

**Engaging Indigenous Urban Youth in Environmental Learning: The
Importance of Place Revisited**

by

Natalie Swayze

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in partial fulfillment of the requirements for the degree of

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Abstract

This thesis describes the evolution of an environmental learning program for Indigenous, urban youth called Bridging the Gap. A critical pedagogy of place provides a theoretical framework to engage in a practitioner-reflection, exploring the decisions made while revising the original program to make it both culturally and ecologically relevant. Using an action research methodology, the practitioner-researcher resolves to continue to seek resolution to relevant aspects of marginalization in attempt to facilitate reinhabitation for Bridging the Gap learners while emphasizing the program's place-specific social, economic, and ecological situatedness.

Chapter 1: Introduction

Introduction

It has been suggested that all education is environmental education (Orr, 1992). Whether or not this is true, not all environmental education is good education. In today's world many of us find global information available at our fingertips, yet often neglect to consider the direct relevance of this information within the places we actually reside and seek to inhabit.

Environmental learning¹ grounded on a set of universal principles or values ignores the particularities of varied socio-ecological contexts. What some propose for consideration as “best practices” must even be called into question and assessed based on their relevance to the specific socio-ecological contexts in which one works.

Mindful that environmental learning (EL) has traditionally represented the voice and vision of the white middle-class (Russell, Bell, & Fawcett, 2000), there is a need to come to terms with the potential “monoculturalism” that pervades it. As Canadian society becomes more complex, more ethnically, linguistically, and geographically diverse, and more urbanized, people of diverse ethnic, cultural, linguistic, and racial groups, along with the working class, continue to be underrepresented in EL, overlooked, or play marginal or insignificant roles (Owens, 2003). As a practitioner, I am challenged to recognize that different cultures may value different bodies of knowledge and ways of knowing, and must remain cognisant that all formal education is political and value laden (Willinsky, 1998). It is essential that when planning programs I continue to be cautiously aware of the potential for education to be used to maintain a certain status quo, and I must remain willing to challenge prevailing “norms” and demands to fit within generalized guidelines and practices.

As the field of environmental learning evolves and societies become increasingly diverse and complex, I am mindful that all rational thought in today's post-colonial contexts, requires questioning of context, values, and relativity (Willinsky, 1998). Adequately accommodating a

multiplicity of views, requires consideration that “curricula are created by people within temporal, political, cultural, economic, and cultural contexts,” (Ornstein, & Hunkins, 2004, p. 62), using models and techniques, “filtered through a political or social lens, especially race, class, and gender” (p. 91). These complex issues must be considered when aiming to teach and plan in inclusive ways. As part of the process of developing effective pedagogies to better align learning experiences with the diverse realities of students’ lives and the places they inhabit, it is necessary to evaluate existing models of teaching and learning, and re-conceptualise alternative pedagogies and their underlying epistemologies.

As an environmental educator, I am determined to think carefully about how I develop my programs, as I become critically aware of the various influences that impact my planning. Non-formal environmental learning programs that target school age children frequently seek to meet curriculum standards from formal education, thereby becoming accountable to the larger educational system. When striving to meet these curriculum outcomes and “fit” within other national and/or international mandates, I must question how relevant these standards are within a local context and to my specific place², what is worth knowing in environmental learning and who should be involved in deciding this, whose views are most important, are we prepared to be critical of national and/or international mandates and perhaps even challenge them, and finally would it be more beneficial to develop teaching and learning strategies that are contextualized at a local level, relevant within a specific place and its unique social, environmental, and economic contexts?

¹Although various opinions exist regarding nomenclature, my view and use here of the term environmental learning is inclusive of “environmental education,” “education for sustainable development,” “education for sustainability,” and other relevant terms.

My research explores these issues while analyzing my success in modifying a non-formal environmental program for urban, Indigenous youth called Bridging the Gap (BTG). Using an action research methodology, opportunities to resolve relevant aspects of marginalization will be tested through a modified program, in an attempt to facilitate reinhabitation for Bridging the Gap learners while emphasizing the program's place-specific social, economic, and ecological situatedness. A critical pedagogy of place provided the theoretical framework to inform the process of revising the BTG program, and I engaged in a practitioner-reflection of the success made in revising the original program to make it more culturally and ecologically relevant.

The BTG Program

One of the highlights of being an environmental educator is the sight of a student's first encounter with nature, an entire forest or a tiny insect. Children who grow up in inner-city neighbourhoods are often disconnected from nature. In Winnipeg, Manitoba, a program called Bridging the Gap (BTG) brings together environmental learning and Aboriginal concepts of stewardship, and provides Grade Four students from inner-city schools the opportunity to visit local natural areas.

BTG initially began in 2004, as an innovative, non-formal environmental learning program based in Winnipeg. Winnipeg is the capital and largest city in the Canadian province of Manitoba. The city lies at the confluence of the Assiniboine

²The use of the term place is used here with a view that place embodies multiple dimensions, including, spatial, geographical/political, and temporal.

and Red Rivers, a historic focal point of routes historically travelled by Aboriginal peoples. The rivers provided transportation for trade and knowledge sharing, and linked many Aboriginal peoples. The general area surrounding Winnipeg was populated for thousands of years by Aboriginal peoples who would use the area for camps, hunting, fishing, and trading. Winnipeg is located within the prairies of Western Canada, in a native tall-grass prairie ecosystem. At one

time, tall grass prairie covered one million square kilometres in central North America. In Manitoba alone, the tall grass prairie covered one and a half million acres. Today, tall grass prairie is all but gone. In Manitoba only 1/20th of 1% of the original tall grass prairie remains (Manitoba Conservation, 2010).

I developed BTG while employed with the City of Winnipeg's Naturalist Services Branch. Naturalist Services Branch has been actively involved in developing and delivering curriculum-aligned, environmental learning programs for youth in urban contexts, playing a key role in promoting awareness of the cultural and ecological benefits of Winnipeg's natural areas and encouraging stewardship of natural habitats within this urban setting. Native habitats within the city, including wetlands, aspen parkland forest, and endangered tall grass prairie, are being permanently protected from development through policy measures. Resident indigenous plant and animal communities are now preserved as an integral component of the city's ecological and cultural heritage.

However, like many large cities, the majority of Winnipeg's high quality natural areas are located in suburban environments. Few natural areas are found in the downtown area. As a result, for students living in inner-city neighbourhoods there are fewer opportunities to visit and explore high quality, urban natural areas. Coupled with this, an over-representation of low-wages, poverty, and family instability commonly persist in inner-city neighborhoods. The Bridging the Gap (BTG) Program was designed in an attempt to address these issues. The program set out to confront an observed "gap" – the perceived disparity of fewer opportunities for inner-city youth to visit and learn about forests, wetlands and tall grass prairie and to engage in related stewardship activities. To date, several participants in Bridging the Gap have told me that it was their first time visiting a forest, wetland or prairie habitat. Others have been unable to identify common plant and animal species. This lack of experience and awareness highlights a gap in supporting inner-city youth to learn about stewardship. Stewardship implies accepting

responsibility for the future of the planet. If inner-city youth have no meaningful relationship with the earth, what motivation is there to accept this responsibility. It is the wonder, awe and respect that come with affection for a place that underlie stewardship. When we connect with the place we live, we can conceive of ourselves as part of and not separate from the earth. This affects both our conscious and unconscious actions, and inevitably shapes our interactions with the environment (Orr, 2022).

The BTG program was created to provide free programs for Grade Four students from Winnipeg's inner-city. As part of a full-day field trip, children visit and hike through high quality, urban natural areas, spending time in guided explorations, facilitated discussions, hands-on activities, and collecting data. The children learn about environmental stewardship, human interrelationships, and our reliance on animals, plants and Earth's resources for survival. During the hike, children are introduced to the resident animals and plants and to the unique features of the habitat. The hike is taken slowly to give children time to stop, listen and notice small details. Discovering signs of wildlife prompts them to think of the animals that make the habitat their home. The hike concludes with a review and recording of information about the components of the habitat.

The concept of stewardship is important in BTG and is central in Indigenous teachings, which generally take a holistic view of the world. Indigenous elders are a wonderful resource in environmental education, as they have knowledge to help develop unique lessons for teaching the principles of stewardship. Often, Indigenous worldviews emphasize respect for and personal connection with the environment. It can be argued that this is opposite to the Western scientific view of the environment that reduces it to an abstraction. Indigenous elders and advisors from many different First Nations, including the Cree and Anishinaabe, participate in BTG. Each brings their own unique beliefs and knowledge to the program, maintaining an important link between past and present generations.

When BTG began, it had an ecology-based focus and was designed to address learning outcomes from Manitoba's science curriculum. The content focused on student learning outcomes outlined in the Grade Four life sciences, cluster titled "Habitats and Communities" and a discussion of the habitat concept (meeting needs for food, water, shelter, space, air). The program also aimed to support the development of environmentally responsible behaviour and sustainable living practices, with connections made to other relevant curricular areas including social studies and Aboriginal languages and cultures. Since 2005, the program focus has been modified to reflect the following key considerations. First, the fastest growing segment of Manitoba's population is Aboriginal. It's home to the largest urban Aboriginal population in the country (Hanselmann, 2001; Mays, 2005), and the highest percentage of Winnipeg's population of Aboriginal youth attends school in the inner-city (Statistics Canada, 2003). Although the numbers fluctuate each year, large percentages of learners who participate in BTG are usually of Aboriginal descent (Métis, First Nations, or Inuit). Second, there is a close fit between the program's goals and traditional Indigenous cultural values, which are identified as concepts at the heart of sustainability and by being present, may help to rekindle traditional cultural values of sustainable living for the urban, largely Indigenous population, affected by historical issues related to colonialism (disruption of culture and loss of connection of land) (Aikenhead, 2000; Cajete, 1999). To date, some attempts have been made to improve BTG based on these considerations by exploring means to effectively and respectfully integrate Indigenous knowledges and pedagogies with science-based learning outcomes. However, based on observations and teacher feedback, additional program modifications are needed. Rather than "token", symbolically and often meaningless, attempts, to include Indigenous knowledges in BTG, a more holistic means is required; one that not only effectively and respectfully integrates Indigenous knowledges and pedagogies in the program, but also supports meaningful student learning.

The primary purpose of my research project was to study the effectiveness of my teaching and the changes I implemented in the BTG program. In this study, I implemented a revised BTG program that embraces the unique social, environmental and economic contexts, emphasizes place and employs place-related pedagogies. I explored whether an emphasis on place and employment of place-related pedagogies improved student ability to connect Indigenous teachings with the program's original science-based content. With this research project, the overall goal was to develop a more effective, intercultural approach for BTG by implementing and evaluating the success of the revised program. The focus was on determining the effectiveness by measuring the broader learning resulting from the strategies I employed as I sought to improve my understanding of how to include Indigenous knowledges and Indigenous pedagogies and support future program planning.

BTG continues to be beneficial to the Naturalist Services Branch and the City of Winnipeg as an organization promoting awareness of the educational benefits of using city owned natural areas as outdoor learning spaces. The BTG program addresses and fits with both the mission of the Parks and Open Space Division to enhance the quality of life in Winnipeg through stewardship of our green spaces, urban forest and natural areas, and the commitment of the Naturalist Services Branch to providing quality environmental learning. Moreover, the Branch Manager and City Naturalist, Rodney Penner, is highly supportive of the program. The information gained from this study provided valuable information for developing more effective environmental learning programs and creating a framework for establishing future directions in community-based programming for the City of Winnipeg.

Rationale of the Study

In exploring ways to respectfully include Indigenous perspectives within the BTG program, the ongoing challenge has been to ensure that an attempt will meaningfully support learning while reflecting the local cultural traditions, languages, beliefs, and perspectives.

Effectively integrating Indigenous knowledge into the BTG Program has not been a simple task. An additional challenge is that the program is not school-based and, thus, prior knowledge of students and their past learning experiences is limited.

After the first year of the program, it was noted that a large percentage of the participating students were Aboriginal. Across Canada, there is a growing recognition of the need to provide learning opportunities in culturally appropriate contexts. A close fit was also acknowledged between the program focus and traditional Indigenous cultural values, particularly the belief that humans share Earth with other animals and have a responsibility to care for this shared habitat given our mutual dependence on Earth's natural resources to meet all habitat needs. In light of these observations, the inclusion of Indigenous perspectives within BTG was considered highly appropriate, and a new focus for improving the program evolved. My previous attempts to include Indigenous perspectives in the program involved inviting an Elder to share traditional teachings over the lunch hour of the school field trip. In year two of the program, a local Elder was invited to participate and share traditional cultural teachings related to Earth stewardship. This was seen to be an effective and respectful way to bring relevant traditional cultural values into the program, given that this knowledge was not something I could provide myself. I recognized that the teaching must come directly from an Elder or another knowledgeable Aboriginal person. In revising the program design to include an opportunity for the Elder to teach, it was decided that the existing program structure, objectives and learning activities would not change, but the itinerary for the day would be modified to include a half-hour "Elders Teaching" component before lunch. The Elder was provided with specific background on the program goals and structure and was also made familiar with the Living Prairie Museum where the teaching took place. The teaching topic was "Friends with Relations" in which the Elder described to the students the principle of humans as being of "one-blood" with the animals. Like animals, people were described as relying on plants and Mother Earth for

survival, resulting in a need to be mindful of our responsibility to respect Earth/Mother and our fellow relations/animals.

