualities of an effective 21st century education. Students today want to participate in their own learning and today's teacher wants to create the educational spaces that allow them to do so.



As Elder Peter Russell Taylor of the Dakota, Sioux Valley advises,

***“The young have to use their eyes, ears,
hands...sit on Mother Earth...not only in
chairs.”***

(Taylor 2007 p.x)

This is a call to action that informs the design of this curriculum support document. It is an invitation to begin a journey of possibility.

WELCOME!

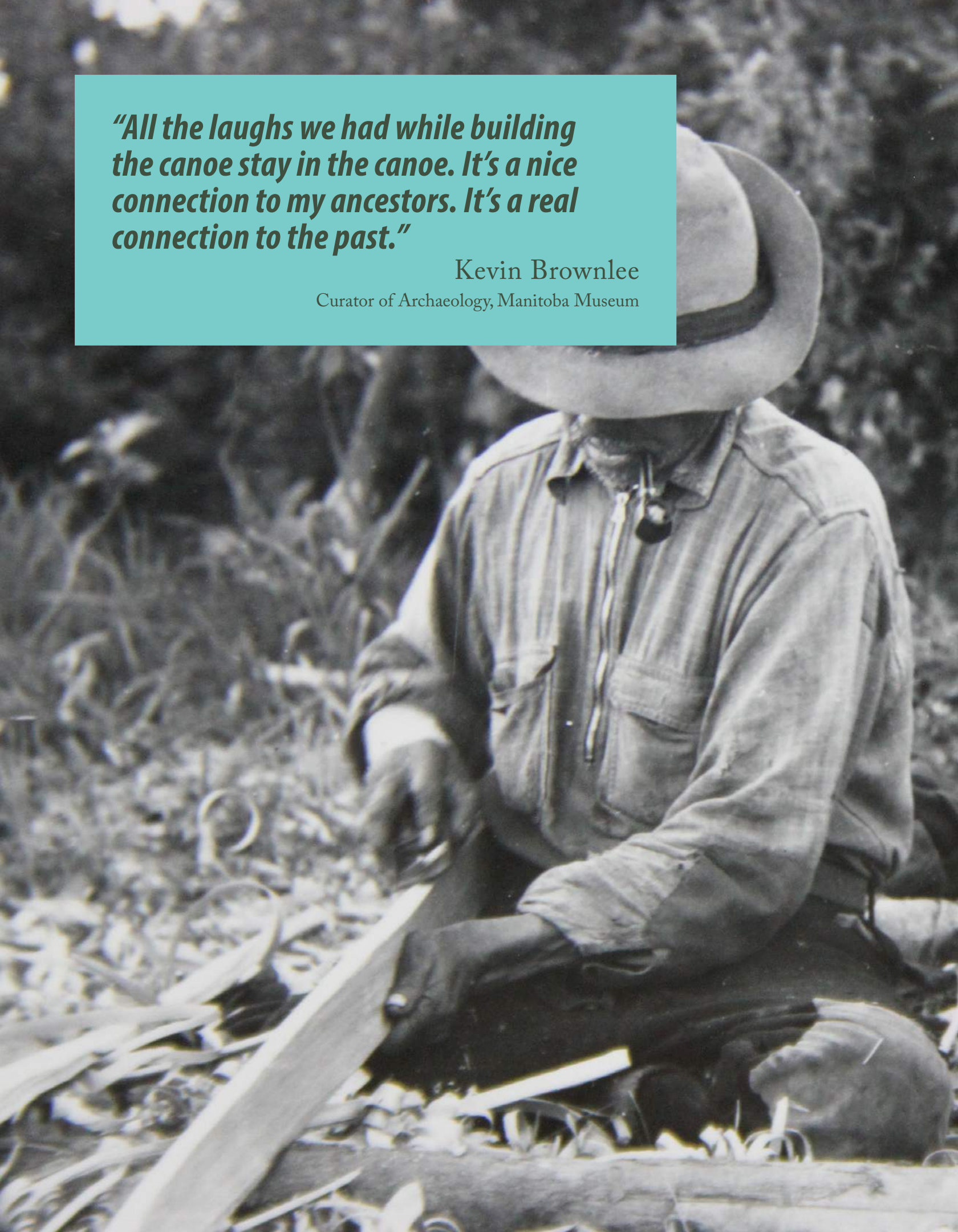




“All the laughs we had while building the canoe stay in the canoe. It’s a nice connection to my ancestors. It’s a real connection to the past.”

Kevin Brownlee

Curator of Archaeology, Manitoba Museum





BACKGROUND STORY

The Birch Bark Canoe: Navigating a New World is a 20 minute video resource commissioned by the partnership of Engineers Canada, Manitoba Aerospace, the Engineering Access Program and the Faculty of Engineering at the University of Manitoba. It is designed to be used in Manitoba classrooms to honour the contributions of First Nations peoples and to educate future generations about the art and science of the birch bark canoe.





ABOUT THIS CURRICULUM SUPPORT

This guide began with careful consideration of the philosophy and pedagogies highlighted in current Manitoba curricula in Aboriginal Education, Science, Mathematics, Social Studies, English Language Arts, Art and Drama education. General Learning Outcomes are drawn directly from these provincial documents. A holistic approach to teaching and learning is supported in these curriculum documents and they in turn informed the shape and content of this guide. Prepared with the classroom teacher in mind, activities are 'hands on' and designed to serve existing requirements.

The video, **The Birch Bark Canoe : Navigating a New World** is employed as a catalyst (Edwards 2008) for trans-disciplinary questions and interdisciplinary connections. It offers the classroom teacher a means to stimulate inquiry driven learning experiences that invite optimal student engagement.

For the last two decades, Manitoba Education has worked to support curricular initiatives that increase knowledge and understanding of First Nations world views and honour Indigenous peoples many contributions to Canadian culture. Curricular connections in this guide are made based on the research and insights provided by the Elders, youth, teachers and scholars that informed the creation of:

- **Integrating Aboriginal perspectives: A Resource for Curriculum Developers, Teachers, and Administrators**
- **Integrating Aboriginal Perspectives: A Theme Based Approach**
- **Aboriginal Language and Culture: Manitoba Curriculum Framework of Outcomes**

Many thanks to all who contributed their knowledge and wisdom.

LINKS

The Birch Bark Canoe; Navigating a New World available for download at www.birchbarkcanoe.ca

Engineers Canada
<http://www.engineerscanada.ca>

Manitoba Aerospace
<http://www.mbaerospace.ca>

Engineering Access Program
<http://www.engap.com>

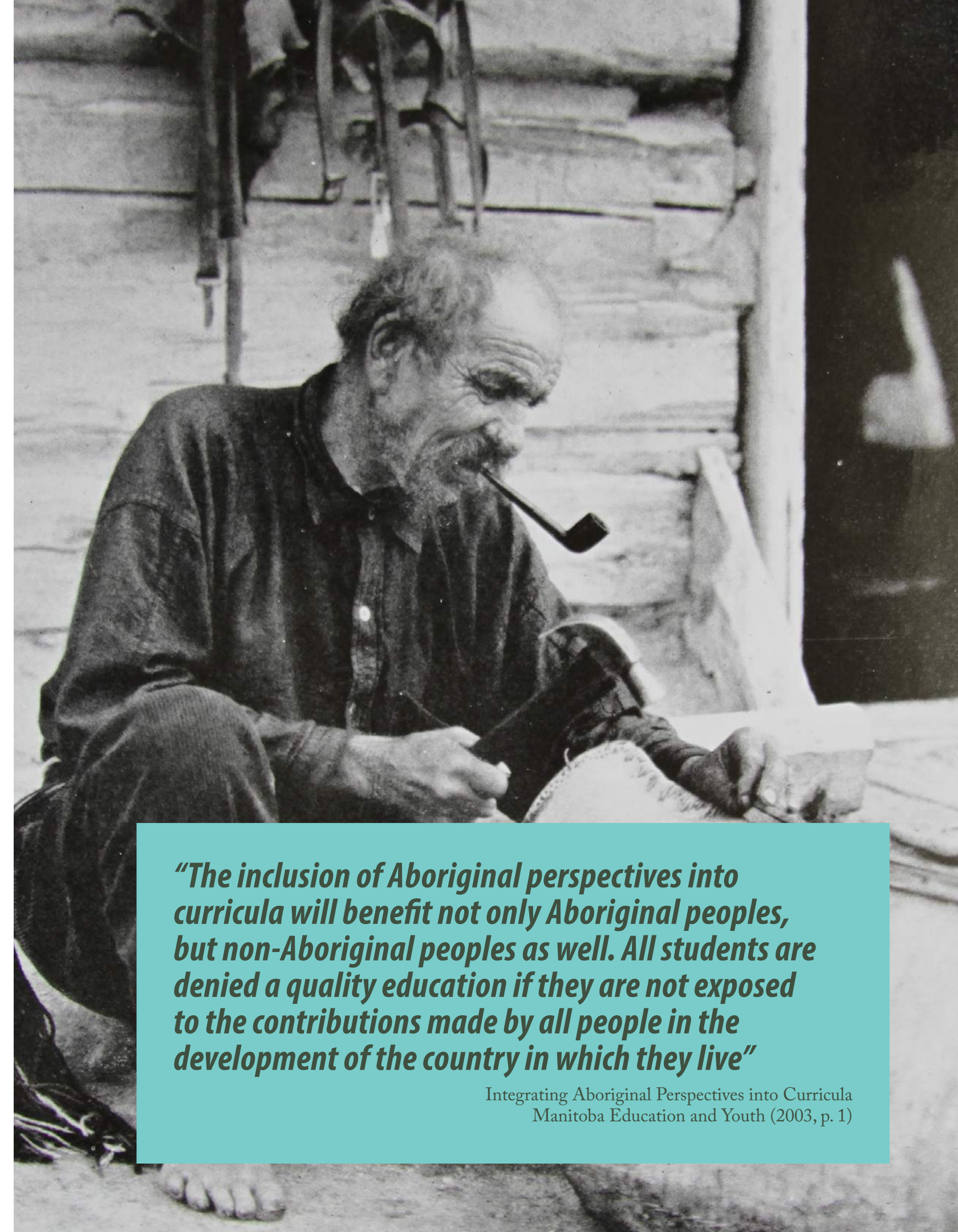
University of Manitoba Faculty of Engineering
<http://umanitoba.ca/faculties/engineering/>

Integrating Aboriginal Perspectives A Resource for Curriculum Developers, Teachers and Administrators
<http://www.edu.gov.mb.ca/k12/docs/policy/abpersp/index.html>

Integrating Aboriginal Perspectives: A Theme based approach
<http://www.edu.gov.mb.ca/k12/abedu/perspectives/index.html>

Kindergarten to Gr. 12 Aboriginal Language and Culture
<http://www.edu.gov.mb.ca/k12/abedu/framework/index.html>

Manitoba Education Curriculum Subjects
<http://www.edu.gov.mb.ca/k12/cur/index.html>



“The inclusion of Aboriginal perspectives into curricula will benefit not only Aboriginal peoples, but non-Aboriginal peoples as well. All students are denied a quality education if they are not exposed to the contributions made by all people in the development of the country in which they live”

Integrating Aboriginal Perspectives into Curricula
Manitoba Education and Youth (2003, p. 1)

PREPARATION AND PRE-VIEW

VIDEO AS CATALYST FOR TEACHING AND LEARNING

Catalyst: An agent that provokes change or action.

Video is often used in the classroom to illustrate or augment curricular content. In contrast, this design places the student in response to the video at the centre of the learning experience. In this approach, the video functions as a catalyst for responsive curricular exploration. It is meant to be viewed numerous times for a range of purposes.

“Teaching strategies should be based upon the following principles:

- all new learning should be based upon what has been learned before
- students should see the meaning and significance of what they are doing
- students should become actively involved in their learning
- there should be frequent interchange of ideas with others

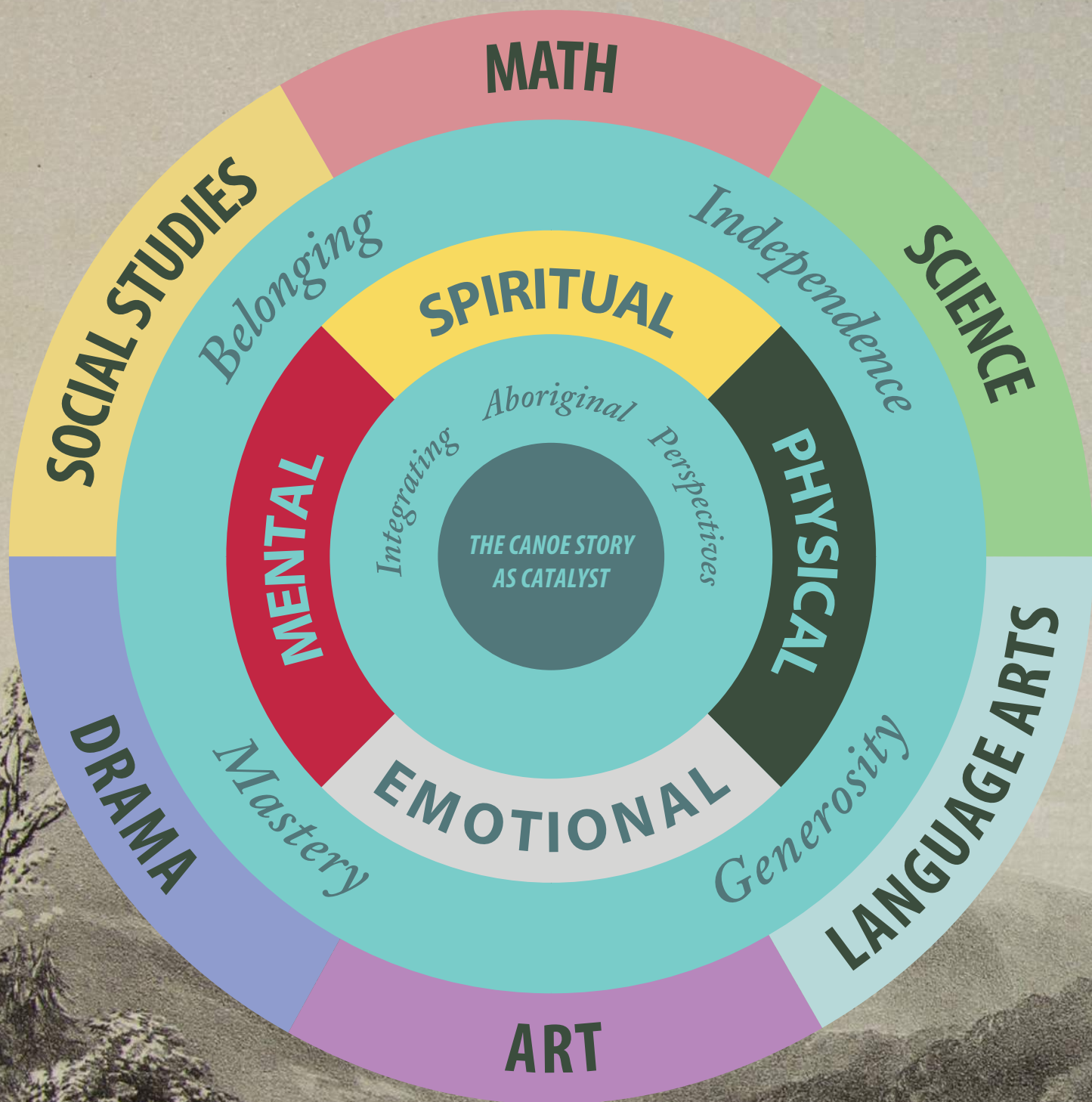
Approaches and Teaching Strategies Focus On:

- emphasizing inquiry and discovery by students
- teacher presentation of process
- viewing the teacher’s role as facilitator, resource person and inquirer together with students
- emphasizing the cognitive and affective outcomes of student learning
- concentrating on activities, values and actions of people”

Aboriginal Education (web)

<http://www.edu.gov.mb.ca/k12/abedu/native.html>

The principles and approaches recommended in the Aboriginal Education documents are echoed throughout the current provincial Manitoba curricula. Working creatively and collaboratively with others on significant projects, participating in authentic inquiry and understanding the interconnections of a range of systems is described as qualities of an effective 21st century education. (Dede 2009)



“The circle represents an on-going continuous way of looking at life”

Aboriginal Language and Cultures:
Manitoba Curriculum Framework of Outcomes (p. 13)





“Aboriginal voices have been clear and persistent in calling for a respectful recognition of their world view, while acknowledging the value of the knowledge, skills, and attitudes required to participate in the new technologies and economies”

K-12 Aboriginal Languages and Cultures Framework of Outcomes
(2007, p.11)



USING THE VIDEO IN YOUR CLASSROOM

Pre-View: Preparation

To optimize student engagement we need to slow down and provide opportunities to examine and interact with image and language. “Twenty-first century” learners are accustomed to surfing de-contextualized fragments of information. Practise with a single image (a painting, a photograph) and **deep read** to allow students to consider context. Who, what, when, where, why, how? This is a large group experience. The teacher facilitates the process and student impressions are supported. The intention is to slow down the rush to judgement and sensitize observational skills.

4 Stages of Engagement with Visual Text: (Feldman 1991)

1. Description

What does the piece seem to be made of? Size? Scale? Medium Used?

2. Analysis

What are the relationships within the piece? Shapes? Colour? Lines?

3. Interpretation

Building on what has been observed respond to the piece as fully as possible. Thoughts? Feelings?

4. Evaluation

What do you think are the merits of the piece?

SCIENCE 5-8 (p. 2.6)

A4. Identify and appreciate contributions made by women and men from many societies and cultural backgrounds towards increasing our understanding of the world and in bringing about technological innovations.





PRE-VIEW

What would you need to do...if you wanted to build a canoe?

Examine a real birch bark canoe and/or provide tactile engagement with materials required to create a birch bark canoe. ex: pieces of birch bark, cedar, spruce roots, sap, fat etc.

Research images of canoes from the past and the present: Consider impressions of size, weight, shape, design, function, purpose, effect. What are the common patterns? What has changed? What remains the same? Compare and Contrast similarities and differences.