Unfortunately, based on my observations, informal discussions with the learners, and feedback from the participating Grade Four teachers, this change in the BTG program did not effectively contribute to meaningful student learning. Learners were unable to connect the Elder's teaching with the existing program's content, which had been derived primarily from the provincial science curriculum. Reflecting on the program structure itself, I felt dismayed for having involved the Elder in what seemed to have been an artificial or "token" way. The teachings were perceived as being disconnected from the science content, having been presented in a different format and included as a separate "piece" of the overall BTG program. The ideas in the Elder's teaching and those from the science curriculum were, from my perspective, connected, related in theory and quite a logical fit, but my attempts to include both and help students make the connection were not effective.

This research study developed as an attempt to address this weakness in the program. Throughout this research, I have focused on exploring "place" as a principle underpinning Indigenous pedagogies and environmental education, and the potential use of place-related pedagogies to develop and implement a revised approach to the original BTG program. Although the idea of place as a significant educational tool was proposed by John Dewey more than a century ago, the importance of place has been overlooked in education (Orr, 1992). Place-related pedagogies within environmental learning (Powers, 2004) and within Indigenous science education (Aikenhead, 2006) have been advocated for, but research is needed in understanding linkages between Indigenous science, place and urban Aboriginal students (Herman, Vizina, Augustus and Sawyer, 2008). This study has therefore contributed to my own understanding while improving the BTG program, and has the potential to provide valuable insight for others.

Embedded in this study is my story, my connections to BTG and motivations for the decisions I have made in the past and continue to make. My relationship with nature, other people and my cultural identity are related to who I am today, personally and professionally. My current research and professional interests are so closely intertwined with my personal identity and it has influenced many of the choices that I've made in life. This study was about my journey as an educator, researcher and person, as I sought to improve my practice. I wanted to see if I could use a more constructive approach to including Indigenous knowledges and pedagogies in the BTG Program by drawing on both my practitioner knowledge and a relevant theoretical framework.

Research Questions and Intentions

In this study, the modified program was the intervention to address the stated problem; moving from “token” or artificial attempts to include traditional Indigenous perspectives in the BTG Program to a more holistic approach to making the BTG program culturally relevant to the Aboriginal participants. The overall goal of improving the effectiveness of BTG was an opportunity to critically evaluate and improve my practice. Throughout this research, I have concentrated on exploring place as a concept underpinning Indigenous pedagogies and environmental education. I sought to embrace BTG's unique social, environmental and economic contexts, and develop and implement a revised teaching and learning strategy that is contextualized at the local level. The focus was on determining the effectiveness of my teaching by measuring the broader learning resulting from the strategies I employed as I sought to improve my understanding of how to include Indigenous knowledges and Indigenous pedagogies and support future program planning.

As a practitioner reflection, this study was also about me and my journey as an educator, researcher and person, while seeking to improve my practice. I wanted to see if I could use a more constructive approach to include Indigenous knowledges and pedagogies by drawing on

both my own practitioner knowledge and a relevant theoretical framework. Weaving together all of the different ways I think and learn, to find a constructive way to look at the problem objectively and make important changes to the BTG Program, I also hoped to demonstrate the potential to use theory in practice, and present a model for incorporating Indigenous knowledges that could be adapted by other educators in their own work.

Chapters four and five provide an in-depth description of how I chose to collect and analyze data from learners to assist me in evaluating the changes I made to the BTG Program. These chapters outline how I chose to go about looking at my own practice constructively, using both my prior knowledge and experience in BTG, and data from the students who participated in this study. My interpretation of student data is not an evaluation of the learners, but a means to evaluate my practice and the changes I made to BTG as part of this study.

In addition to qualitative analysis, I have used quantitative approaches because this technique was familiar to me in light of my science background, and provided me with a constructive and comprehensive way to look at and present student data. This was a personal choice reflective of who I am, and the various influences on how I learn and have learned to learn, both scientifically, reflectively, and from a cultural perspective. While learning to be critical of how research can be undertaken and of the more creative ways data can be presented and analyzed, I wanted to explore how to use scientific frameworks, my own practitioner knowledge, and a cultural perspective harmoniously. By using a format common in academia, alongside my personal narrative and voice, my hope was that this approach would allow the results to reach and be meaningful to multiple individuals. Developing a structured approach for evaluating student learning had not been done previously in the BTG program. Therefore, creating a framework to do so as part of this study provides a foundation for me to modify in subsequent years, and a means to collect data and report it to participating teachers and program funders.

To this end, my thesis addressed the following research questions:

1. Can an emphasis on place and employment of place-related educational theories assist me in my pedagogical planning and provide a suitable means to effectively and respectfully integrate Indigenous knowledges and pedagogies with science-based learning outcomes in the Bridging the Gap program for urban Indigenous youth?
2. Will the changes made to the original the Bridging the Gap program, implemented as part of this study help BTG learners move towards the “inhabiting” end of the inhabiting-residing continuum?

Question One was focused on my reflection on my teaching and my broader learning. For Question Two, I did not utilize a pre-test / post-test means of collecting student data, and drew instead on my prior experiences with the BTG Program to help answer this question. When seeking to answer this question, my interpretation of student data was not an evaluation of the learners, but a means to evaluate my practice and the changes I made to BTG as part of this study.

Theoretical Framework - A Critical Pedagogy of Place in an Urban Indigenous Context

David Gruenewald’s critical pedagogy of place (2003) (herein referred to as CPP) provided the theoretical framework for this study. A CPP was selected as a framework with particular relevance to the BTG Program, providing the potential influences that resulted in the changes to the original program.

As the ideas and approaches in environmental learning have continued to change and evolve, researchers and educators are beginning to reconceptualize environmental learning, viewing it as broader and more inclusive of the complex influences on learners within the unique communities in which they live (Nichols, Tippins, Morano, Bilbao, & Barcenal, 2006).

Gruenewald’s CPP calls for an ecological, place-based critical pedagogy. He argues that “critical pedagogy” (concerned with power structures and decision making in education) and “place-based education” (which seeks to connect learners with local social, cultural, and ecological

communities) can be synthesized into a CPP. Drawing upon aspects of both educational traditions, Gruenewald's CPP challenges educators to consider the nexus of culture, environment, and education, unique to specific places.

Gruenewald (2003) states that a CPP seeks to, identify, recover and create material spaces and places that teach us how to live well in our total environments (reinhabitation); and (b) identify and change ways of thinking that injure and exploit other people and places (decolonization)...a CPP seeks to create learning experiences that *decolonize* or identify and change ways of thinking that injure and exploit other people and places, and *rehabituate* or identify, recover, and created material spaces and place that teach us how to live well in our local environments. (p. 9)

Gruenewald (2003) explains this further in the distinction he draws between inhabiting and residing in a place. The inhabitant has detailed knowledge of, and an intimate connection to a place, and has developed a deep sense of care as someone who "dwells" in that place. In contrast, the resident, largely as a result of displacement and/or urbanization, has little connection to a place beyond its ability to gratify. The resident is more of a temporary occupant. As two opposing ways of relating to a place, this suggested a possible continuum between being a resident and an inhabitant and the ability for an individual to occupy a unique position within this continuum at a specific point in time.

With these two intertwined objectives of reinhabitation and decolonization combined into one overarching goal, Gruenewald's CPP fits the reality of the BTG program well and was, therefore, used in the process of developing a revised approach to the BTG Program, implemented as part of this study and to inform its evaluation.

Indigenous educational contexts can be in First Nations reserve communities or, as in this case, an urban inner city. Each context may vary and require distinct methods of facilitating "cultural-border crossings" (Aikenhead, 2002). From my perspective, a CPP also provided an

ideal structure to revise and improve my understanding of the BTG program and my pedagogical decision making process, while expanding my views on the application of placed-based education and the role of critical, place-based approaches within broader educational reform movements.

As a researcher-practitioner in BTG, I was also intrigued by the notion of “inhabiting” vs. “residing” in a place, and the potential existence of a continuum between these two. This inhabiting-residing continuum reflects my belief and those shared by other Aboriginal and non-Aboriginal educators (Aikenhead, 2000; Cajete, 1999), that learning is a continuous lifelong journey. We embark upon this journey along with the learners with whom we work, ideally moving towards reinhabitation. As the primary program developer in BTG, I continually looked to determine if the changes made to the original program, when implemented as part of this study, contributed to movements towards this “inhabitant” end of the continuum while achieving progress towards the broader goals of the program.

Chapter 2: Literature Review

As this thesis focused on improving my ability to effectively and respectfully integrate Indigenous knowledges and Indigenous pedagogies with science-based learning outcomes in a non-formal environmental learning program for urban, Indigenous youth, this chapter begins with an overview of environmental learning (EL), the demand for culturally relevant EL and the importance of place within EL. I then outline and describe a historical rationale and approaches for integrating Indigenous perspectives in science-based EL. Next, I review Indigenous knowledges and pedagogies and the importance of place therein. Finally, as the primary purpose of the project is to study the effectiveness of my teaching as I implement a revised approach to BTG that emphasizes place and employs place-related educational theories, I review the concept of place and components of place-related theories and practices.

Overview of environmental learning (EL)

The importance of and need for environmental learning (EL).

Humans and nature are on a collision course. Although humans evolved and have lived in intimate contact with nature for almost their entire history, our activities have and continue to inflict harsh and often irreversible damage on the environment and Earth's natural resources. As human populations continue to grow at an increasing rate, fresh water supplies are dwindling, greenhouse gases are accumulating, forests are shrinking, species are dying, agricultural land is eroding and in many places the air is no longer safe to breathe (Manitoba Education and Training, 2000; Hautecour, 2002; Kellert 2005). The root of the ecological crisis lies in an ethic of nature consumption and a human society that is estranged from its natural origins and has failed to recognize the basic dependence of people on nature as a condition of sustained growth and development. Fundamental changes are needed to build societies that are environmentally sustainable (Hautecour, 2002; Haigh 2006).

Education is the basis for action. To promote sustainable development and improve the human capacity to address environmental issues, effective education is critical (Haigh, 2006; Stapp, 1996; Kellert, 2005). Environmental learning (EL) is described as taking place in the environment, being about the environment, and being for the environment. EL is rooted in the belief that humans can live compatibly with nature and act equitably toward each other. Both aim for a democratic society in which effective, environmentally literate citizens participate with creativity and responsibility (Robottom, 1995).

In December 2002, the United Nations General Assembly (UNGA) adopted resolution 57/254 to put in place a United Nations Decade of Education for Sustainable Development (UNDESD) spanning from 2005 to 2014. The primary goal of the UNDESD is to encourage "...Governments to consider the inclusion ... of measures to implement the Decade in their respective education systems". In 2000, Manitoba Education and Training released the document "Education for a Sustainable Future" (Manitoba Education and Training, 2000) with explicit emphasis on integrating sustainability into the teaching of all Manitoba curricula. There is clear international and provincial support for the development of effective EE learning resources and initiatives in formal and non-formal education.

Until quite recently, children grew up in intimate contact with the natural world and had the freedom to play, explore and interact with nature with little or no restriction or supervision (Wells & Evans, 2003; Faber-Taylor, Kuo, & Sullivan, 2001a&b; Chawla, 2006). Today, the lives of children are much different. With rising levels urbanization, many children have few opportunities for free play and regular contact with the natural world. The culture of childhood that played outside is disappearing, and the lives of many children's have shifted to the indoors (Hart, 1999). Research studies have shown that children, even at early ages, are spending a decreasing amount of time outdoors (Kellert, 2005; Louv, 2005). Today, with children's lives disconnected from the natural world, their experiences are predominately mediated in media,

written language and visual images. The virtual replaces the real, and children lose the understanding that nature exists in their own backyards and neighborhoods, which further disconnects them from knowledge and appreciation of the natural world (Chawla 2006). As a result, children's opportunity for direct and spontaneous contact with nature is vanishing, and childhood and regular play in the natural world are no longer synonymous. According to Chawla (2006) and Kellert (2005) this breeds apathy towards environmental concerns.

Not only does the loss of children's contact with the natural world set the stage for continuing loss of the natural environment, it also negatively impacts the growth and development of the whole child and their acquisition of knowledge. In addition to clearly substantiating the affinity to nature and a positive environmental ethic that children's regular contact with and play in the natural world create, research is providing convincing evidence of the significant benefits of experiences in nature to children (Chawla 2004; Sobel 1995, Hart 1997; Kellert 2005). Nature is important to children's development in every major way - intellectually, emotionally, socially, spiritually, and physically (Kellert 2005). Experiences with the natural world have been linked with the development of imagination and the sense of wonder, two important motivators for lifelong learning (Louv, 2005). Moreover, it has been found that nature interaction between children reduces or eliminates bullying and supports the development of independence, a sense of peace, self-control, and self-discipline (Faber-Taylor, Kuo, & Sullivan, 2001 a&b; Kellert, 2005; Lieberman, & Hoody, 2000; Wells, 2000).

Need for cultural relevancy in environmental learning (EL).

Environmental learning has traditionally focused on natural resources, wildlife and how people manage their behavior to sustain healthy ecosystems. However, environment and culture are also closely interconnected (Brawdy, 2004). The cultural history of a society is the shared ideas, identities, and collective expressions of a cultural group. Culture is intricately related to our identity as a people or peoples and to the way we define ourselves (Brawdy, 2004). Balanced

EE programs should take a broad view of differing perspectives, viewpoints and theories (NAAEE, 1996; Stables & Bishop, 2001; Wais & Evert, 1992). According to Lijmbach and colleagues (2002) this implies a shift from teaching the ‘right’ attitudes to allowing for openness to inquire and opportunities to reflect on the diversity of knowledge and skills required for the protection of nature and the environment.

Canada is a nation composed of diverse racial and ethnic groups. In this multicultural context, there is a recognized need to provide culturally appropriate environmental learning (Fontes, 2004; Lijmbach, Margadant-van Arcken, Koppen, and Wals, 2002; NAAEE, 1996; Stables & Bishop, 2001; Wais & Evert, 1992). Learners form ways of looking at the world based on personal experiences and knowledge acquired and constructed within unique cultural and linguistic environments, and within contexts that are culturally, linguistically, and cognitively meaningful and relevant to them (Barton, 1998a, 1998b; Eisenhart, 1996; Lee & Fradd, 1998; Rodríguez, 1997, 1998a). Environmental learning and environmental programs need to recognize that there are multiple perspectives on environmental issues that may be in conflict. As such, it is important that such programs provide opportunities for the discussion of differing views and assist learners in considering other viewpoints while developing their own opinions. As part of the process of developing effective pedagogies to better align learning experiences with the diverse realities of students’ lives and the places they inhabit, it is necessary to re-evaluate existing models of teaching and learning and conceptualise alternative pedagogies and their underlying epistemologies. Opportunities to explore different cultures’ use of and relationship to the natural world are one way of encouraging learners to open their minds to different ideas and perspectives (Lijmbach, et al., 2002). According to the North American Association for Environmental Education (1996), programs and initiatives should express the views and interests of people of various socio-economic status, include the views of Indigenous peoples, and be sensitive to the needs of persons with disabilities.

In the everyday world, there are many aspects that influence our personal identities. Learners should feel at ease in exploring various cultures, learning to move back and forth between cultures, and in the process becoming better citizens in a society enriched by cultural differences (Aikenhead, 2000; Western Canadian Protocol for Collaboration in Basic Education, 2000). Fontes (2004) maintains that comprehensive environmental learning should seek to integrate the learning of science concepts as well as cultural values that impel and sustain action. Social environments are also unique, and our ecosystems are valued for a variety of aesthetic, economic, cultural, recreational, and spiritual reasons. EL programs should, therefore, strive to be fair, accurate, balanced and inclusive of different cultural ideas, thus, taking a broad view and presenting differing perspectives, viewpoints and theories (NAAEE, 1996; Stables & Bishop, 2001; Wais & Evert, 1992). This implies a shift from teaching the ‘right’ attitudes required for the protection of nature and the environment (Lijmbach, et al., 2002).

Importance of place in environmental learning (EL).

Coupled with a growing sense of an “impending environmental crisis” comes a recognition of the human role in contributing to it. Indeed, this sense of crisis has historically been a powerful impetus for nature study, conservation education and environmental learning. Transforming behaviours and relationships with the environment, and ultimately developing individual and community capacity to actively engage in environmental stewardship, is generally regarded as environmental learning’s ultimate goal (Hungerford & Volk, 1990; Tilbury, 1995). However, there are various mechanisms, strategies and techniques employed in environmental learning to achieve this goal. As the ideas and approaches in environmental learning have continued to change and evolve, researchers and educators are beginning to reconceptualize environmental learning, viewing it as broader and more inclusive of the complex influences on learners within the unique communities in which they live (Nichols, et al., 2006). Some have concerned themselves with the importance of place, and point to a serious lack of relationship-

building and connection to the local environment, both physical and social (Orr, 1999; Sobel, 2004). In the same vein, McRae (1990) states that “many people have become passive participants, spectators, recipients of second-hand knowledge, attitudes and values, increasingly removed from real firsthand experiences” (p.4). This physical, emotional and intellectual disconnection and abstraction can be found not only in curricula and pedagogy but also in more subtle contexts such as the schools’ architecture and design (Orr, 1999).

It may be argued that education needs to focus more, not less, on real-world issues based in students’ lives and communities, providing opportunities for personally meaningful, experiential inquiry and place-based learning fundamental to scientific and environmental literacy. Research suggests that positive experiences in local, natural settings during early childhood are instrumental in developing personal connections with and appreciation of the natural world, which evolves into commitments to the principles of environmental stewardship (Chawla, 2006; NAAEE, 1996). “We protect what we care about, and we care about what we know well” (NAAEE, 1996), thus, environmental learning should be locally relevant and involve the community (NAAEE, 1996). Environmental learning associated with place integrates humans and nature and develops ecosystems knowledge characteristic of sustainable cultures (Chinn, 2007; Cajete, 1999, 2000; Fain, 2004; Gruenewald, 2003, Kawagley, 2001; Orr, 1992). Environmental learning incorporating place as a deep-ecology principle, enhances aesthetic experience of the environment, stimulates sensitivity to nature and can give children a sense of place in the natural world (Semken & Freeman, 2008).

“Experiencing and observing the local environment is an essential part of environmental education,” (NAAEE, 1996). The natural environment provides a genuine, relevant context for learning where issues of environmental sustainability and social responsibility can be explored. Learners can make associations between disciplines, reducing fragmented learning and achieving a greater depth of understanding (NAAEE, 1996). Learners build upon understanding through direct

involvement in field experiences in the outdoors. Participative, structured learning opportunities, which deal with real-life concerns, are essential in developing understanding of the environment and appropriate behaviours in relation to the environment. Direct experience in local, outdoor environments fosters conceptual understanding and awareness of environmental and sustainability related topics, in addition to greater appreciation and motivation towards action (Chawla, 2006, Haigh, 2006, Naidoo, 1999, NAAEE, 1996, Owens, 2003, Stranix, 1975). In urban settings, local natural areas can provide genuine and relevant contexts for learning where issues of environmental sustainability and social responsibility can be explored (Chawla, 2006). However, feelings about a place take longer to develop than factual knowledge that can be acquired relatively quickly (Owens, 2003). Through community partnerships and service learning projects, learners can become engaged in and personally involved with real-world environmental issues that are close to home as they develop understanding of environmental and sustainability issues (NAAEE, 1996).

Indigenous perspectives in Science-based environmental learning (EL).

Environmental learning has taken insights from multiple practices and theories such as feminism and ecofeminism, environmental justice, Indigenous knowledges, critical pedagogy, conservation education deep ecology, and bioregionalism (Russell, Bell, & Fawcett, 2000). Indigenous perspectives have typically been included in environmental education as a result of a close fit in program goals with traditional Indigenous cultural values, identified as concepts at the heart of sustainability (Aikenhead, 2000; Cajete, 1999). In many cases, traditional Indigenous cultural values exemplify the qualities of good stewardship in supporting a worldview of collective responsibility for respecting the land, of the interconnectedness and interdependence of all life forms, and of using only what is needed for sustenance. Indigenous environmental knowledge developed over centuries of observing and respecting natural ecological cycles. While the diversity of ecologies or living lodges has resulted in distinct nations with diverse worldviews (Henderson, 2000), Indigenous nations share a certain unanimity in their views on

the natural world, to which humans are intricately connected (Michell, 2007; Battiste, 2000; Kawagley & Barnhardt, 1999; Knudtson & Suzuki, 1992). Reflecting the ecological connectedness of nature, “the Aboriginal worldview asserts that all life is sacred and that all life forms are connected” (Henderson, 2000, p. 259). This knowledge and understanding of the natural world, based on the importance of sustaining Mother Earth for seven generations to come, is embedded in traditional aboriginal cultural values and is a concept at the heart of sustainability (Graham, K., & Peters, 2002; Manitoba Education and Training, 1995, 2000; Western Canadian Protocol for Collaboration in Basic Education, 2000). From an Indigenous perspective, the land is the ultimate source of knowledge, and “all knowledge flows from the same source: the relationships between a global flux that needs to be renewed, the people’s kinship with the other living creatures that share the land, and the people’s kinship with the spirit world” (Battiste & Henderson, 2000, p. 41). Indigenous knowledge is “the expression of the vibrant relationships between the people, their ecosystems, and the other living beings and spirits that share their lands” (Battiste & Henderson, 2000, p. 42).

The majority of environmental learning programs, especially those for school aged children, are typically ecology based with a focus on addressing grade level appropriate learning outcomes from the science curriculum (Russell, Bell, & Fawcett, 2000). However, in seeking to integrate Indigenous perspectives with programs based on the formal science curriculum, it is critical to remain mindful that Indigenous perspectives are embedded within Indigenous worldviews. Complications may arise when attempting to understand Indigenous knowledges from a Eurocentric (Western) point of view and Indigenous science cannot be subsumed as a category of Indigenous knowledge (Battiste and Henderson, 2000). For example, from an Indigenous perspective, nature is the source of knowledge, and learning about nature cannot be limited to the discipline of “science” (Michell, 2007) since “no separation of science, art, religion, philosophy, or aesthetics exists in Indigenous thought; such categories do not exist”

(Battiste and Henderson, 2000, p. 40). Because Indigenous worldviews and epistemologies share a radically different conception of nature, they offer the possibility of a radically different conception of science. As Michell (2007) states, “Indigenous epistemology is guided by Indigenous worldview frameworks that provide a lens for different perceptions of scientific knowledge and ways of thinking, and acting on complex problems and natural reality,” (p. 78).

Effectively and respectfully including Indigenous perspectives in environmental learning must also involve more than identifying common content and subject matter. To ensure that learning is meaningfully supported and respectfully reflects the local cultural traditions, languages, beliefs, and perspectives, consideration must be given to the overall pedagogical approach, teaching strategies, resources used, and modes of conveying and assessing knowledge (Kanu, 2007). As part of the process of developing effective pedagogies to better align learning experiences with the diverse realities of students’ lives and the places they inhabit, it is necessary to re-evaluate existing models of teaching and learning, and conceptualise alternative pedagogies and their underlying epistemologies. To do so, non-Indigenous education systems must increase their understanding of Indigenous worldviews, epistemologies, pedagogies, and new Indigenous education systems must be supported as equitable and beneficial processes.

Indigenous perspectives hold promise for environmental educators who want to encourage an understanding of deep cultural roots in modern industrial societies that profoundly alienate the “more-than-human world” (Russell, Bell and Fawcett, 2000, p. 204). In examining human-environment relationships, Russell, Bell and Fawcett (2000) describe the challenge of differing views of equating resources. Members of modern, industrialized societies generally imagine humanity to be different from, and superior to, all other life. This notion that the environment is to be controlled and used solely for the benefit of humans is in contrast to the Indigenous worldviews and an understanding of ecology, which hold that humans are part of, not separate from, environmental processes.

Indigenous knowledges and pedagogies

Indigenous Science education.

The term ‘science’ can have a number of different meanings. It has been used to refer to a body of knowledge about the natural world, a particular method of inquiry (the methods of science) or a reflection of philosophical and cultural assumptions underlying the term, embedded in a Eurocentric worldview. According to Aikenhead (2007) defining science is problematic because of its political history and neo-colonizing potential. Similarly terms such as “Native Science”, “Indian Science”, “Indigenous Science”, “Aboriginal Science”, and “Traditional Ecological Knowledge” can mean different things to different people. These terms have sometimes been described by distinguishing them from “Western Science”, as differences in worldviews between cultures, and/or different views of science as a body of knowledge. The selected nomenclature (“Native Science”, “Indian Science”, “Indigenous Science”, “Aboriginal Science”, and/or “Traditional Ecological Knowledge”) also varies. Some opt to use the terms interchangeably and others use only one. As a contemporary educator, exploring opportunities to use “Aboriginal Science” in my programming, a better understanding of these various alternatives to “Western Science” was important. In light of my interest in improving my ability to use “Aboriginal Science” in my programming, it was critical to begin to consider which terminology I will use and how I might define this. The following summary illustrates the complexities of describing and defining “Aboriginal Science” and the diverse approaches that scholars use in describing it and integrating it in teaching and learning.

Although science is a core discipline in elementary and secondary schools around the world, the scientific models of Western culture reflect a worldview that is not held by everyone. There is difference between Indigenous and Western science and a variety of research that suggests science learning experiences differ between non-Western and Western students (Aikenhead, 1996, 1997, 2000, 2003; Christie, 1993; Knudtson & Suzuki, 1992; Peat, 1994). The

culture and language of an individual student has been shown to influence how they approach science learning (Aikenhead, 1996, 1997; Aikenhead & Jegede, 1999; Allen & Crawley, 1998; Chipman & Pachaury, 1985; George & Glasgow, 1988; Jegede & Aikenhead, 1995; Ogawa, 1995; Jegede & Okebukola, 1991; Kanu, 2006; Lee & Fradd, 1996; Lynch, 1996a; Lynch, 1996b; Lynch, McKinley, McPherson-Waiti & Bell, 1992; Sutherland, 1998; Sutherland & Dennick, 2002). The greatest challenge is to find a respectful way to compare Eurocentric and Indigenous ways of knowing and include both in contemporary modern education (Battiste & Barman, 1995). It is challenging, yet crucial, not to distort local knowledge by making it conform to the Western epistemology endemic of school culture. Inadvertent assimilation will take place in a science classroom if the local knowledge is taken out of its epistemic context (Aikenhead, 1996, 1997, 2000; Cajete, 1999).