Read and Discuss: Marcel Labelle's Blueprint for birch bark canoe design. (see inside back cover)

Visualize: Close your eyes and listen to:

A story about the history of the Birch Bark Canoe.
canoe.ca/AllAboutCanoes

OR

A Story about the science of the Birch Bark Canoe
<http://connection.ebscohost.com/c/articles/3871918/science-building-birchbark-canoe>

VISUALIZATION “involves thinking in pictures and images, and the ability to perceive, transform and recreate different aspects of the visual-spatial world”

K-8 MATHEMATICS CURRICULUM FRAMEWORKS (2013, p. 14)

“Contextualization and making connections to the experiences of learners are powerful processes in developing mathematical understanding. When mathematical ideas are connected to each other or to real-world phenomena, students can begin to view mathematics as useful, relevant, and integrated.”

K-8 MATHEMATICS CURRICULUM FRAMEWORKS (2013, p.11)



SCIENCE GR. 5-9

C5. demonstrate curiosity, skepticism, creativity, open mindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind (p. 2.11)

E.L.A. GR. 5-9

5.2.2 Work in Groups - Organize and complete tasks cooperatively and collaboratively; evaluate group productivity and efficiency. (p.8)

MATHEMATICS GR. 5-9

Patterns and Relations

Use patterns to describe the world and solve problems (p. 15)

SOCIAL STUDIES GR 5- 8

8-5-100 Collaborate with others to establish and carry out group goals and responsibilities.

8-5-102 Make decisions that reflect fairness and equality in their interactions with others.

8-5-104 Negotiate constructively with others to build consensus and solve problems. (p.131)

ACTIVITY: A THOUGHT EXPERIMENT

Task:

Create an instruction guide to build a canoe - a step by step guide to the materials needed and the process to follow. Don't worry about being correct. This is a collaborative thought experiment. Think it through together!

Materials:

- Multi-coloured markers/pencils/crayons/pastels
- Large newsprint available as needed.

Students are gathered in groups of 4.

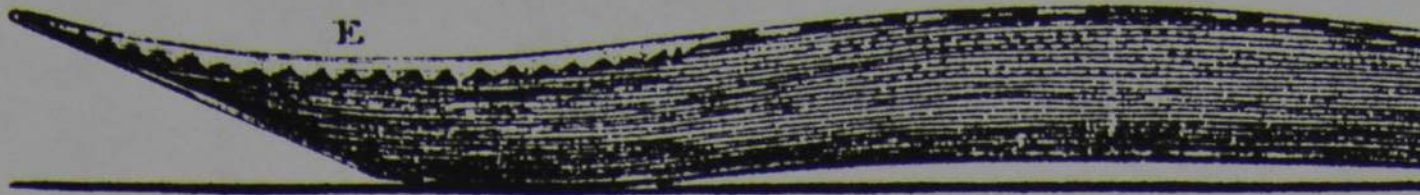
1. Group negotiates how long they think the task will take. Arrive at agreement.
2. Student collaboratively create posters to represent their thinking.
3. Display posters.
4. **A Gallery walk:** In pairs. Students look at and talk about each others ideas.
5. **Large Group Discussion:** What did they/you notice? Were there common elements considered by all groups? What surprised you?
6. Further Questions?

TEACHING STRATEGY: GALLERY WALK

“During a Gallery Walk, students explore multiple texts or images that are placed around the room. Teachers often use this strategy as a way to have students share their work with peers, examine multiple historical documents, or responding to a collection of quotations. Because this strategy requires students to physically move around the room, it can be especially engaging to kinesthetic learners.”

Facing History and Ourselves (web resource)

www.facinghistory.org/for-educators/educator-resources/teaching-strategies/gallery-walk-teaching-strateg



Reference

A *The Bottom of the Canoe*

B *The Forepart*

C *The Frame, complete*

D *A Set of Timbers bent and lashed, in their proper shape for drying*

E *A Canoe*

F *A Paddle*

G *A Spear*

H *The man*

1 *The*

2

3 *The*

4 *The*

5 *Some*

6 *The*

7 *The*

8 *Law*

are

“Thought experiments are devices of the imagination used to investigate the nature of things”

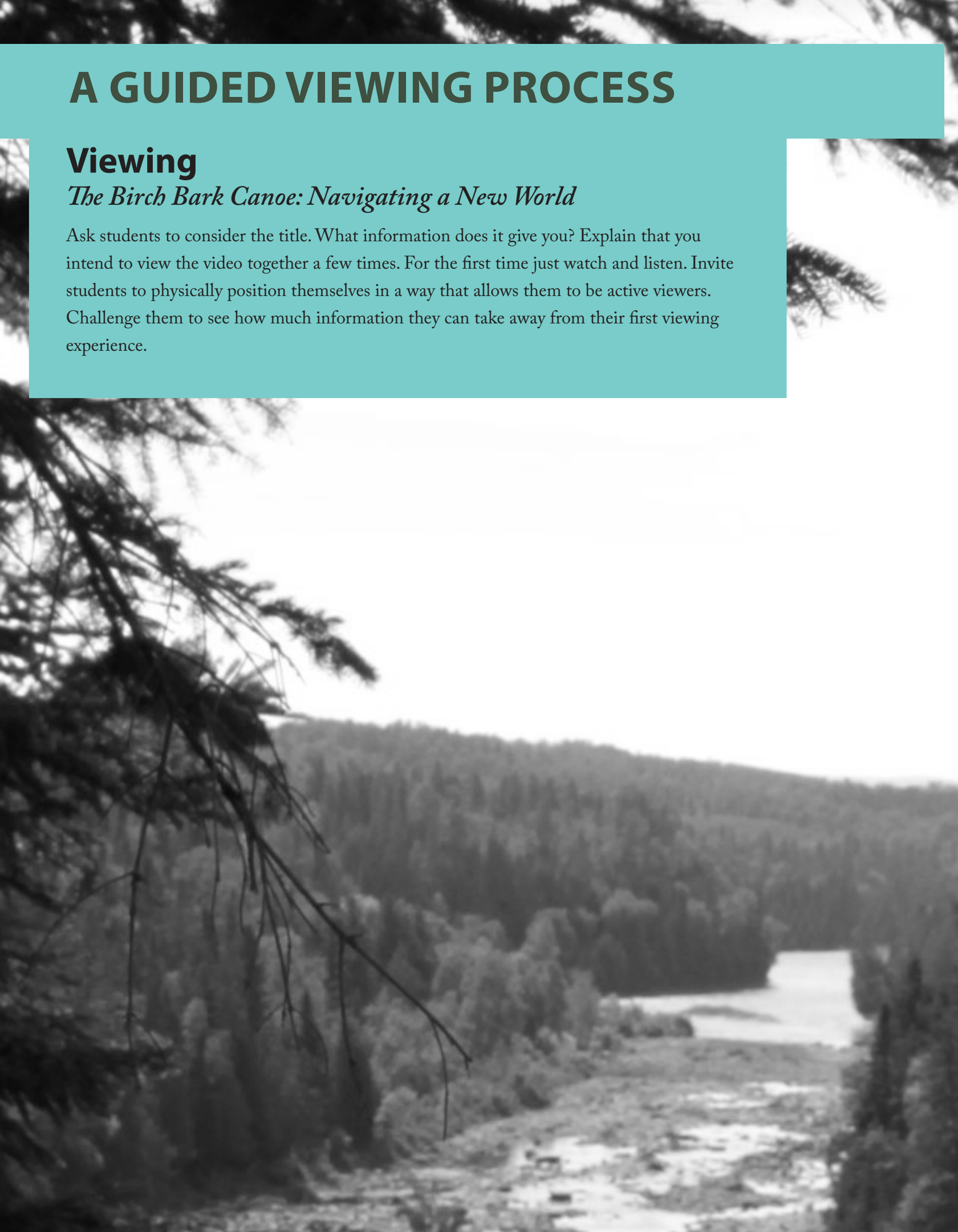
<http://plato.stanford.edu/entries/thought-experiment/>

A GUIDED VIEWING PROCESS

Viewing

The Birch Bark Canoe: Navigating a New World

Ask students to consider the title. What information does it give you? Explain that you intend to view the video together a few times. For the first time just watch and listen. Invite students to physically position themselves in a way that allows them to be active viewers. Challenge them to see how much information they can take away from their first viewing experience.





AFTER VIEWING ACTIVITY: GRAFFITI BOARD

Resources:

- Poster Paper/ Markers

Students are gathered in groups of 4.

What did we learn about the birch bark canoe?

Ask students to document the BIG IDEAS in the video. What ideas and information do they take away from their first encounter with the video? Fill the page with the information students collectively take away from the first viewing experience. Invite students to represent their ideas through words or image. Display the posters as one larger response. The smaller group response becomes part of the larger group response. Invite student observations.

- What points resonated throughout the groups?
- Draw lines to connect ideas. Build a web of collective ideas.
- What are points of interest? Curiosity?
- What would you like to know more about?