Unlike Western science, which places humanity apart and above the natural world, free to exploit the physical world and its resources (Aikenhead, 2007), Indigenous science evolved to allow human beings to fit into the natural world, rather than outside of, with a relationship of respect and a sense of responsibility to keep it healthy (Cajete, 1999). Furthermore, there is a conflict between the importance of localized knowledge in Indigenous science and current science curricula. The motivation for developing knowledge about nature is fundamentally different in the two cultures (Aikenhead, 2000). Current science curricula often emphasize the importance of conclusions that can be generalized beyond the local context, de-emphasizing the importance of localized knowledge, an integral component of Indigenous science. Many advocates for a more multicultural representation of science have argued that this universalistic stance is not a true representation of science and that there is a need to find respectful ways to compare Eurocentric and Indigenous ways of knowing and including both in contemporary modern education (Battiste & Barman, 1995).

The increasing diversity of the Canadian school-aged population, coupled with differential academic performance among student demographic groups raises questions as to

what counts as science and how science should be taught. From a pedagogical stance, predominant definitions of science from a Western worldview are problematic with students from diverse backgrounds (Aikenhead, 2007). Students form ways of looking at the world often based on common sense or naïve preconceptions and their personal experiences and knowledge acquired and constructed within unique cultural and linguistic environments (Barton, 1998a, 1998b; Eisenhart, 1996; Lee & Fradd, 1998; Rodríguez, 1997, 1998a). There are alternative worldviews and ways of knowing in addition to the Western scientific view, and Indigenous communities in both urban and reserve settings have not been well served by generic science curricula and programs based on a Western worldview (Aikenhead, 1996; Cobern & Aikenhead, 1998; Lee, 1999a).

Intercultural science education is complex because Indigenous science is “a body of stratified and amalgamated knowledge and cosmology” (Ogawa (1995, p. 1) and, “a simple [curricular] transformation from one system to another is not often feasible (McKinley, 2005). Intercultural science education should not simply translate contemporary curricular objectives, because whether Eurocentric and Indigenous worldviews are compatible depends on the context (Aikenhead (2006b). There is no simple formula. “Creating a balance between two worldviews is the great challenge facing modern educators” (Battiste, 2000a, p. 202). The concept of bridging the two knowledge systems (Western science and Aboriginal science) is not new (Maddock, 1981; Pomeroy, 1994). Traditional Ecological Knowledge (TEK) is one proposed bridge that came into widespread use in scholarly circles in the 1980s (see also Johnson, 1992; Inglis 1993; Lukey, 1995; Johannes, 1989, 1993; Williams & Baines, 1993), but there is no universal agreed upon definition of Traditional Ecological Knowledge” (Michell, 2007, p. 34). McGregor (1994, 1995(a)(b); 1999; 2000) uses the term Traditional Ecological Knowledge to refer to a branch of Indigenous knowledge that is usually connected to the disciplines of biology and ecology. However, TEK was conceptualized from a Eurocentric worldview (Aikenhead, 2002) and,

although it may be attractive to Western scientists and academics, the practice of TEK may be problematic. Interest in TEK usually originates outside Aboriginal communities, resulting in non-Aboriginal scientists determining the agenda, which perpetuates the colonial exploitation of Indigenous knowledge (McGregor, 2000), avoids a two-way integration of the two knowledge systems, reinforcing a Western cultural bias and controlled decision making.” (Aikenhead, 2002; Nadasdy, 1999). The power relationships inherent in the integration processes bridging Western and Aboriginal sciences, as TEK attempts to do, are not appropriate (Aikenhead, 2002). Instead, we should actively support a post-colonial model such as co-existence, which promotes functioning of both systems side by side (Battiste, 2000; MacIvor, 1995; McGregor, 2000; Sainte-Marie, 2000; Urion, 1999) or other models that balance two cultures including two-way learning (Ritchie & Butler, 1990), bi-cultural instruction (Cajete, 1999; Kawagley, 1995, 2000) and cross-cultural learning (Aikenhead, 1997, 2006).

Possible approaches to incorporating Indigenous knowledge in the science classroom have been offered (Barnhardt & Kawagley, 2005; Cajete, 2000; Snively & Corsiglia, 2001; Schroeder, 2006; Sutherland & Tays, 2004), although research suggests that educators must learn to act as facilitators when working with Indigenous students, helping them cross-cognitive and social borders when learning science (Aikenhead, 1996, 1997, 2000; Aikenhead & Jegede, 1999; Williams & Stewart, 1992). Aboriginal students’ social power and privilege in the classroom increase when students sense a genuine respect for their traditional cultural values (Aikenhead, 2000; Cajete, 1999), while in the everyday world both the culture of their community and the culture of Western science influence their personal identities. As a consequence, students should feel at ease in both cultures and learn to move back and forth between the two cultures, becoming better citizens in a society enriched by cultural differences (Aikenhead, 2006, 2001, 2000; Western Canadian Protocol for Collaboration in Basic Education, 2000). The relationship between student and teacher is at the heart of culturally relevant approaches. This relationship,

based on observing and learning about each individual's unique learning needs, is a component of holistic development (Edmonton Aboriginal Services Branch, 2005). In effective learning environments, it is essential that the teacher and students understand how to interact and communicate with each other, as well as how to relate academic disciplines to students' previous knowledge and experience (Aikenhead, 2007; Ohkee, 2002). To enable these students to learn science, a pedagogy merging subject specific and diversity-oriented approaches is believed to be needed, although these approaches have traditionally remained distinct and separate from each other (Ohkee, 2002).

Some educators advocate for the co-existence and integration of the two knowledge systems in school science (Aikenhead, 1997, 2002, 2006b; Battiste, 2000; MacIvor, 1995; Sainte-Marie, 2000; and Urion, 1999). In the United States such approaches are called bi-cultural instruction (Cajete, 1999; Kawagley, 1995, 2000), and in Australia and Aotearoa/New Zealand, models of co-existence are often called two-way learning (Ritchie & Butler, 1990). The term cultural broker has been used to describe the theory in which teachers facilitate student border crossings into and out of school science (Aikenhead, 1997; Mitchie, 2004; Stairs, 1993, 1994). Cross-cultural border theory is another approach in which teachers can help students negotiate difficult border crossings, but this help is normally absent in science classrooms because teachers are often unaware that cultural borders exist for their students. According to cross-cultural border theory, the worldview of Aboriginal students and Western science are different. When worldviews come into contact with each other, students face a cross-cultural experience (Aikenhead, 2002, p. 289; Cajete, 1999; Maddock, 1981; Sutherland, 1998). Culture brokers acknowledge that a border exists, motivate students to cross it, employ language of both the students' culture and the culture of Western science, and help students resolve cultural conflicts that may arise (Aikenhead, 1997; Chang & Rosiek, 2003; George, 1999; Jegede & Aikenhead, 1999; Rollnick & Rutherford, 1996; Sutherland & Dennick, 2002).

The importance of place in Indigenous knowledges and pedagogies.

Place is integral to Indigenous cultures. Indigenous Knowledge systems are place-based knowledge systems (Battiste & Henderson, 2000; Cajete, 2000; Michell, 2005), and understanding what place means from an Indigenous perspective is a concept necessary to understanding and learning Indigenous knowledges and pedagogies. Pueblo scholar Gregory Cajete (1994) explains the unanimity among Indigenous worldviews as being rooted in nature: “Indian people traditionally understood the human psyche and the roots of human meaning as grounded in the same order that they perceived in Nature. They experienced Nature as a part of themselves and themselves as part of it. They understood themselves literally as born of the Earth of their Place,” (p. 83). Indigenous knowledge is “the expression of the vibrant relationships between the people, their ecosystems, and the other living beings and spirits that share their lands” (Battiste & Henderson, 2000, p. 42). Understanding what place means from an Indigenous perspective and what role it plays in Indigenous knowledges and learning processes is essential. Place is contextual and inseparable from the land, culture, worldview, philosophy, and spirituality. Place is also embedded in Indigenous languages (Basso, 1996; Battiste, 2002; Little Bear, 2000; Harris, 2002), because Indigenous languages have symbolic, verbal, and unconscious elements which structure Indigenous knowledges and worldviews. The validity of Indigenous knowledges are delimited by the geographic and ecological setting, specific to particular places and are not easily transferable to different contexts (Aikenhead, 2002; Battiste & Henderson, 2000; Hampton, 1995; Kawagley & Barnhardt, 1999; Michell, 2005). For Indigenous Peoples, knowledge is as dynamic as the very place it reflects - “not static but, like the shifting dynamics of particular ecologies, [knowledge] changes over time” (Battiste & Henderson, 2000). As such, Indigenous knowledges are more than ecological awareness. They are living relationships with specific places (Henderson, 2000). Indigenous knowledges, therefore, embody a web of relationships within specific ecological contexts; containing

linguistic categories, rules, and relationships with localized content and meanings (Battiste, 2002).

Attempts have been made to articulate Indigenous concepts of place in the English-language, with the following five central dimensions common among various Indigenous groups:

- 1) Place is multidimensional. With physical, spiritual and emotional characteristics, place encompasses all aspects of life and refers to more than just a geographic space. Place is “created by the setting combined with what a person brings to it” (Steele, 1981, p. 9) as the interaction between location and resident (Cajete, 2000).
- 2) Place is a relational (or relationship-based). The principle of interrelatedness is central to Indigenous epistemologies (Colorado, 1988) and place refers to a “familiarity with the personality of objects and entities of the natural world” (Deloria and Wildcat, 2001, p. 2) or a spiritual relationship with the tangible world that connects other aspects of life.
- 3) Place is experiential and contextual. It is the experiences that an individual has in the natural world that gives place its meaning (Aikenhead and Ogawa, 2007; Cajete, 2000; Michell, 2005; Michell, 2007). A hands-on approach to learning provides tangible connections between knowledge and life, making learning meaningful and practical.
- 4) Place is local and site-specific. The concept of place is as unique, individual, and local as the people who create it. Indigenous knowledge and learning become contextualized, geographically, socially, culturally, spiritually, and physically (Battiste, 2002).
- 5) Place is land-based. Humans are intricately connected to the land (Kawagley & Barnhardt, 1999; Knudtson & Suzuki, 1992; Michell, 2005), and it is this relationship between land and people who inhabit it, that define a place.

It has been argued that learning from place must be an integral part of school curriculum in order to effectively adapt to Aboriginal perspectives (Cajete, 1986; Chinn, 2007; Kawagley, 1999; Smith, 1999; Smith, 2003). Learning from place refers to “the learning of traditional

knowledge, processes and practices from living in a particular place” (CCL, 2007a). Place must be experienced by living in a particular place in nature, in the pursuit of wisdom, and in the context of multiple relationships (Aikenhead & Ogawa, 2007) and cannot be extracted due to its inherent interconnectedness to other aspects of life. In order for a science curriculum to be effectively adapted to suit Indigenous knowledges and pedagogies, place must be an integral part of the experience.

Promising place-related pedagogies and concepts

Conceptualizing place and a sense of place.

Place has been defined and used in different ways by different people. It has been described as a characteristic of geographic places, a feeling or perception held by people, in relation to characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging. Places are socially constructed out of physical spaces, and individuals and communities know and experience places differently. Past experiences, influence the relationship between people and place (Semken & Freeman, 2008; Tuan, 1977). As result, the same place can accrue many different meanings - aesthetic, ceremonial, economic, familial, historical, political, and spiritual, as well as scientific. Place contains cultural, sociological and political dimensions (Schroeder, 2006) and is a primary component of human experience.

Place suggests the concepts, memories, histories, ideas, emotions, relationships, identities (both individual and community) and objects associated with a particular physical space. People develop emotional attachments to meaningful places. Certain places hold special meaning to particular people or peoples. Places said to have a strong "sense of place" have a strong identity and character that is deeply felt by local inhabitants and by many visitors.

As Gruenewald (2003) states:

To be at all—to exist in any way—is to be somewhere, and to be somewhere is to be in

some kind of place. Place is as requisite as the air we breathe, the ground on which we stand, the bodies we have. We are surrounded by places. We walk over and through them. We live in places, relate to others in them, die in them. Nothing we do is unplaced. How could it be otherwise? How could we fail to recognize this primal fact? (p. 622)

A sense of place is a social phenomenon that exists independently of any one individual's perceptions or experiences, yet is dependent on human engagement for its existence. As previously mentioned, feelings about a place take longer to develop than abstract knowledge that can be acquired relatively quickly (Owens, 2003). Such a feeling may be derived from the natural environment, but is more often made up of a mix of natural and cultural features in the landscape, and generally includes the people who occupy the place. The combined set of place meanings and place attachments held by a person or a group, constitutes a functional definition of the sense of place (Brandenburg & Carroll, 1995; Williams & Stewart, 1998). Because it is characterized by relationship to some identifiable portion of the coincident natural and cultural landscapes, sense of place is contextually bound. A "sense of place" encompasses the meanings and attachments that places hold for people.

Place and pedagogy.