Graffiti Board Strategy:

“This strategy enables a small group to share and record what they know and wonder about a topic or experience. A small number of students seat themselves at a table or on the floor around a large piece of paper. Chart paper works well. Each student has access to markers and is expected to contribute. The students are instructed to discuss a topic and write and draw as they do so, capturing the highlights of their conversation in symbols and the sort of shorthand language that people use when writing graffiti on walls. Every group member adds to the graffiti board as they think of related ideas and information and in 15 minutes or so, groups typically have a page of brainstorming that looks similar to a wall covered in graffiti.”

Arts Together Steps toward Transformative Teacher Education
(Berghoff, Borgman & Parr 2005)

A detailed explanation of the Graffiti Board strategy can be found at

http://www.eworkshop.on.ca/edu/pdf/Mod36_coop_graffiti.pdf

SOCIAL STUDIES K-8

8-S-200 Select information from a variety of oral, visual, material, print, or electronic sources.

S-305 Observe and analyze material and visual evidence for research.

8-S-307 Compare differing accounts of historical events

8-S-309 Interpret information and ideas in a variety of media

8-S-400 Listen to others to understand their perspectives.

MATHEMATICS K-8

Collect, display, and analyze data to solve problems. Use patterns to describe the world and solve problems. (8)

MATHEMATICS K-8

“Environments that create a sense of belonging, encourage risk taking, and provide opportunities for success, help students develop and maintain positive attitudes and self-confidence. Students with positive attitudes toward learning mathematics are likely to be motivated and prepared to learn, participate willingly in classroom activities, persist in challenging situations, and engage in reflective practices.”

K-8 Mathematics Curriculum

E.L.A. 5-9

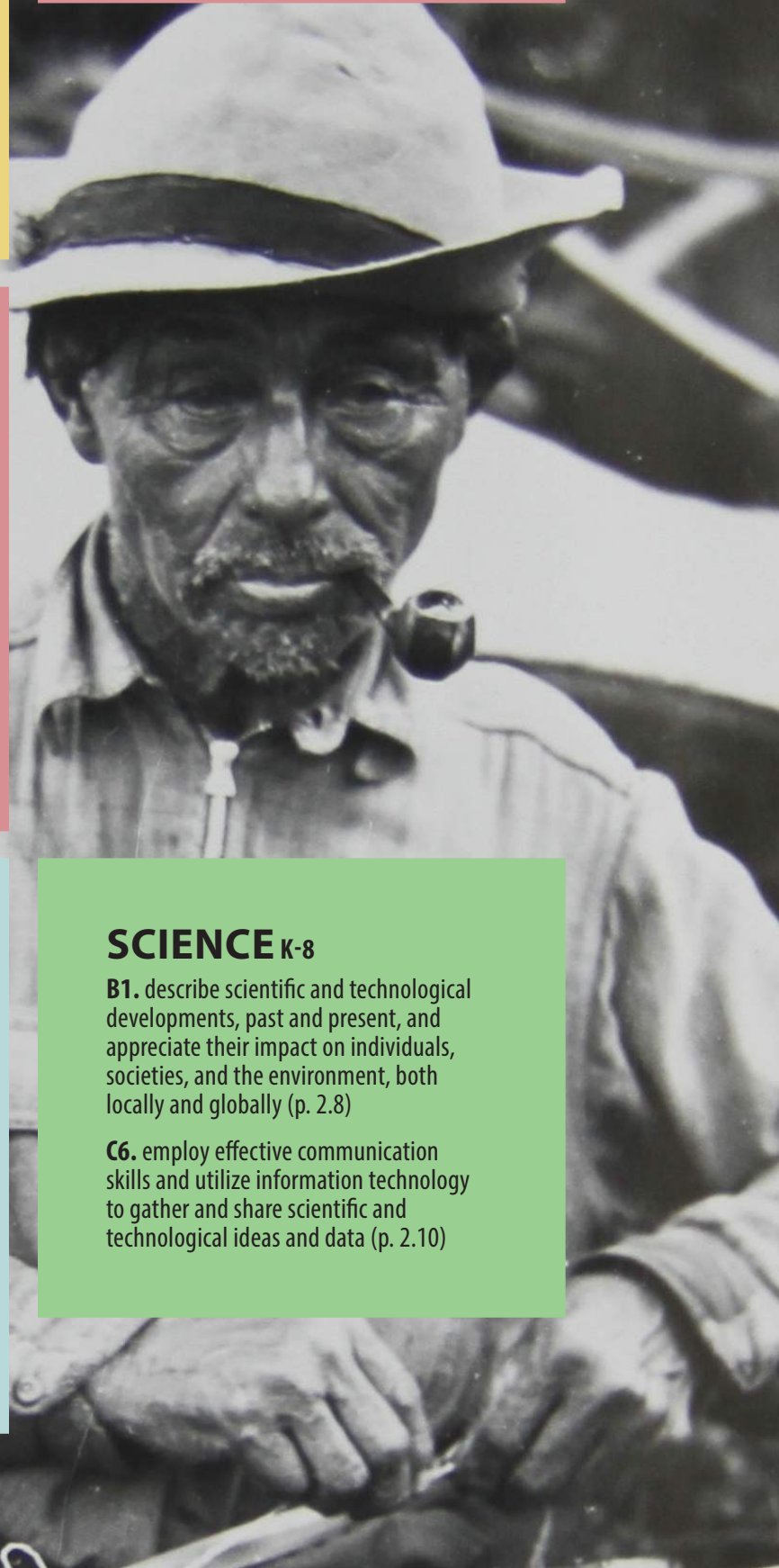
Students will **listen, speak, read, write, view, and represent**

1. to explore thoughts, ideas, feelings, and experiences
2. to comprehend and respond personally and critically to oral, literary, and media texts
3. to manage ideas and information
4. to enhance the clarity and artistry of communication
5. to celebrate and to build community

SCIENCE K-8

B1. describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both locally and globally (p. 2.8)

C6. employ effective communication skills and utilize information technology to gather and share scientific and technological ideas and data (p. 2.10)



TAKING A CLOSER LOOK: A FOCUSED VIEWING EXERCISE

A second encounter with *The Birchbark Canoe: Navigating a New World* invites students to engage in viewing with purpose. This time students undertake the task of viewing the video for particular information.

RESOURCES:

- Paper, pencils, markers, poster paper

Students are gathered in groups of 4.

The six **Social Studies General Learning Outcomes** are displayed in the room. If possible, they are a visual constant.

For this exercise, small groups work with one General Learning Outcome. Allow students the freedom to choose based on interest. Duplicates are O.K. They will serve to expand thinking and reinforce information. Add to the list the items that students identified that they would like to know more about.

GROUP TASK:

Discussion: What do we mean by each of these General Learning Outcomes? Students and teacher arrive at working definitions of the meaning of each outcome. Share thinking with the large group and invite additions and clarification.

Each group is asked to be responsible for watching the video with a specific purpose in mind. For the SECOND viewing, students are asked to gather as much information as they can relating to their selected General Learning Outcome. Example: The groups responsible for **Historical Connection** will watch the video for information relating to history. They will collectively record their data.

- Small groups organize and clarify data gathered. Refine.
- Record information on poster paper.
- Present data to the large group. Invite additions, comments, questions and discussion.

“Social studies is the study of people in relation to each other and to the world in which they live. In Manitoba, social studies comprises the disciplines of history and geography, draws upon the social sciences, and integrates relevant content from the humanities. As a study of human beings in their physical, social, and cultural environments, social studies examines the past and present and looks toward the future. Social studies helps students acquire the skills, knowledge, and values necessary to become active democratic citizens and contributing members of their communities, locally, nationally, and globally.”

Manitoba Social Studies Curriculum
(2003, p. 3)

SOCIAL STUDIES

There are Six General Learning Outcomes that frame Social Studies in the province of Manitoba. (p.18)

The general learning outcomes are the basis for the specific learning outcomes and provide a conceptual structure for social studies. Six general learning outcomes are identified for all grades:

- **Identity, Culture, and Community**
- **The Land: Places and People**
- **Historical Connections**
- **Global Interdependence**
- **Power and Authority**
- **Economics and Resources**

The skills learning outcomes for each grade are grouped in four skill categories:

- **Active Democratic Citizenship**
- **Managing Ideas and Information**
- **Critical and Creative Thinking**
- **Communication**

Social Studies Skills (2003, p. 129)

“Learning is the active process of constructing meaning.”