With this view of place, then, its role in science education becomes evident. Learning from place refers to "the learning of traditional knowledge, processes and practices from living in a particular place" (CCL, 2007). An enhanced science curriculum recognizes Indigenous knowledge as a total knowledge system that describes and explains nature in culturally powerful ways. This knowledge resides in Aboriginal languages. Its validity is delimited by the geographic setting of those who hold it. Indigenous Knowledge systems are place-based knowledge systems (Michell, 2005). Place-based education is a method that includes experiential learning in local natural and social settings. It includes a trans-disciplinary and cross-cultural synthesis of place-related knowledge and pedagogy, and service learning or other forms of

community outreach (Gruenewald, 2003; Sobel, 2004). Place-based teaching is conscious of place, empowers the students and teachers senses of place and promotes local ecological and cultural sustainability (Sobel, 2004; MacIvor, 1995; Tuhiwai Smith, 2002).

Considered from the perspective of teaching and learning, sense of place, defined as place meaning plus place attachment, encompasses the cognitive (knowledge as place meaning) and affective domains (place attachment; attitudes and preferences as place meanings). It may also extend into the psychomotor domain by incorporating kinesthetic skills learned or performed in specific physical places, whether for a recreation (e.g., playground leisure, (Lim & Calabrese Barton, 2006) or vocational (e.g., tilling a field) purposes. A sense of place encompassing place attachment and place meaning is a measurable learning outcome of place-based teaching and can be measured psychometrically (Semken & Freeman, 2008).

Thinking about place in relationship to education leads to exceptionally rich and creative avenues of exploration, especially when coupled with a social justice perspective. The many dimensions of human experiences in places have been shown to be “profoundly pedagogical [in] nature” (Gruenewald, 2003b). Place-based teaching focuses on local and regional environments and synthesizes different ways of knowing them, leveraging the senses of place of students and teachers. Place-based education is a method that includes experiential learning in local natural and social settings. It includes a trans-disciplinary and cross-cultural synthesis of place-related knowledge and pedagogy and service learning or other forms of community outreach (Gruenewald, 2003a, 2003b; Gruenewald & Smith, 2008; Smith, 2007; Sobel, 2004; Woodhouse & Knapp, 2000).

Place-based education immerses learners in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum. These local opportunities and experiences create the context for studying regional, national and global issues,

and empower students to make positive changes at a local level, through participation in service projects. Research has shown that well-designed initiatives can improve learner engagement, academic achievement, and sense of personal efficacy while strengthening ties between local social and environmental organizations and their constituencies in the schools and community (NAAEE, 1996).

In the natural sciences, place-based pedagogy is advocated as a way to improve engagement and retention of students, particularly members of Indigenous or historically inhabited communities (e.g., American Indian, Alaska Native, Native Hawaiian, Mexican American) who possess rich culturally rooted senses of the places studied (Aikenhead, Calabrese Barton & Chinn, 2006; Cajete, 2000; Emekauwa, 2004; Gibson & Puniwai, 2006; Kawagley, D. Norris-Tull, & R. A. Norris-Tull, 1998; Riggs, 2005; Semken, 2005). The knowledge systems these groups have built over centuries or millennia of observation, reasoning, and intergenerational transfer are variously called traditional ecological knowledge (Inglis, 1993), local environmental knowledge (Reynolds et al., 2007), or simply Indigenous or local knowledge (Riggs, 2005). These are of increasing interest to the mainstream scientific community (Couzin, 2007; Krajick, 2005) and are making their way into science teaching (Aikenhead, 1997, 2001; Cajete, 1994; Chinn, 2006; Glasson, Frykholm, Mhango, & Phiri, 2006; Nelson-Barber & Estrin, 1995; Riggs & Semken, 2001; Semken, 2005; Semken & Morgan, 1997; Snively & Corsiglia, 2001).

Science curricula and methods that dispassionately probe, analyze or represent, in ways that are culturally offensive or inappropriate, for example, portraying planet Earth as a machine (Semken, 2005) or the environment as a repository for wastes (Chinn, 2006), may contribute to cultural discontinuity that deters scientific study (Aikenhead & Jegede, 1999; Semken, 2005). Place-conscious education has been identified as a contemporary research orientation particularly germane to the work of furthering dialog between the native and Western traditions (Barnhardt &

Kawagley, 2000; Peat 2002) and has been advocated for, given its relevance and potential to attract underrepresented groups to science (Semken & Freeman, 2008). Conscientious, effective place-based science teaching must be informed not only by the sound scientific knowledge, but it must also respect mutual understanding of the diverse meanings and attachments affixed to these places. These meanings and attachments provide context for the scientific knowledge (Semken, 2005).

Place-conscious education draws on critical humanist and social justice traditions within education, and it is this radical perspective that distinguishes ‘place-conscious’ from ‘place-based’ education, with which it has much in common (Schroeder, 2006). Place-based teaching promotes local ecological and cultural sustainability over competitiveness and resource exploitation (Sobel, 2004). Place-conscious education seeks to further the goals of the ecojustice movement, which are to synthesize four educational and political goals: (a) understanding the relationship between ecological and cultural systems, specifically, between the domination of nature and the domination of oppressed groups; (b) addressing environmental racism, including the geographical dimension of social injustice and environmental pollution; (c) revitalizing the noncommodified traditions of different racial and ethnic groups and communities; (d) reconceiving and adapting our lifestyles in ways that will not jeopardize the environment for future generations (Furman & Gruenewald, 2004, p. 55).

David Gruenewald’s critical pedagogy of place (2003) is place-conscious, provides opportunities to participate meaningfully in the process of place making and shifts the discourse of ‘accountability’ to that of place-conscious accountability, rather than focus on the narrowly defined academic indicators. It also challenges assumptions about progress, renewing and creating local traditions that support social justice and ecological sustainability (Gruenewald, 2003; Furman & Gruenewald, 2004)

An education for the purposes of cultural decolonization and ecological reinhabitation; to

identify, recover and create material spaces and places that teach us how to live well in our total environments (Gruenewald, 2003), requires support for community-based learning activities aimed at reinhabitation, and means of engaging in more place-based learning strategies (Gruenewald, 2004). This requires redefining relationships in education and curriculum development, including appropriate consultation mechanisms to support community based decision-making and development of new locally relevant educational structures which support collaboration from multiple educational sectors or, as others have recommended, a new conceptual, imaginative innovative model (Denzin & Lincoln, 2005; Orr, 2003; Sharp, 2002). Some have suggested that it demands broader societal support and collaborative efforts (Aikenhead, 2006). The challenge for science educators is to decolonize the pan-Canadian science framework (Aikenhead, 2006; Battiste, 2002) by engaging Indigenous communities as prime stakeholders and full partners, enabling them to use their experience and local wisdom to work collaboratively in the education system and reclaim control of their ways of knowing (Lomawaima & McCarty, 2002; Stringer, 2004; Weber-Pillwax, 2001).

Chapter 3: Becoming a Critically Reflective Practitioner

With this research project, the overall goal was to develop a more effective, intercultural approach for BTG by implementing and evaluating the success of a revised program. The focus was on determining the effectiveness of the new approach and measuring the broader learning resulting from the strategies I employed as I sought to improve my understanding of how to include Indigenous knowledges and Indigenous pedagogies and support future program planning. In this study, my role as the researcher, my level of participation, and relationship with participants needed to be clearly described, declaring assumptions about the topic under study and making views explicit given the potential influence on the research findings (Creswell and Miller, 2000; Stringer, 2004). By disclosing some of my background, underlying assumptions, beliefs, and motivations, and describing their potential influences on the both the intervention, data collection and analysis phases, personal subjectivity was more effectively accounted for (Creswell and Miller, 2000; Eisenhart and Borko, 1993; Mertens, 2003). This also assisted me in engaging in a more reflexive, reflective process in analyzing study data. The underlying assumption within an interpretative, qualitative study is that all inquiry is value-laden (Mertens, 2003). Reflective practice is "the capacity to reflect on action so as to engage in a process of continuous learning", which, according to the originator of the term, is "one of the defining characteristics of professional practice" (Schön, 1983). According to one definition it involves "paying critical attention to the practical values and theories which inform everyday actions, by examining practice reflectively and reflexively. This leads to developmental insight" (Bolton, 2010).

Exploring Motivations

As a practitioner reflection, this study was about me and my journey as an educator, researcher and person, as I sought to improve my practice. I drew on my past experiences, academic learning, and various emotional, intellectual and spiritual influences as part of this

study. Embedded in this study is my story, my connections to BTG and motivations for the decisions I have made in the past and continue to make. BTG is intertwined in my identity.

Bio and personal history

I am a woman from a mixed cultural background in my mid thirties with over a decade of experience as a researcher and practitioner of environmental education. My relationship with nature, other people and my cultural identity are related to who I am today, personally and professionally. My current research and professional interests are intertwined with my personal identity and have influenced many of the choices that I've made in life.

Growing up, I was a careful observer of the world around me. Being raised by two very compassionate and intelligent parents who encouraged me to explore, I was blessed with a childhood that included regular exposure to the natural world. From family camping trips and weekends at the cabin, to daily "adventures" in my own backyard, I quickly became a budding naturalist and inquisitive learner. With this nurturing upbringing, I embarked on my formal schooling years as a very "school-ready" child, entering into Kindergarten able to read fairly proficiently and perform arithmetic computations. More importantly (as my parents refuse to let me forget!) I had an insatiable appetite for knowledge and information. As a result, I was quickly dubbed as "gifted" and to this day continue to be a "good student". Looking back, I can see that this early love of learning and school has translated into my becoming a "lifer" as my friends and family have referred to it, having spent 12 of the last 13 years since graduating high school enrolled in University either full or part-time.

With this background in mind, it might make sense that my decision to become an educator was borne out of an early love of school and a passion for learning. This of course, would have been too simple. In chapter one of *Why We Teach*, Sonia Nieto reports findings of a survey that questioned new teacher motivations for choosing the profession. Thrilled to hear that the top reason was not "having summers off", I found it interesting that the majority of teachers

confessed to choosing to enter the profession because of a “sense of service” and a desire to make a positive contribution to society. I too fit within this category and belong to this “idealistic group” that experienced a “calling” to teaching out of a desire to bring about positive change in the world. From “making a difference”, to “doing something meaningful with my life”, my journey to becoming a teacher was in fact prompted by an idealistic vision of being involved in inspiring positive change. However, my desire to “do something meaningful with my life” led to a passion for a variety of issues, and teaching children was not my original goal.

In fact, many of the choices I have made in my life to date, including my career choices, have drawn on my personal beliefs and values and have also been significantly shaped by surrounding social political contexts i.e. extrinsic influences. My graduation from high school came at a time when I was first becoming aware of the devastating destruction and deterioration of our natural world that was occurring around me. From this, combined with my passion for science and a love of nature, evolved a conviction that the important career I had been searching for would be within the field of environmental conservation. I enrolled in the Faculty of Science at the University of Winnipeg, and completed a Bachelor of Science Degree in Environmental Studies and Geography.

I did not, however, become the wildlife biologist or conservation ecologist that I had originally imagined. Although I have held a few biology-ecology related positions over the years, additional factors redirected my career course, and my journey of finding a way to “make a difference”. While I was completing my undergraduate degree, I took a few semesters off from my studies in order to gain work (and life!) experience and to help pay for my tuition. In 1997, I decided to take a position as an English Language Instructor in Japan. Although I originally went because I wanted to travel and spend time in Japan, I soon discovered that one of the greatest rewards of the trip was having the opportunity to teach and work with children. When I returned to Winnipeg, I was offered a position as an Earth Sciences Laboratory Demonstrator at the U of

W, and held this position until I completed my Bachelor of Science in 2001. During this time I also volunteered as a Summer Day Camp Instructor at Fort Whyte Center, and started teaching Sunday School at my church. It wasn't until after I had graduated that it dawned on me that I had made a wrong career choice. Remembering the joy that my teaching experiences had brought me, I realized that there was no better way for me to make a significant contribution to the world than to educate children and become a teacher. A friend of mine describes teaching as "saving the world one child at a time." This sense of purpose, although it may sound somewhat naïve and romanticized, is a sentiment that I have now also come to share.

This decision to teach however was not the end of the road in terms of choosing a profession. Although I did complete a two-year Bachelor of Education degree and have classroom teaching experience "under my belt", I have continued to pursue employment and volunteer opportunities in both the environmental and educational fields. Since 2001, I have been employed part-time as an Education Coordinator with the City of Winnipeg's Naturalist Service Branch, which has provided the opportunity to combine two of my passions and work as an environmental educator. I have since come to be a firm believer in the concept of environmental education as a means to promote both responsible use of natural resources and as a fundamental tool in personal development for children and adults alike. I believe that a strong sense of ownership, personal responsibility and ability to affect change in our world's physical, social and economic environment is realized in the applying stewardship principles. By exposing children to these concepts at a young age, I feel we are able to not only expand their horizons and empower them with a positive view of their abilities, but also ensure that our world's resources, natural areas, and wildlife species can continue to coexist with sustainable urban growth and human developments.