Manitoba Social Studies Curriculum (2003, p. 5)

SHOOTING THE RAPIDS

Navigating Curriculum Connections

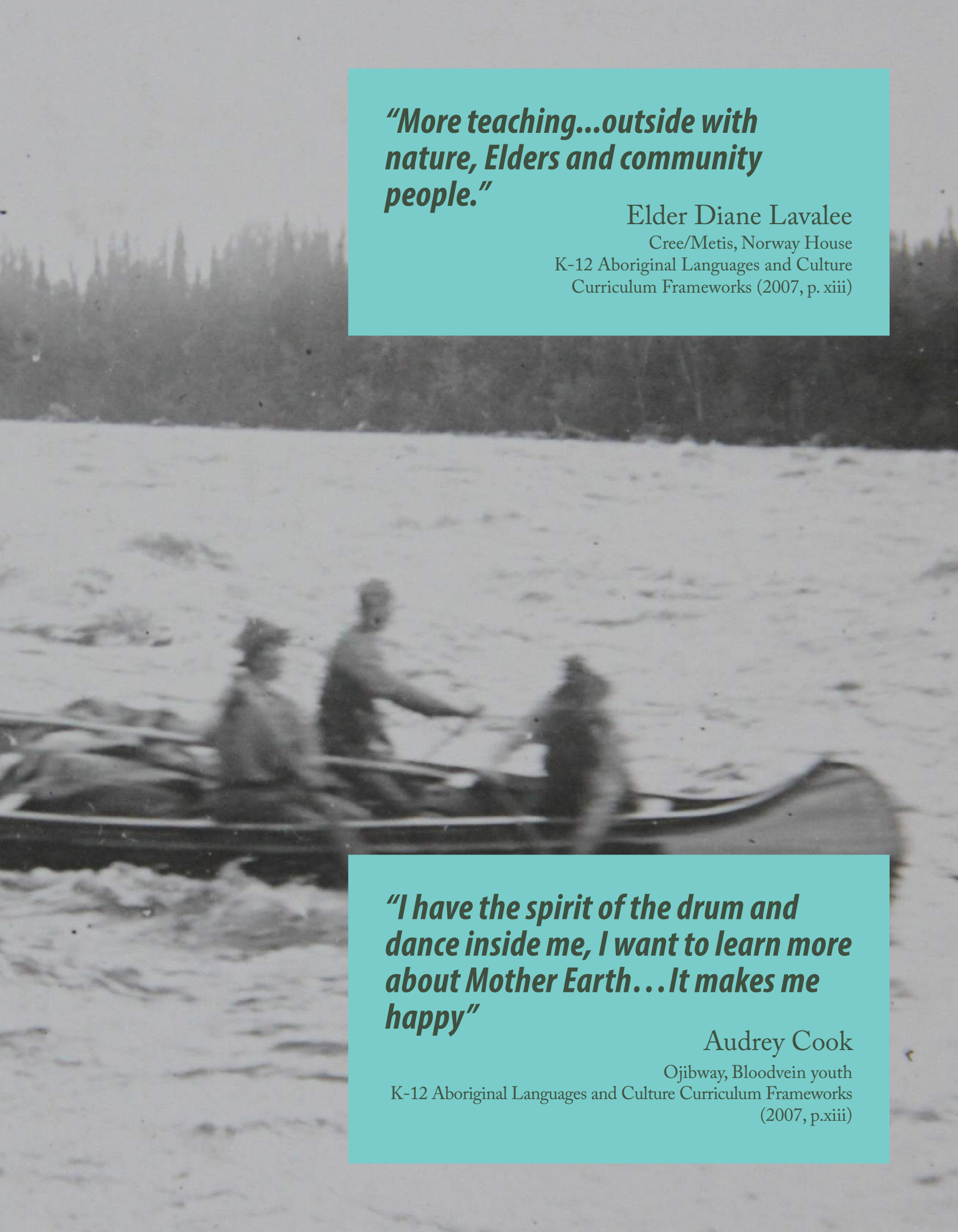
The following curriculum connections invite teachers to consider potential launching places to begin an expanded learning journey. As with any journey, preparation, technical knowledge and attitudes impacts the quality of the experience. Time and resources are factors that all teachers work with. Tailor the suggested tasks to suit your particular circumstances and to be responsive to the unique interests and needs of the learning community. No two expeditions will be the same but it is recommended that every effort be made to:

- Invite Elders and members of the community to contribute their wisdom in meaningful ways.
- Expand the walls of the classroom.
- Encourage multi-modal representation of ideas.
- Facilitate a respectful environment that supports different viewpoints.

“We need to take the time to learn things... we need to practise respect... we know that everyone doesn't see the things in the same way.”

Elder Diane Lavalee

Cree/Metis, Norway House
K-12 Aboriginal Languages and Culture
Curriculum Frameworks (2007, p. xi)



“More teaching...outside with nature, Elders and community people.”

Elder Diane Lavalee

Cree/Metis, Norway House
K-12 Aboriginal Languages and Culture
Curriculum Frameworks (2007, p. xiii)

“I have the spirit of the drum and dance inside me, I want to learn more about Mother Earth...It makes me happy”

Audrey Cook

Ojibway, Bloodvein youth
K-12 Aboriginal Languages and Culture Curriculum Frameworks
(2007, p.xiii)

NAVIGATING CURRICULUM CONNECTIONS

Curriculum connections articulated in provincial Science education documents offer a smooth entry into an expanded learning journey. They provide purpose and support for taking the important first step.

PROCEDURE

“Students learn most effectively when the study of science is rooted in concrete learning experiences, related to a particular context or situation and applied to their own world where appropriate” (p.1.3) (K-8 Science)

“People ask ‘where did you get this canoe?’ I say I found it in the bush. Some assembly required.”

Marcel Labelle
Metis Elder and Canoe Builder

PURPOSE

“Prepare students to critically address science related, societal, economic, ethical, environmental issues.”

(p. 1.2) (Gr. 5-8 Science)

PROCEDURE

“Encourage students at all grades to develop a critical/rational sense of wonder and curiosity of scientific and technological endeavours.”

(An Action Plan for Science Education in Manitoba)

http://www.edu.gov.mb.ca/k12/cur/science/action_plan/goal.html

PROCEDURE

“Create opportunities to pursue progressively higher levels of study.”

An Action Plan for Science Education in Manitoba

http://www.edu.gov.mb.ca/k12/cur/science/action_plan/goal.html

PRODUCT

“Acquire new knowledge and solve problems to improve the quality of their own lives and the lives of others.”

An Action Plan for Science Education in Manitoba

http://www.edu.gov.mb.ca/k12/cur/science/action_plan/goal.html

WHAT'S IT MADE OF ?

This exercise invites students to investigate the materials used to make a birch bark canoe.

ACTIVITY: INQUIRY

Gather in Groups of 4

Discussion: Look at the shape of the canoe from as many perspectives as possible. Can you think of other things in nature that share the same shape? Why do you think the canoe has the shape it has? What is the advantage?

Identify the materials required to build a canoe. **Research** and **test** the character and qualities of the materials used to build a birch bark canoe: Cedar, Spruce, Birch.

Describe the appearance and feel of each piece of material required to build the canoe. What are the similarities and differences? Represent your findings. What conditions are required for these trees to grow? Soil? Sun? Water? What are the effects of the seasons on the growth of the tree? How do they respond to change in temperature? Water? Experiment! Document your findings and share them with the rest of the group.

How were these natural materials harvested to ensure their sustainability?

How do these materials interact with each other to make a durable birch bark canoe? What does each material contribute to the strength, durability and adaptability of the craft?

Culminating Representation of work: A Symposium: Students will represent their research multi-modally. eg: Songs, dances, stories, poster boards, charts, graphs, videos. Host a sharing symposium for other classes and community members.

“Trying to educate children without parents, family and community is like trying to rake leaves on a windy day”

Integrating Aboriginal Perspectives:
A Theme Based Approach



UNIFYING CONCEPTS IN SCIENCE EDUCATION

- Similarity and Diversity
- Interactions
- Change/Constancy/Equilibrium
- Energy

CONNECTION TO COMMUNITY/ ELDERS

Invite Elders to share First Nations Languages. What are the words for Birch Bark? Cedar? Spruce? What are the names of the seasons? What is the word for sun? What are the stories about local waters?

Integrating Aboriginal Perspectives

ART THEME: SYSTEMS AND INTERACTIONS

“An important part of understanding and interpreting the world is the ability to think about the whole in terms of its parts and, alternately, about parts in terms of how they relate to one another and to the whole. A system is a collection of components that interact with one another so that the overall effect is often greater than that of the individual parts, even when these are considered together.”

Manitoba Education and Training. Grades 5 to 8 Science. (2000, p.2.3)

- Invite local Aboriginal artists into the class to share their work. Discuss the work in terms of the elements and principles of design as well as technique, medium and subject matter. How do these considerations relate to each other?
- Research and discuss the idea of ‘systems’ and how they are manifested in the natural, technological and art world. Share small group findings with the large group.
- Individuals select a ‘system’ of interest to represent visually with mixed media. Share thumbnail sketches and invite student analysis and comments in small groups.
- Display completed works in a community forum.

ART K-8 CURRICULUM FRAMEWORKS

A-L1 Students demonstrate understanding of the elements and principles of artistic design in a variety of contexts

A-U1 Students experience and develop awareness of artworks from various times, places and cultures

A-C1 Students generate and use ideas from a variety of sources for creating art

A-V2 Students analyze their own and others compositions



INQUIRY PROJECT

Can We Build a Cardboard Craft?

Big or small, short or tall, this exercise invites students to design, build and test a cardboard canoe craft of their own. After learning the significance of the birch bark canoe to Canada through repeated viewing and interaction with the stories in the video, students will be challenged to design and build a canoe craft within particular parameters. Time and space will determine the size and demands of the craft. You can refer to the enclosed links to see small crafts tested in tubs of water and larger crafts holding multiple passengers for a predetermined period of time. There is so much to learn through this laboratory/studio experiment!