The final leg of my journey to becoming the teacher and person I am today, involves the development of my commitment to social justice and equity issues, particularly as they relate to

youth living and attending school in inner-city communities. Working in Winnipeg's inner-city schools as a teaching assistant, a pre-service teacher, and as a teacher, I have become increasingly concerned for issues relevant to these communities. My concerns however, are not limited to issues of poverty, violence and crime commonly associated with these areas. Although I do acknowledge that these types of problems often exist in inner-city communities, my primary concern is the rising number of sensationalized media portrayals of the inner-city and inner-city schools in Winnipeg and elsewhere. With stories involving gang-related problems, violence or other criminal activity frequently found in the headlines, I feel that a very negative view of these communities and the children and adults living within them is too often perpetuated. I continue to be frustrated with the negative side effects of this media sensationalism and a general lack of public understanding of the people living and working in the inner-city. I view these types of misconceptions and generalizations as obstacles not only for those living in these communities, but also for others making more positive strides towards advocacy for inner-city youth and communities.

I have a strong commitment to excellence in teaching and an ongoing interest in student learning and development, and I embrace teaching as an opportunity to be involved in ongoing positive change. I see students as partners in the learning process who are capable of taking responsibility for their own learning. I work towards facilitating learning communities that emphasize the integrity of each student and acknowledge the valuable contributions each one can make to the learning process. Whether in formal or non-formal learning environments, I believe that diverse forms of knowledge must be validated and celebrated and so that learning is accessible to students with a range of learning styles and backgrounds.

My interest in Indigenous knowledges is very personal. I've always found it difficult to describe my cultural background as it's always been an evolving concept for me, as is my cultural identity. "Culture" can have many different interpretations. To some it means ethnicity

or race. For others, it means something completely different. It's actually more challenging for me because my cultural and ethnic history is so complicated. My birth father is Pakistani. There's a distinct Pakistani culture, but I don't know anything about it. I was adopted by my current father, have always lived with my biological mother whose heritage is Icelandic, British, Cree, and Sioux, and was raised in a household that was very much Polish and German. I grew up in a cultural context that was very different from my actual ethnicity. How I currently I think of myself culturally may be very different than when I was a child. I've become intrigued by learning more about my Aboriginal ancestry.

It was about ten years ago that I actually realized that we had Aboriginal ancestry. I think, for me, just because my own cultural identity was so complicated and I didn't have any connection to my Pakistani heritage, I've been drawn to the identity of being Aboriginal and immersed myself in learning about it. I do have a connection with the Icelandic heritage that is also part of me, but I've begun to develop a strong sense of identity as being Aboriginal and being Métis, with the realization that I now I have a specific culture with which to identify.

This combination of experiences, beliefs, and views has affected and continues to affect my decisions.

The "Dilemma" in My Practice

The rationale for this study outlined in Chapter One, describes the dilemma I encountered in year two of the BTG Program (see Appendix E), when first trying to include Indigenous knowledges and pedagogies. I felt that although the students listened actively throughout the Elders teaching, there was a disconnection between this teaching and what was addressed in the program content based on the science curriculum. As a result of my reflection on the program structure itself, I felt dismayed for having involved the Elder in what seemed to have been an superficial way, rather than as a fellow teacher within the program. Her teachings seemed disconnected from the science content, because they were presented in a different form and were

included as a separate “piece” of the overall program. The ideas in her teaching and those from the science curriculum were related in theory and quite a logical fit, but my attempts to include both and help students make the connection between Indigenous knowledge and science seemed ineffective.

Including Indigenous knowledge in the BTG program was not something that I had sufficient expertise and ability to do. An Elder was brought in as the “expert” in this area, but my attempts to connect this with the science concepts didn’t seem to work. While trying to support students in learning to understand science ideas and concepts from both worldviews, I did not feel I was able to support them in making natural connections between the two. Recognizing that I need to avoid trying to “integrate” the cultural ideas, I felt there must be a ways to involve Elders in this program. Ways that are not only respectful, but also meaningful, relevant, and help support students in seeing the related science concepts from both a western European and Indigenous worldview.

When reflecting on this problem in the program, and the disappointment I felt as an educator, I became aware of several issues.

First of all, the program goals were too ambitious and unrealistic within the context of a one-day program where the student population is unknown. I needed more realistic goals for the program in light of the non-formal setting. Considering the challenges faced in dealing with an unknown group of students, who are likely to be concerned with many things other than what I am trying to teach (the students are of course in a new setting, on a field trip, and perceive me as a stranger, among other possibilities) expecting the students to “walk in both worlds comfortably” after a one-day program is not realistic. As a teacher I know that existing knowledge is considered valuable and essential to the learning process and should be the starting point in planning the present, existential, teaching/learning situation. We should try to facilitate the development of conditions conducive to experiences leading to growth. In this case, however,

there is limited ability to use in-depth knowledge and sympathetic understanding of learners or insight into their past experiences to ensure that the learning experiences are developmentally appropriate, sufficiently varied and focused on relevant, familiar topics.

Second, I felt that the Elder could be engaged in a more meaningful way, with the teaching not presented as a “stand alone” piece but more fully involved with the BTG program. Moreover, there may not have been enough connection between the conceptual areas addressed in the program content (meeting habitats needs) and the focus of the Elders teaching (respect for our fellow animals). There was perhaps a need for to me consider the specific learning outcomes of the Grade 4 science cluster that might be addressed in the program and the related activities in which students would be involved in during the day. Rather than focusing on habitat needs, some of the other learning objectives from the science curriculum could be included, for example: (Sci) 4-1-09 Recognize that plant and animal populations interact within a community; (Sci) 4-1-13 Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community; (Sci) 4-1-14 Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations; (Sci) 4-1-15 Describe how their actions can help conserve plant and animal populations and their habitats; (Sci) 4-1-17 Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal populations and interactions; and (Sci) 4-4-15 Identify natural phenomena and human activities that cause significant changes in the landscape.

If felt these SLOs might provide more logical or suitable connections to the Elders teachings. I also began to consider some changes to the program itself. Recognizing the limitations of a one-day program, there would ideally be opportunity to do follow-up activities with the students. This would allow more opportunity to build on previous learning and provide more room for meaningful assessment.

Finally, it is important also to recognize that all learning is ongoing and takes a time to if depth and breadth of understanding is the goal. Within such a continuum of understanding, learning has no “ultimate destination” or end point. Particularly in this context of a non-formal program, with limited prior knowledge of students, fewer opportunities to engage in assessment, and no prospect of using assessment information to plan the next instructional steps, I can only hope to support students learning along this journey. My own experiences provide a good example of this. When I consider that my understanding of the “habitat concept” from a Western view is rooted in an academic background in environmental sciences, and that my own sense of appreciation and respect for natural habitats was borne out of regular childhood exposure to the natural world, it’s obvious that my commitments to environmental stewardship and sense of connection to the land developed over time and required extensive nurturing; it is not the result of a one-day field trip.

It is important to note that although the words “dilemma”, “issues”, “problems” are used in this thesis, all of these could and should be considered as “opportunities” or “invitations”. Developing a structured approach for evaluating student learning had not been done previously in the BTG program. Therefore, creating a framework to do so as part of this study would provide a foundation for modifying the program in subsequent years, as well as a means to collect data that could be used to report program outcomes to participating teachers and program funders.

Chosen Terminology - Indigenous Knowledges and Pedagogies

As an educator seeking effective ways to include Indigenous perspectives in my science-based environmental learning program, understanding the various definitions and approaches used has proven useful. Acknowledging that my own understanding and views reflect a specific point in time, drawing from the works of others and fitting this with my own lived reality and prior understanding, makes possible a richer description of “Indigenous Knowledges and

Pedagogies”. However, the description provided is not suggested as a universal truth. The intention is not to impose this view on others or to suggest that my own views will not continue to evolve and change. In fact, the following description is embraced as a part of an ongoing personal learning process. As I continue to learn from others while exploring alternative ideas through dialogue and reflection, this will almost certainly result in revising my views or reaffirming these views as true for me. As a Canadian educator, I opt to use the terms “Indigenous” and “Aboriginal” interchangeably based on the specific context in which I am working. However, given that the term “science” can be interpreted to mean different things, I am hesitant to include the term “science” as I feel this risks confusing the intended meaning or having its meaning inadvertently assumed. For example, one could interpret Indigenous science as their own understanding of “science” practiced by Indigenous people. In addition, using the term “science” and its associations with a Eurocentric worldview risks suggesting that “Indigenous Science” is merely a subset of science rather than a unique body of knowledge and method of inquiry in its own right. Indigenous knowledges and ways of knowing are able to transcend the boundaries imposed by a different worldview. Rather than forcing it to “fit” within a discipline-oriented compartmentalized structure, I opt not restrict it by including the term science, and use “Indigenous knowledges and pedagogies”.

Employing a Critical Pedagogy of Place - Revising the Bridging the Gap Program

In this study, the implementation of two lessons (see *Appendix D Intervention*) was used as the intervention. The implementation of these lessons was looked at from a programming perspective. The lessons were revisions to the original BTG lessons (see *Appendix E*). Gruenwald’s CPP was used to inform my pedagogical planning to ensure these lessons were more place-specific, contextualized at a local level and employed place-related pedagogies. This study sought to improve understanding and support future program planning, not to suggest direct correlation or determine causal relationships between variables, or assess individual

students. Rather, the focus was measuring the effectiveness of the strategies used and broader learning as a result of the entire process.

The two lessons, were designed to be more locally relevant with the sequencing of activities as well as the instructional and assessment strategies based on a sound rationale for place-based education, while also following a set of guiding principles for integrating Indigenous knowledges and pedagogies in science. The modified program also includes a series of follow-up activities for classroom teachers to use to continue related learning in the classroom. As an adapted approach for the BTG Program, these lessons were designed to address the following factors.

Embrace place-specific ecological attributes - In light of BTG's urban context, the concept of an "urban habitat" was embraced. Learners were encouraged to recognize that humans are dependent on the natural world and use living things and natural resources provided by this world. Learners were guided to discover that "nature" exists within an urban context and to consider their role as residents of an urban habitat and what it means to live respectfully from the land within this context. For example, in the original BTG Program student learning focused only on how wildlife meet habitat needs. In the revised BTG program, after sharing ideas about how wildlife living within local natural areas meet their habitat needs, learners were guided to discuss some of their similar needs for food, water, and space. Another change in the revised program is that after discussing some of the traditional ways that humans have met their needs (traditional plant use, hunting, trapping), learners were then guided to consider how the ways in which these needs are met have changed over time, particularly in contemporary, urban settings. Learners were also guided to reconsider common misconceptions of human relationships with the land (i.e., food does not "come from the store" and water does not "come from the tap").

Embrace place-specific cultural attributes - Relevant cultural attributes of BTG were embedded in the revised program goals and embraced proactively as integral components of

BTG, not as afterthoughts or add-ons. The overall learning objectives for the revised program include the original ecological concepts and skills from the Manitoba Grade Four science curriculum (those originally in the BTG Program), but also place equal emphasis on relevant learning outcomes from Manitoba's Aboriginal Languages and Cultures Curriculum Framework. Accordingly, key learning objectives for the revised program include learner's ability to: a) recognize how knowledge of plant and animal populations and interactions helped Aboriginal peoples to survive in the past; b) demonstrate proper protocols when working with Elders; and c) describe the traditional Aboriginal perspective on natural resources (e.g., no ownership of natural resources and all resources are to be shared).

In the revised program, Elders also continue to be involved in the first activity, the outdoor field trips and providing traditional cultural teachings. However, the Elder is involved throughout the activities instead of only speaking to students during the lunch hour break. To enhance the Elders involvement in the revised program and improve its cultural relevance, a second in-class activity was developed in collaboration with the Elder. This second activity provides learners with more exposure to Elders and Indigenous knowledges and facilitates opportunities for relationship building. Consideration of distinct worldviews was important when seeking to develop compatible learning experiences and teaching strategies.

A continued emphasis in the revised approach is to reinforce the concept that humans are animals; a concept aligned with the traditional Indigenous view of humans' relationship with the natural world. This required that the program assume the distinct viewpoint where all humans, perceived as animals, are part of a larger ecological system. Learners involved in BTG are encouraged to view themselves as human animals, an integral and interdependent part of the environment; not removed from it. Rather than having a distinct or superior status to other life forms, all human activities are discussed as integral aspects of the environment.

Other changes made included using present verb tenses to indicate that Indigenous knowledges are useful in contemporary society (versus applicable only in the past) and seeking out local interpretations rather than representing all Indigenous peoples as the same, or making generalized, stereotypical statements.

In addition to these changes, modifications were made to encourage learners to respect all traditional cultures. The non-formal educators and the Elder involved in the program included questions and comments in their teachings related to the need to respect all cultures.

“Demonstrate respect for and interest in learning about other cultures” was also added to the student learning objectives for the revised program, and learners were assessed on this as one of the criteria of the analysis and evaluation.

De-Emphasizing the Formal Curriculum – Then original BTG program had an ecology-based focus and was designed specifically to address learning outcomes from Manitoba’s Grade Four science curriculum. The revised program had a new emphasis on embracing local ecological and cultural attributes, requiring place-specific elements be used as the starting point when developing teaching and learning activities, not the formal curriculum. Accordingly, Specific Learning Outcomes (SLOs) from the provincial curricula for the revised program were selected based on the following criteria. First, SLOs needed to be relevant to the types of natural areas that are studied in the program (wetlands, tall-grass prairie, and aspen parkland forests), and the specific issues involved in preserving and protecting these natural areas (as well as the resident plant and animal populations within the urban setting). Secondly, the SLOs needed to provide suitable connections to the Elder’s cultural teachings and align with specific Indigenous knowledge bundles. As a result, curricular SLOs were incorporated in the program if they fit with the local ecological and cultural realities--not vice versa.

Student Learning Outcomes	
Revised BTG Program	Original Program - Year Two
Demonstrate appropriate protocols and behaviours when listening to an Elder	Identify and give examples of habitat components – food, water, shelter, space
Work cooperatively with peers in small groups	Investigate and describe three Manitoba habitats
Use previously collected data in a new way	Acknowledge that people and other living things are part of an interdependent family using nature as home
Recognize that plant and animal populations interact within a community	Reflect on personal behaviours and attitudes towards nature and identify issues related to environmental stewardship and sustainability in Manitoba.
Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community	Participate in activities that show respect, gratitude and appreciation of Manitoba's natural environment
Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions	
Demonstrate respect for and interest in learning about other cultures	
Recognize that humans are animals and part of the natural world	
Recognize that humans are dependent on the natural world and that people use living things and natural resources	
Indicate and provide a rationale for an interest in environmental stewardship	

Role of the Elder – The title “Elder” does not necessarily indicate age, and “...not all Elders are teachers, not all Elders are spiritual leaders and not all old people are Elders,” (Medicine, 1987, p. 147). Elders are described as respected individuals who have amassed a great deal of knowledge, wisdom and experience. They include men and women who have special gifts and are recognized for their wisdom. The community looks to them for guidance and sound judgment, and the wisdom of Elders is central to cultural learning. Elders are the “Keepers of Knowledge,” and it is their guidance that people seek as they strive for balance in their relationships with the Creator, the natural world, other people and themselves (Cajete, 1999; Report of The Royal Commission on Aboriginal Peoples, 1996; Western Canadian

Protocol for Collaboration in Basic Education, 2000). Elders are not only individuals with significant wisdom in areas of traditional knowledge, but they are recognized as having the capacity to transmit this knowledge to others and, thus, play an important role in passing on knowledge to younger generations. There are many different teaching topics, but each Elder holds and has ability to share specific place-based teachings. Across North America, many educators invite Elders to share traditional cultural teachings, exposing students to a worldview that recognizes the intrinsic value and interdependence of all living things. Elders have a socio-culturally grounded role in guiding, advising and supervising younger generations based both on their “traditional” knowledge and their understanding of “modern” knowledge (Western Canadian Protocol for Collaboration in Basic Education, 2000).

The presence and wisdom of Elders have been seen as an effective way to preserve and foster traditional knowledge in education, providing support for Aboriginal learners. Their involvement in education helps close generation gaps created by legacies of residential schools while strengthening Aboriginal pride and kinship. When involving Elders in education, it is essential that Elders not be viewed as decorative or symbolic. They must be acknowledged as leaders, deeply entrenched in educational foundations. As repositories of traditional knowledge and managers of Indigenous knowledge systems, they are primary providers and transmitters of information (Worldbank, 2006). It is recommended that Elders have an active role in education and be treated as professionals, respected for their expertise, unique knowledge and skills (Cooke-Dallin, et al., 2000). They must be seen as authoritative community stakeholders in developing culturally relevant science curricula (Aikenhead, 2006; ANKN, 2004a; Inuit Subject Advisory Committee, 1996; Kawagley et al., 1998; McKinley, 1996; Riggs, 2005; Sutherland & Tays, 2004).

In year two of the BTG Program (see Appendix E), the Elder was only involved in speaking to the students for 30 minutes during the field trip lunch break. The Elder’s shared

teachings over the lunch hour break was called “Friends with Relations”. The Elder describes to the students the principle of humans as being of “one-blood” with the animals. Like animals, the Elder describes how people also rely on plants and Mother Earth for survival, resulting in a need to be mindful of our responsibility to respect Earth/Mother and our fellow relations/animals. This Elder was not involved in any other activities of the Program.

A different Elder was involved in the revised program (see Appendix D). This Elder participated in developing the revised program and was a co-educator in both lessons. This Elder’s role in the field trip and teaching topic within the field trip was different from year two. Each field trip opened with the Elder’s 30-45 minute teaching, which provided an overview of the Seven Sacred Teachings, specifically focusing in on the Teaching/Law of respect, which is represented by the bison or buffalo. Students participating in Bridging the Gap were familiar with these teachings, as Winnipeg School Division has adopted such teachings within their schools. However, these teachings are place specific and would not be appropriate for all audiences. These teachings are intended to help all people have a good, healthy and balanced life. The buffalo teaches respect as it once provided many of turtle island nations with food, shelter and the tools needed to survive. Materials such as bison tallow (soap), hide (drum), tail hair (rope), dung (fuel), and stomach (pouch to carry water) are shown to students to highlight prior uses of the buffalo among Aboriginal people. Each teaching is always different, in that a buffalo song or story might be shared. However, the theme of bison and respect is always central. Tobacco is passed to the presenter for each individual program. Speaking with an Elder gives students the opportunity to explore a different perspective on the role of humans in the natural world. The class learns about environmental stewardship, human interrelationships, and our reliance on animals, plants and the earth for survival. The Elder also shares teachings about traditional uses for plants encountered along the field trip hikes.

Re-Envision "Success" - It is important to remain mindful that reinhabiting and decolonizing place takes time and involves significant work in the face of globalist pressures. Like many other environmental educators, I have what could be referred to as "idealistic" ambitions and hopes for the future of the world, and the potential of the transformative role of environmental learning. While hesitating to suggest that my expectations for the program were "lowered," I sense that they perhaps became more realistic. Coming to knowing is a lifelong journey-one that won't be accomplished through a two-day program alone. I, therefore, could not expect children to instantly develop "pro-environmental" behaviours as a result of participating in BTG. To measure the success of BTG based on such an ambitious goal would fail to account for some of the important achievements that the program does make. The revised approach to the BTG program, therefore, included modified goals of what the program seeks accomplish, as well as more realistic objectives for assessing learners ability to engage in Indigenous knowledge.

Chapter 4: Methodology

In this section, the research methodology for this study is outlined. This includes a rationale for the methodology, a description of the research setting, methods to be used in gathering data, ethical considerations, and the data analysis used for the findings.

Research methodology

The study analyzed my success in modifying BTG using place-related educational theories to effectively and respectfully integrate Indigenous knowledges and Indigenous pedagogies with science-based learning outcomes in a non-formal environmental learning program for urban youth. Using an action research methodology, the program focus was modified to reflect: a) the close fit between the programs goals and traditional Indigenous cultural values, identified as concepts at the heart of sustainability (Graham & Peters, 2002; Manitoba Education and Training, 1995, 2000); b) the rekindling of traditional cultural worldviews for this urban, largely Indigenous population, affected by historical issues related to colonialism; and c) the integration of Western and Indigenous worldviews while avoiding teaching science in an assimilative way (Aikenhead, 1997). This study involved implementing a revised approach to the original BTG program, that embraced BTG's unique social, environmental and economic contexts, and incorporating teaching and learning methods, informed by Gruenewald's CPP, that are place-specific and contextualized at a local level. The goal was to determine if this revised approach, with its emphasis on place and employment of place-related pedagogies enabled me to more effectively and respectfully integrate Indigenous knowledges and Indigenous pedagogies and to support meaningful student learning in a way that is both culturally and ecologically relevant.

This study took place in three natural settings. As the researcher I was directly involved in delivering the program/intervention. This study also dealt with interpreting individual values and attitudes. The action research approach was thus considered highly appropriate given that

this study also involved traditional, Indigenous knowledges. With a focus on improving understanding rather than making generalized conclusions, this was a participatory, culturally accommodating approach, emphasizing collaborative decision-making. In this study, the revised program was the intervention to address the stated research problem. As a qualitative study, the overall goal was to improve understanding and support future program planning not to suggest a direct correlation between variables.

Action research and participatory action research are appropriate and powerful methodologies, as they enable critical thought to be transformed into action through community decision-making. “Naturalistic inquiry focuses on understanding the systems of meaning and interpretation inherent in people’s everyday lives” (Stringer, 2004). Action research is an approach to producing knowledge through reciprocal exchange of information, dialogue, and joint analysis between a professional researcher, or research team, and the people affected by the situation under study for the purpose of effecting positive social change. An action research approach, which includes respect of Indigenous Knowledges and worldviews and assists individuals and communities in making use of their own understanding and expertise, may assist in the reconciliation process and generate new forms of knowledge drawing on ancient and modern traditions (Hughes, 2000, Smith, 1999).

The action research model draws upon a collaborative approach to investigation that seeks to engage participants, in this case, traditional land users and teachers, as equal and full participants in the research process. The approach reinforces the application of practical knowledge to community-defined issues and problems in a way that provides long-term improvement in the quality of life of a group of people (Fletcher, 2003). Action research addresses pressing community issues because it is community-based, action-based, and focused on knowledge gathering (Stringer, 2004). The action research approach is appropriate in that the questions asked arise among those who will benefit most from the research.

The action research approach can be culturally accommodating, inclusive, democratic, participatory, and empowering. It can acknowledge differences between “professional knowledge” of the researcher and other relevant forms of knowledge. It can extend understanding and link research objectives and methodologies to community needs and context enabling meaningful integration of knowledge obtained through research. This methodological approach is, therefore, highly suited to studies involving Indigenous people, communities and/or other issues relevant to Indigenous people.

People have intimate, detailed knowledge of their everyday realities. When they become the researchers and not merely the researched, the activity of research is transformed. They are able to reclaim control over their ways of knowing and being and work in a format that “makes sense” to their lifestyle and culture. They are able to use their experience and local wisdom to work systematically through a process of investigation to acquire a deeper, broader, and more effective understanding that enables them to develop workable solutions to the problems they investigate (Stringer, 2004).

Action research can also be political in nature. As a research methodology with roots in Critical Theory, the approach has been used in some cases to create more democratic societies by educating workers, minorities, and Indigenous people about the underlying causes of their oppression (Friere, 1970). Action researchers commonly seek to “give voice” to the oppressed, trying to be genuinely democratic or non-coercive and enabling those to being helped to determine the purposes and outcomes of their own inquiry. Action research can help by implementing emerging canons in which Indigenous Knowledges provides the framework for conducting research and Indigenous people do the research themselves (Patten & Ryan, 2001).

The methods of data collection and assessment used in Action Research are also highly suited to projects involving Indigenous peoples where knowledge must be earned based on trust relationships and be mutually beneficial. A cooperative approach used within the action research

framework appropriately seeks to develop partnerships where participants are viewed as equals thereby facilitating the creation of trust and accountability. The flexible nature of the action research approach also enables use of data and research quality assessment techniques based on Western notions of scientific quality and on criteria prescribed by the Indigenous participants (Weber-Pillwax, 2001; Lomawaima & McCarty, 2002).

Research methods

In exploring ways to integrate Indigenous knowledges and pedagogies with science-based learning outcomes in the BTG program, the ongoing challenge has been to ensure that attempts to do this meaningfully support learning while respectfully reflecting the local cultural traditions, languages, beliefs, and perspectives; to move from “token” attempts to include traditional Indigenous perspectives to a more holistic approach to making the program culturally relevant. This research study developed as an attempt to address this challenge within Bridging the Gap. I sought to transform BTG into a program that is adapted to and accounts for its unique socio-ecological situation, creating teaching and learning strategies that are contextualized at a local level, relevant within a specific place with unique social, environmental, and economic contexts. The primary purpose of the project was to study the effectiveness of my teaching and my revisions to in BTG. I implemented a revised approach (Appendix D) to the original BTG program (Appendix E), which was informed by Gruenewald’s CPP. I then analyzed the success of these modifications and reflected upon whether an emphasis on place and employment of place-related educational theories allowed me to more effectively and respectfully integrate Indigenous knowledges and Indigenous pedagogies and improve the program’s ability to connect Indigenous knowledges and pedagogies with science based learning outcomes related to environmental stewardship.

The intervention

In this study, the implementation of two lessons (see *Appendix D Intervention*) was used as an intervention and looked at from a programming perspective. The lessons were revisions to the original BTG lessons (see *Appendix E*) and Gruenwald's CPP was used to inform my pedagogical planning to ensure these lessons were more place-specific, contextualized at a local level and employ place-related pedagogies. The two lessons, were designed to be more locally relevant with the sequencing of activities as well as the instructional and assessment strategies, based on a sound rationale for place-based education, while also following a set of guiding principles for integrating Indigenous knowledges and pedagogies in science. The modified program also includes a series of follow-up activities for classroom teachers who wish to continue such integrated learning in the classroom. As an adapted approach for the BTG Program, these lessons were designed to: embrace place-specific ecological attributes; embrace place-specific cultural attributes; de-emphasize the formal curriculum; and re-envision "success". I coordinated the program activities and the evaluation of student learning, and then reflected upon the effectiveness of the strategies used in the revised program.

This study involved two Grade Four teachers from the Winnipeg School Division's Inner City School District and their classes. In the first weeks of the 2009/2010 school year, these Grade Four teachers and their classes were invited to participate in the "Bridging the Gap Program." On separate dates, in the autumn, each class visited the Assiniboine Forest and Living Prairie Museum as part of a six-hour field trip and completed a three-hour in-class follow-up activity. The dates for the field trip and the in-class activity were scheduled, at the convenience of the Grade Four teachers, during the months of October, November and December 2009. These two schools and both teachers had participated in the BTG program previously and had verbally indicated that they were willing to be involved in this research. Both teachers and their students were asked to participate on a voluntary basis as part of regular classroom learning experiences.