MATERIALS

- Cardboard (amount will depend on the size of the craft)
- Tape (lots)
- Wood glue (depending on the type of cardboard used)

LINKS

The Internet is alive with ideas about building cardboard canoes. What will students learn from their research? What are the challenges and opportunities of the task?

Canoe Study: A Math Lesson. University of Minnesota

<http://intersectingart.umn.edu/?lesson/13>

Students do Math with Cardboard Canoes

<http://www.timesleader.com/news/local-news/1028465/A-sailing-they-did-go>

Prof. Berry's Tips for Building a Cardboard Boat

http://www.highairs.com/uploads/Prof_Barry_Boat_Building_Tips_1_29_13.pdf

Cardboard Boat Science

<http://www1.cyfernet.org/act-CYFAR/mom/07-07-SurfAndSail/CardboardBoatScience.pdf>

Lesson Plan Cardboard Boat Construction

<http://www.cteonline.org/portal/default/Curriculum/Viewer/Curriculum?action=2&view=viewer&cmobjid=313159>

Cardboard Boat Building Tips

<http://www.washcoll.edu/centers/ces/cardboard-boat-building-tips.php>

Hamilton High School Card Board Canoe Project: High School Students design , build and race their canoes

<http://www.mychandlerschools.org/Page/13904>

Elementary School Students build a Cardboard boat

<http://www.northumberlandnews.com/news-story/4397834-port-hope-students-making-waves-with-cardboard-boat/>

MATHEMATICS

WHAT IS THE MATHEMATICS OF THE BIRCH BARK CANOE?

MEASUREMENTS

WEIGHT, LENGTH, VOLUME, PATTERNS, RATIO, TIME, SYMMETRY, BEAUTY, ELEGANCE

What mathematical functions define the shape of the canoe in 3 dimensions. What can we figure out using paper, pencils and computers to determine equations?

Nature of Mathematics

CHANGE, CONSTANCY, NUMBER SENSE, PATTERNS, RELATIONSHIPS, SPATIAL SENSE, UNCERTAINTY

How do these concepts manifest themselves in the birch bark canoe?

SCIENCE

WHAT IS THE SCIENCE OF THE BIRCH BARK CANOE?

UNIFYING CONCEPTS:

SIMILARITY + DIVERSITY:

- Nature of Material
- Attributes and distinctions
- Relationships and impact on the environment

CHANGE, CONSTANCY, EQUILIBRIUM:

- Effects of environmental conditions on natural materials , heat, cold, wet, dry etc.

SYSTEMS AND INTERACTIONS:

- Cell systems.
- Interaction of solid and liquid.
- Movement of canoe in water.
- Relationship of shape and size to function.

ENERGY: Transference of sun's energy to the natural materials .

- Energy of food /nourishment transferred to motion.

CONCEPTS: Density, Buoyancy, Stability, Archimedes' Principle, Displacement, Water Pressure, Friction/Drag

VISION FOR SCIENTIFIC LITERACY

"Global interdependence; rapid scientific and technological innovation; the need for a sustainable environment, economy, and society; and the pervasiveness of science and technology in daily life reinforce the importance of scientific literacy. Scientifically literate individuals can more effectively interpret information, solve problems, make informed decisions, accommodate change, and create new knowledge. Science education is a key element in developing scientific literacy and in building a strong future for Canada's young people."

Manitoba Education and Training. Grades 5 to 8 Science. (2000, p.1.2)

"Skills such as questioning, observing, inferring, predicting, measuring, hypothesizing, classifying, planning experiments, collecting, analyzing, and interpreting data are fundamental to scientific inquiry; as are attitudes such as curiosity, skepticism, and creativity. The design process includes proposing, creating, and testing of prototypes"

Manitoba Education and Training. Grades 5 to 8 Science. (2000, p.2.10)

RIDING THE RIVER

To a place where Social Studies, English Language Art, and Drama meet.

Create an idea rich environment. Surround students with maps of traditional territories and trade routes. Display cultural artifacts, books, and artwork that illustrate life before and after European contact with First Nations peoples.

Learn 7 words in a local Indigenous language. Listen to them spoken aloud a number of times. Repeat them until they are committed to memory. In small groups help each other remember how to say them and understand what they mean.

What is in a word? The Oral Tradition

- Invite an Elder into the classroom to share creation stories and to talk about how they were passed down through generations.
- Discuss the importance of story and listening in an oral culture.

Task: (small group discussion) Give students questions to think about in advance of discussion.

What makes a good story?

How do we learn to listen?

Who and what do we listen to? Why? Discussion itself is conducted with a 'sharing circle' protocol where everyone has a turn to speak.

TEACHING STRATEGY: ROLE- PLAYING

“ Students adopt a role and enter into a story or character’s life, learning about the character’s feelings and motivations vicariously through that experience and then emerge with a new understanding of another person’s reality.”

Gould Lundy (2008, p. 136)

SOCIAL STUDIES Gr. 5

Students explore First Peoples' ways of life before and during their early contact with Europeans, which includes a focus on the daily life, leadership, culture, and beliefs of First

Peoples' communities. Students also consider traditional territories of First Peoples and their connections with the natural environment.

KI-004 Describe First Peoples' stories of their origins, as well as current theories of migration to the North American continent.

VH-008 Value oral tradition as an important source of knowledge about First People

KL-016 Locate on a map of North America the traditional territories of First Peoples.

KL-017 Describe practices and beliefs that reflected First Peoples' connections with the land and the natural environment.

KH-024 Relate First Peoples' stories of their pre-contact and early contact

"Skills such as questioning, observing, inferring, predicting, measuring, hypothesizing, classifying, planning experiments, collecting, analyzing, and interpreting data are fundamental to scientific inquiry; as are attitudes such as curiosity, skepticism, and creativity. The design process includes proposing, creating, and testing of prototypes"

Manitoba Education and Training. Grades 5 to 8 Science. (2000, p.2.10)

E.L.A. K-8

Students will listen, speak, read, write, view and represent to explore thoughts, feelings and experiences.

2.2.2 Connect self, text and Culture. Discuss how similar ideas, people, experiences and traditions are conveyed in various oral, literary and media texts.

2.3.5 Create original texts

5.2 Encourage, Support, and Work with others

5.2.1 Cooperate with Others. Engage in dialogue to understand the feelings and viewpoints of others and contribute to group harmony.

5.2.2 Work in Groups. Organize and complete tasks cooperatively and collaboratively; evaluate group productivity and efficiency.

5.2.3 Use Language to Show Respect. Demonstrate respect for other people's language, history, and culture.

DRAMA K-8

DR – L1 Students develop understanding of and facility with a variety of dramatic forms

DR – U1 Students experience and develop awareness of drama from various times, places, social groups, and cultures

DR – C 1 Students generate and use ideas from a variety of sources for creating drama

DR – V 1 Students analyze, reflect on and construct meaning in response to their own and others work.

ACTIVITY: STORIES AROUND THE CAMP FIRE

Groups of 4-6

Drama Forms: Mime, Tableaux, Improvisation

Drama Tools: Voice, Body, Imagination

Mime: Prepare and pack for a three day canoe trip

Tableaux: Groups create 10 tableaux to tell the story of the journey

Improvisation: Around the camp fire at night, you and your canoe mates tell stories of obstacles encountered and overcome.

Share stories.

Discuss experience and observations.

TEACHING STRATEGY: TABLEAUX

“Tableaux, or frozen images, are an excellent way of framing moments of significance that students encounter in their reading, writing, and discussions. These frozen pictures ‘bottle time’ and allow students to demonstrate through their bodies (using facial expressions, gestures, positions, and movement) their understanding about what is being taught... tableaux are still images or ‘freeze frames’ of people who represent not just a moment in time, but also a problem in time. Encourage them to create images with their bodies that tell some kind of story. They can crystallize a key moment, idea, reaction, statement or theme that the rest of the class as the audience can then study, analyze and discuss.”

Teaching Fairly in an Unfair World (Gould Lundy, 2008) (p.142)



“The canoe is a First Nation’s gift to Europeans and the world. It is part of First Nation’s technology and ingenuity”

Kevin Brownlee

Curator of Archaeology, Manitoba Museum



“Listening to the Elders...great professors...they taught us to listen...visualize what they were saying...they asked us to share...once we shared...they could evaluate what we understood”

William Dumas

K-12 Aboriginal Languages and Culture Curriculum Frameworks (2007, p. xi)



“Elders say we are all teachers...we all have gifts...even a small child can teach us something”

Diane Lavalee

K-12 Aboriginal Languages and Culture Curriculum Frameworks (2007, p. x)

As this curriculum journey draws to a close, it is important to note that the outcomes highlighted in the outlined activities represent just a few of the potential connections that could be made along the way. Manitoba curricula are rich in vision and support for active and inclusive educational environments and experiences. They provide a vision for the future that values the teacher as a responsive, creative individual and the student as an active participant in their own learning.

Future expeditions may consider the infinite design possibilities offered in the Grade 5-8 Science Framework of Outcomes. **The Birch Bark Canoe: Navigating a New World** can act as catalyst for a wide range of learning journeys. Imagine where the following connections might take you?

SCIENCE

GENERAL OUTCOMES K – 12

NATURE OF SCIENCE AND TECHNOLOGY

A1. recognize both the power and limitations of science as a way of answering questions about the world and explaining natural phenomena

A2. recognize that scientific knowledge is based on evidence, models, and explanations, and evolves as new evidence appears and new conceptualizations develop

A4. identify and appreciate contributions made by women and men from many societies and cultural backgrounds towards increasing our understanding of the world and in bringing about technological innovations

SCIENCE, TECHNOLOGY, SOCIETY, AND THE ENVIRONMENT (STSE)

B1. describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both locally and globally

B5. identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally

SCIENTIFIC AND TECHNOLOGICAL SKILLS AND ATTITUDES

C2. demonstrate appropriate scientific inquiry skills when seeking answers to questions

C3. demonstrate appropriate problem-solving skills while seeking solutions to technological challenges

C4. demonstrate appropriate critical thinking and decision-making skills when choosing a course of action based on scientific and technological information

C5. demonstrate curiosity, skepticism, creativity, openmindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind

C6. employ effective communication skills and utilize information technology to gather and share scientific and technological ideas and data

C7. work cooperatively and value the ideas and contributions of others while carrying out scientific and technological activities

C8. evaluate, from a scientific perspective, information and ideas encountered during investigations and in daily life

ESSENTIAL SCIENCE KNOWLEDGE

D3. understand the properties and structures of matter as well as various common manifestations and applications of the actions and interactions of matter

D4. understand how stability, motion, forces, and energy transfers and transformations play a role in a wide range of natural and constructed contexts

E1. describe and appreciate the similarity and diversity of forms, functions, and patterns within the natural and constructed world

E2. describe and appreciate how the natural and constructed world is made up of systems and how interactions take place within and among these systems

E3. recognize that characteristics of materials and systems can remain constant or change over time, and describe the conditions and processes involved

E4. recognize that energy, whether transmitted or transformed, is the driving force of both movement and change, and is inherent within materials and in the interactions among them

CLUSTER 0 IN THE MANITOBA SCIENCE

K – 9

Identifies the skills and attitudes involved in Scientific Inquiry and design process. This cluster of specific learning outcomes (SLO's) describes in detail the scientific "habits of mind" and practises that can be nurtured through active classroom engagement with significant topics of interest. This cluster also itemizes cross-curricular connections and recognizes the value of curriculum integration.

EXAMPLE:

S1-0-1 Propose questions that could be tested experimentally.

GLO: C2

(ELA: S1: 3.1.2)

S1-0-1b Select and justify various methods for finding the answers to specific questions.

GLO: C2

(Math: S1: A-1)

UNIFYING CONCEPTS

- *Change, Constancy and Equilibrium Energy*
- *Similarity and Diversity*
- *Systems and Interactions*



DESIGNING AN INTEGRATED INQUIRY

For details in planning an Integrated Inquiry, consult the Manitoba Education, Citizenship and Youth website <http://www.edu.gov.mb.ca/k12/docs/support/multilevel/chap6.pdf>

Integrated Learning Through Inquiry: A Guided Planning Model (p. 6.3)

“Building classrooms around inquiry engages students, integrates process and content from all disciplines, and fosters self directed learning. The basic inquiry process is similar for students of all ages.

Students...

- pose questions and explore ways to answer them
- locate and manage information from various sources
- process and synthesize their findings
- share their findings on an ongoing basis, supporting each other in their research
- reflect on and celebrate their inquiry findings with a community audience”





THE STORYTELLERS



KEVIN BROWNLEE

Kevin Brownlee obtained his Master's Degree in Anthropology from the University of Manitoba. He was hired as the Curator of Archaeology at The Manitoba Museum in 2003. His research focuses on the archaeology of Manitoba's boreal forest and the emerging field of Indigenous archaeology.

<http://www.manitobamuseum.ca/main/archaeology/2010/02/09/kevin-brownlee-%E2%80%93-curator-of-archaeology/>



MARCEL LABELLE

Marcel Labelle is proud of his Metis heritage. His mother is Iroquois and French and his father is Algonquin and French. Marcel grew up in Northern Ontario and spent most of his childhood on the trap line. This is where he learned to live with and from the forest. Today he builds traditional birch bark canoes and demonstrates his craft at many venues. He also instructs a course in the Indigenous Studies field at Trent University in Peterborough, Ontario.

<http://www.birchbarkcanoes.ca/>



DAVE BROWN

Dave is the master canoe builder and shipwright at Fort William Historical Park in Thunder Bay, Ontario. Dave learned the secrets of his craft orally from another skilled individual, which is evocative of how apprenticeships worked in 'olden' times. True to this tradition, Dave's mentor, Charlie Lebarge, received his own training in similar fashion from an Algonquin native in Mattawa, Ontario

http://www.fwhp.ca/index.php?option=com_content&task=view&id=81&Itemid=136



CARLY DELAVAU E.I.T.

Carly Delavau is a PhD. Candidate in water resources engineering in the Department of Civil Engineering at the University of Manitoba. She is a successful graduate of the Engineering Access Program. Carly loves to go with friends every year on a canoe trip.



ERICA DANIELS : NARRATOR

Anishinabe Kwe, originally from Peguis First Nation , was born and raised in Winnipeg, Manitoba. Erica is a former participant and alumni of the Broadway Neighbourhood Center's multimedia program called Just TV. Her 6 years of extensive training has led to many job opportunities in the industry, including a part time position working for the Just TV Program as a Technical Assistant and Youth Facilitator. She spent a year documenting international spiritual speaker Dave Courchene JR. This project took her to places such as The Newark Peace Summit in New York, Round-Tables and Ceremonies held in Seattle, WA, and the International Conference of Human Values and Rule of Law held in Monterrey, Mexico where she filmed World speakers such as the Dalai Lama. Erica has been honoured with the 2012 City of Winnipeg Youth Role Model Award in Arts, and most recently, Manitoba Aboriginal Youth Achievement Award in 2013. Erica is currently working with Manitoba's Country Station, NCI FM and Winnipeg's Urban Radio Station, Streetz FM. She also maintains her part time position with the Just TV program, and a more recent job with the Arts and Culture Industries as a Youth Facilitator.

<http://www.birchbarkcanoes.ca/>



RANDY HERRMANN, P.ENG.

Randy is the director of the Engineering Access Program (ENGAP) at the University of Manitoba. He graduated from the University of Manitoba with a degree in Geological Engineering and is a member of the Association of Professional Engineers and Geoscientists of Manitoba and a member of Professional Engineers Ontario. Randy is committed to raising the profile of professional engineering among aboriginal people. Under his leadership, ENGAP has an active, dedicated staff and has produced over 90 graduate engineers. This is easily the largest program of its kind in Canada. The program has about 40 to 50 students at any time and graduates three to five students each year.

<http://umanitoba.ca/faculties/engineering/programs/engap/index.html>



PETER JORDAN

Peter Jordan is a three time Gemini award winner for his work in television. His show 'It's a Living' ran for seven years on the CBC national network. He was a frequent contributor to The Olympic Games, Grey Cups, Stanley Cups and other national and international events. His company, Birch Bark Productions, focuses on stories that celebrate Canada.



JEREMY WARD (*Curator*)

Jeremy has been associated with the Canadian Canoe Museum for more than a decade as a volunteer and staff member. A graduate of Trent University's Canadian Studies and Indigenous Studies programs, Jeremy has managed to find ample opportunity to combine his passion for Canadian heritage with his love for canoeing within the mission of this museum. During his years he has developed and carried out a number of significant projects and programs, perhaps the most notable of which was the research and construction of a 36 foot birch bark canoe. Working before the public at the museum, and leading a dedicated team of volunteers, Jeremy built an authentic, working example of the canot du maitre, the workhorse vehicle of the 18th and early 19th century fur trade in Canada. He has also designed and built the Preserving Skills Gallery and the Voyageur Encampment diorama, and has curated several exhibits for the museum, including the 2008 special exhibit "The Canoe in Miniature."

<http://www.canoemuseum.ca/?q=content/meet-staff>



PAULINE BRODERICK (*Curriculum Support Designer*)

Pauline is a veteran teacher and an instructor with The Faculty of Education at the University of Manitoba. In 2012, she was awarded the Olive Beatrice Stanton award for teaching excellence and is currently working with a development team on the new Senior Years Drama curriculum.



RYLAAN GIMBY (*Graphic Designer*)

Rylaan is a commercial and multimedia artist based out of Winnipeg. His work focuses on collaborative digital and new media art. His work has been shown at the Winnipeg Art Gallery and several smaller galleries in Winnipeg.

SPECIAL THANKS TO:

Dr. Barbara McMillan, Dr. Rennie Redekopp, Dr. Ralph Mason, and Dr. Frank Deer of the Faculty of Education at the University of Manitoba for their advice, insight and ongoing conversation about teaching and learning in complex times.

The men and women who shared their images in the photographs used in the Birch Bark Project. They reach through time to tell their story.



A VIRTUAL PORTAGE : LINKS

The following links provide additional information about the organizations involved in the Birch Bark Canoe Project and general information about birch bark canoes.

THE WOODEN CANOE HERITAGE ASSOCIATION

A non-profit membership organization devoted to preserving, studying, building, restoring, and using wooden and bark canoes, and to disseminating information about canoeing heritage throughout the world.

<http://www.wcha.org/>

ENGAP: ENGINEERING ACCESS PROGRAM

<http://umanitoba.ca/faculties/engineering/programs/engap/index.html>

ENGINEERING ACCESS PROGRAM MOST SUCCESSFUL IN NORTH AMERICA

<http://www.wcha.org/bbresource.php>

[zzhttp://blogs.cc.umanitoba.ca/engineeringnews/2012/04/20/engineering-aboriginal-access-program-most-successful-in-north-america/](http://blogs.cc.umanitoba.ca/engineeringnews/2012/04/20/engineering-aboriginal-access-program-most-successful-in-north-america/)

ALL ABOUT CANOES

<http://www.canoe.ca/AllAboutCanoes/>

THE SCIENCE OF BUILDING A BIRCH BARK CANOE

Tribal College Journal; Winter 2000, Vol. 12 Issue 2, p20

<http://connection.ebscohost.com/c/articles/3871918/science-building-birchbark-canoe>

THE POWER OF THE CANOE: BIRCH BARK CANOES AND NATIVE YOUTH

<http://www.kickstarter.com/projects/voyagesofrediscovery/the-power-of-the-canoe-birch-bark-canoes-andnativ>

MAKING A BIRCH BARK CANOE

[file:///C:/Users/Pauline/Downloads/Making%20A%20Birchbark%20Canoe%20\(1\).pdf](file:///C:/Users/Pauline/Downloads/Making%20A%20Birchbark%20Canoe%20(1).pdf)

INTEGRATED LEARNING THROUGH INQUIRY: A GUIDED PLANNING MODEL

<http://www.edu.gov.mb.ca/k12/docs/support/multilevel/chap6.pdf>

THE WATER OF LIFE : SCIENCE CURRICULUM UPDATES

<http://www.edu.gov.mb.ca/k12/cur/science/updates.html>

IN THE SKIN OF A TREE. WHY BIRCH BARK?

<http://canoemuseum.wordpress.com/2014/03/06/in-the-skin-of-a-tree-why-birch-bark/>

EHOW: HOW DOES A CANOE FLOAT?

http://www.ehow.com/how-does_4579716_a-canoe-float.html

“The contributions of Aboriginal people are rarely found in history books or the scrolls of the past. The Oral Tradition embedded in Aboriginal cultures and passed down from generation to generation is where the knowledge and contributions of Aboriginal people can be found. The teaching done by Aboriginal Elders, the fiddle music of the Metis, and the Inukshuk of the Inuit people are all examples of Aboriginal knowledge waiting to be accessed and utilized.”

www.edu.gov.mb.ca/k12/abedu/perspectives/index.html

Integrating Aboriginal Perspectives: A Theme based Approach
Manitoba Education Citizenship and Youth (2003, p. 3)



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Manitoba Education and Advanced Learning. *English Language Arts* (website)

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REFERENCES FOR THE DVD

The Birch Bark Canoe: Navigating a New World

All archival still images courtesy the Archives of Manitoba and the Hudson Bay Company Archives: Province of Manitoba

Archival moving pictures from: The Seaport of the Prairies Archives of Manitoba

DVD Canot Du Maitre: Building a 36 ft. Voyageur Canoe courtesy The Canadian Canoe Museum

Feature film Ft. William: The Hinge of an Empire from www.fwhp.ca Crown copyright

MANY THANKS TO THE MANITOBA ARCHIVES, PROVINCE OF MANITOBA AND HUDSON BAY COMPANY ARCHIVES FOR ARCHIVAL PICTURES.

All archival still images in the DVD *The Birch Bark Canoe: Navigating a New World* courtesy the Archives of Manitoba and the Hudson Bay Company Archives: Province of Manitoba

Archival moving pictures from

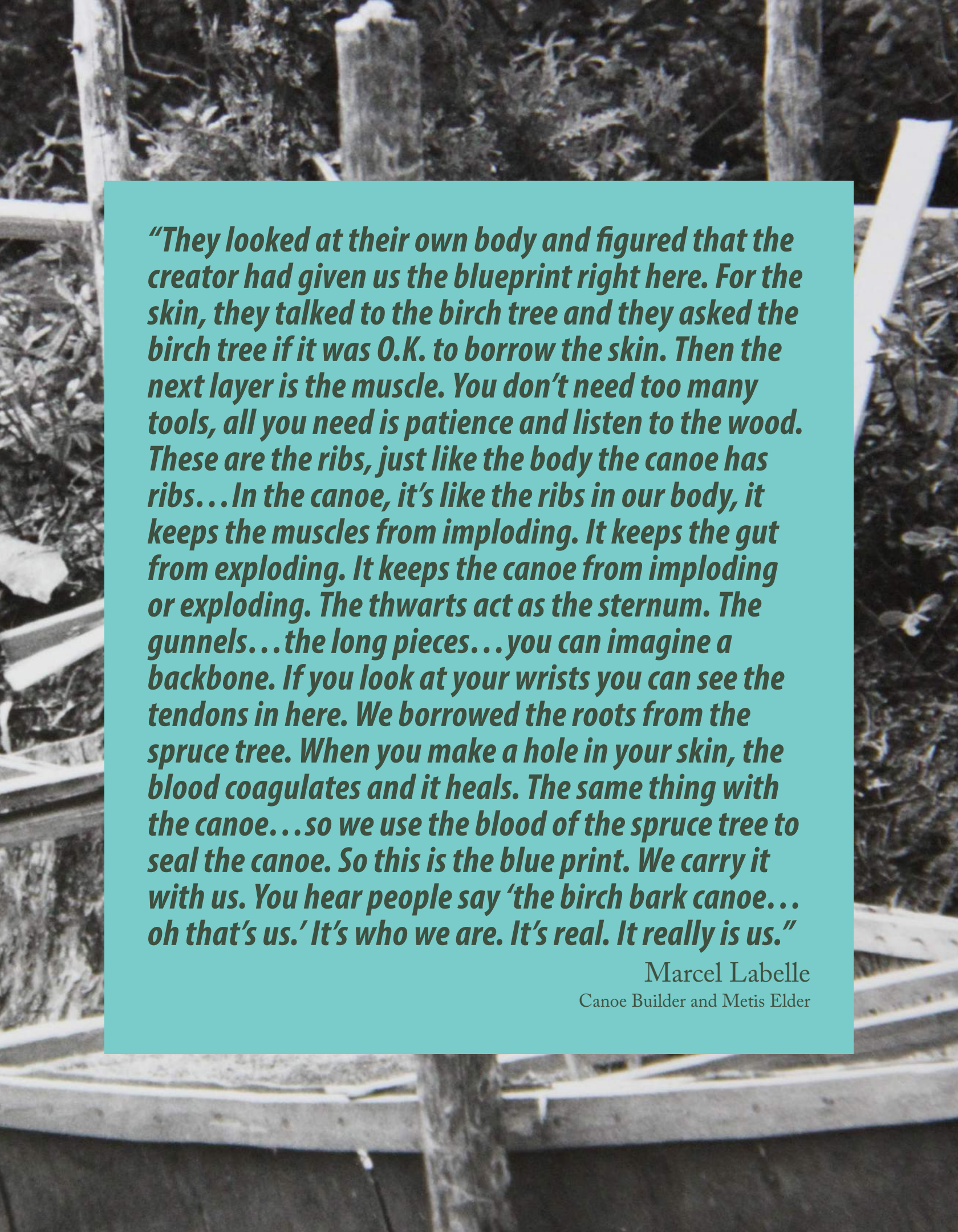
- The Seaport of the Prairies, Archives of Manitoba

Other moving images from

- DVD Canot Du Maitre: Building a 36 ft. Voyageur Canoe courtesy The Canadian Canoe Museum
- Feature film Ft. William: The Hinge of an Empire from www.fwhp.ca Crown copyright







“They looked at their own body and figured that the creator had given us the blueprint right here. For the skin, they talked to the birch tree and they asked the birch tree if it was O.K. to borrow the skin. Then the next layer is the muscle. You don’t need too many tools, all you need is patience and listen to the wood. These are the ribs, just like the body the canoe has ribs...In the canoe, it’s like the ribs in our body, it keeps the muscles from imploding. It keeps the gut from exploding. It keeps the canoe from imploding or exploding. The thwarts act as the sternum. The gunnels...the long pieces...you can imagine a backbone. If you look at your wrists you can see the tendons in here. We borrowed the roots from the spruce tree. When you make a hole in your skin, the blood coagulates and it heals. The same thing with the canoe...so we use the blood of the spruce tree to seal the canoe. So this is the blue print. We carry it with us. You hear people say ‘the birch bark canoe... oh that’s us.’ It’s who we are. It’s real. It really is us.”

Marcel Labelle

Canoe Builder and Metis Elder



For an digital copy of the dvd and curriculum guide please go to www.birchbarkcanoe.ca