The students in the two classes were asked to (a) complete a written journal entry while at school and (b) participate in informal, large group discussions and no more than two one-on-one discussions with me during the field trip and in-class activities. Each class participated in two large-group discussions and two one-on-one discussions with me. The written journal entry was part of the follow-up activity and required no more than 45 minutes. The journal entry and informal discussion focused on children's understanding of habitats, the environment, and traditional Indigenous knowledges. I wrote notes based on children's verbal responses and my observations of them while they participated in the program during the field trip and in-class activities. I include direct quotations from the verbal and written responses, but make no reference to specific student names, teacher names or the name of specific schools.

For each class the field trip (Lesson One) was an outdoor habitat study in which students visited three Winnipeg habitats (tall grass prairie, wetland and forest) as part of the full-day field trip. Two non-formal educators and one Elder were the teachers for the field trips. A guided study of each habitat was divided into three sections, beginning with a discussion with the Elder, followed by a hike, and concluding with the recording of information in data booklets. Speaking with the Elder gave learners the opportunity to explore a different perspective on the role of humans in the natural world, and learn about Indigenous approaches to environmental stewardship, and our reliance on animals, plants and Mother Earth for survival. The focus of the Elder's teaching was responsibility and respect for Mother Earth as well as our fellow animals and relations. During the hike, students were introduced to the resident animals, plants and unique features of the habitat. Breaks were taken for the tasting of edible plants, such as licorice root and rose hip. This encouraged a discussion of local food sources and allowed students to connect concepts with concrete examples. The hike concluded with a review and recording of information about the components of the habitat. A new data sheet was designed to reinforce the

concept that humans are also animals. The new data sheet includes a column to record the habitat needs of two animals; humans in addition to a resident wildlife species.

For the second lesson, *Earth's Medicines*, each class participated on separate dates following their field trip. The *Earth's Medicines* lesson plan outlines a three hour or more teaching and learning sequence completed in three parts. For the purpose of this study, Part A of *Earths Medicine's* was completed by each of the classroom teachers one day before Parts B and C. Parts B and C were lead by the two non-formal educators and the same Elder who was involved during the field trip.

The participating Elder is employed full time at the Thunderbird House in Winnipeg, Manitoba and has been involved for several years in leading traditional ceremonies and providing teaching in a variety of settings including classrooms and conferences. He is well respected within his community for his expertise, knowledge and ability to share his traditional Cree teachings. He was well acquainted with the BTG Program and lessons, and had previously worked with many of the schools within Winnipeg School Division.

Timelines

This study began in October of 2009, with the first phase of the action research cycle completed by January 2011 as follows:

October – November 2009: Implement two lessons, collect data

November 2009 – January 2011: Data analysis, summary of results, report writing and program modification

Collection of Student Data

To ensure reliability and dependability, data-gathering procedures and analysis techniques must be located in the historical, disciplinary or traditional contexts in which the methods were developed, in addition to considering factors of culture and language (Eisenhart & Borko, 1993; NAAEE, 1996). Data needed to be measurable and appropriate given the contextualized nature

(specific time, population and location) of this study (Stringer, 2004). Within the given limitations of this study, all efforts were made to ensure data-gathering instruments and protocols were developed collaboratively and tailored to suit the particular student population. Analysis of the study data was comprehensive, drawing on more than one source of information and striving to provide reasonable explanations for how conclusions were drawn. I have used both my prior knowledge and experience in BTG, and the data from the students who participated in this study. My interpretation of student data is not an evaluation of the learners, but a means to evaluate my practice and the changes I made to BTG as part of this study.

The following provides an outline of the methods I used to collect and analyze student data to inform my reflection. As the focus of this study was to reflect upon and analyze my teaching, a pre-instructional test was not considered necessary.

Self-Assessment and Journal Responses - A student journal response sheet was used to collect feedback on student thoughts and understanding pertaining to the assessment criteria (see Appendix B). The sheet was designed to provide students with an opportunity to respond either in writing or in picture format. The journal responses also included two self-evaluation questions (Questions #1 and #2).

Informal Interviews - Informal student discussions were used in this study to aid in interpreting results and help explain anomalies. Informal questioning of students, using open-ended questioning aimed at assessing student's stage of development with each of the assessed criteria. Interviews can be a useful method for improving the reliability and validity of questionnaires used in education research (Desimone & Le Floch-Kerstin, 2004). Interview questions clarified and/or probed for deeper understanding of the students written responses to the "Thinking About Habitats and Earth's Medicines" worksheet (see Appendix D). For example, I asked students, "why do you think (or not think) the Elder's teaching helps you think of ways to show respect for habitats and nature's gifts." Results of the informal student

interviews used in the assessment in Earth's Medicines were limited as there is an inherent complexity of measuring feelings and emotional data, especially for the participating students who may be shy, or attempting to provide responses to please the researcher. The use of multiple data sources and triangulation in the data analysis phase helped address this challenge.

Student Observations - The classroom teachers were invited to assist in recording observations of participating students during the lesson to provide contextual information, and assist in determining student stage of development in each of the assessed criteria (see Rubric p.59).

Observations and informal interview data were used to assist in interpreting the journal responses and, thus, satisfy the common requirement for research validity of data triangulation by source and method (Stringer, 2004). The data was analyzed both quantitatively and qualitatively with the view that this approach enabled comparisons to be made between participants and allow individual voices to be heard.

Treatment of student data.

Although the two classrooms that participated in this study were from two separate schools, the compiled data and charts are analyzed as a whole. This is because teacher effects were avoided in this study as all participants experienced the same program, taught by the same teacher. However, to confirm this, comparisons were also made between the results from the two classrooms to inform the overall analysis. Using the same data, comparisons were then made between the results from Aboriginal and Non-Aboriginal participants.

Quantitative analysis of student data.

Based on observation throughout the activities, anecdotal notes, informal student interviews and self-assessment, and a review of journal responses, a mutually agreed upon ranking for each student was assigned following collaborative analysis and discussion with the Elder and the co-educators. After the two lessons had been implemented, the Elder, and the co-educators and I

reviewed the data and the scoring rubric (p.70) and decided a score for each learner from 1-4 based on their stage of Mastery (Stage One: No Attempt; Stage Two: Emerging/Stage Three: Beginning to / Developing; Stage Four: Able to/Mastery). This process of deciding a score was collaborative, with all educators' opinions and views considered equally valid. Final scores were assigned once consensus was reached. I completed the data analysis. The student learning data were analyzed within each of the 11 criteria (learning outcomes) using the compiled data, comparing the data for each school, and comparing data from Aboriginal and Non-Aboriginal learners. For some closely related criteria (criteria four and five; criteria eight and nine; and criteria ten and eleven), the results were analyzed together.

The following rubric was used for scoring:

	1	2	3	4
Demonstrate appropriate protocols and behaviours when listening to an Elder	No Attempt; Student interrupts often by whispering, making distracting comments or noises. Statements, responses and/or body language were consistently not respectful.	Student interrupts once or twice, by whispering, making comments or noises that distract others OR moves around in ways that distract others.	Student listens quietly and does not interrupt. Student does not volunteer answers, but willing tries to answer questions she/he is asked.	Student listens quietly and does not interrupt. All statements, body language, and responses are respectful and are in appropriate language.
Work cooperatively with peers in small groups	No Attempt; Does not listen to, shares with, or supports the efforts of others.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Usually listens to, shares, with, and supports the efforts of others.	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.
Use previously collected data in a new way	No Attempt; Student does not willingly participate	Some attempt made: Most responses are not clear, accurate or thorough. Student does not refer to previous data.	Emerging/Developing; Most responses are clear, accurate and thorough, and student refers to and uses previous data once or twice.	Most responses are clear, accurate and thorough, and student refers to previous data frequently.
Recognize that plant and animal populations interact within a community	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough. Student is able to give some examples.
Demonstrate respect for and interest in learning about other cultures	No Attempt; Statements and responses are consistently not respectful.	Statements and responses are usually respectful but student is not able to give some examples of why respecting other cultures is important.	Statements and responses are always respectful. Student is able to give some examples of why respecting other cultures is important.	Student is able to give several detailed examples of why respecting other cultures is important.
Recognize that humans are animals and part of the natural world	No Attempt; No responses are clear, accurate or thorough.	Most responses are not clear, accurate or thorough.	Emerging/Developing; Most responses are clear, accurate and thorough.	All responses are clear, accurate and thorough.
Recognize that humans are dependent on the natural world and that people use living things and natural resources	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.

Indicate and provide a rationale for an interest in environmental stewardship	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
Share ideas of ways to participate in environmental stewardship	No Attempt; Student does not willingly participate	Some attempt made: Most responses are not clear, accurate or thorough. Student does not refer to previous data.	Emerging/Developing; Most responses are clear, accurate and thorough, and student refers to and uses previous data once or twice.	Most responses are clear, accurate and thorough, and student refers to previous data frequently.

The process used for the analysis of student learning data within each of the assessed criteria is outlined below:

1. Demonstrate appropriate protocols and behaviours when listening to an Elder

This is one of the key cultural learning outcomes in *Earth's Medicines*. Results for this criterion were based on learners' journal responses, self-assessment and informal interviews as well as my observations.

2. Work cooperatively with peers in small groups

This is an important skill for learners in multiple disciplines including science. Results for this criterion were based on learners' journal responses, self-assessment and informal interviews as well as my observations.

3. Use previously collected data in a new way

This is another important skill in science. Results for this criterion were based on my observations during lesson two, when students were asked to use data from the field trip to assist them in completing the Medicine Wheel activity.

4. Recognize that plant and animal populations interact within a community

5. Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community

As key concepts in science, these two criteria are closely connected and, therefore, analyzed together as learners' ability to predict effects of changes within communities / populations is founded on prior understanding of ability to recognize that plant and animals interact. Results for these criteria were based on learners' informal interviews as well as my observations.

6. Recognize and appreciate how traditional knowledge contributes to understanding plant and animal interactions

This is one of the key cultural learning outcomes addressed in *Earth's Medicines* and a key concept in science. Results for this criterion were based on learners' journal responses, and informal interviews as well as my observations.

7. Demonstrate respect for and interest in learning about other cultures

This is one of the key cultural learning outcomes addressed in *Earth's Medicines*. Results for this criterion were based on learners' journal responses, and informal interviews as well as my observations.

8. Recognize that humans are animals and part of the natural world

9. Recognize that humans are dependent on the natural world and that people use living things and natural resources

These are key cultural learning outcomes addressed in *Earth's Medicines* and a key concept in science. Results for this criterion were based on learners' journal responses, and informal interviews as well as my observations.

10. Indicate and provide a rationale for an interest in environmental stewardship

11. Share ideas of ways to participate in environmental stewardship

Criteria ten and eleven are key components of Bridging the Gap, crossing multiple disciplines. These two criteria are closely connected and, therefore, analyzed together. These are important cultural learning outcomes addressed in *Earth's Medicines*, key concept in science, a directly support broader goals for the BTG Program. Results for these criteria were based on learners' journal responses, and informal interviews as well as my observations.

Qualitative analysis of student data.

Observations, informal interview data, student journal responses and self-assessments, as well as my anecdotal notes, were used to analyze the data qualitatively. Observer impression was the interpretive technique used for the qualitative analysis of data. I observed and examined the data, interpreting it by forming an impression and reporting this impression using themes. Data

were reviewed and analyzed to determine specific themes emanating from the responses, to inform the overall analysis, to draw conclusions and to assist in answering the research questions. Qualitative analysis was performed once, using the compiled data.

Practitioner reflection and follow-up action

Following the analysis of data, a key component of using an action research approach is planning for an action phase (Stringer, 2004). For this study, after the data collection and analysis was complete, the BTG Program was, and will continue to be modified/adjusted based on the outcomes, conclusions and recommendations of this study. The intent was to establish a cyclical format for ongoing, systematic program evaluation and improvement, to ensure that the program continues to evolve and adapt. I also provide suggestions for other practitioners, as well as recommendations future research.

Research setting, participants and stakeholders

Given the highly contextualized nature of this study, the following detailed background of the contexts and participants enhances the potential transferability of the study design and results (Creswell & Miller, 2000; Stringer, 2004)

Inner City District of the Winnipeg School Division – This study involved students and teachers from the Winnipeg School Division's Inner City School District. The Inner City District consists of twenty-one schools, which serve the downtown-area and surrounding neighbourhoods. There are approximately 7,500 students attending schools in this district, and the schools serve children and families from many different backgrounds, cultures, and beliefs. Two schools from this Division and approximately 45 Grade Four students were invited to participate on a voluntary basis as part of regular classroom learning experiences. Informed written consent was obtained from teachers, students and parents.

Naturalist Services Branch, City of Winnipeg – The Naturalist Services Branch oversees the design of promotional and educational materials as well as supervision of all restoration, trail

improvement or other activities that occurred as part of this study. The researcher is a Program Coordinator with Naturalist Services, responsible for all aspects of BTG program delivery (including fund development, marketing, planning, program scheduling, development of material, and preparing project reports).

Aboriginal Elder – One Elder agreed to be involved. Informed consent was obtained from the participating Elder to act as a co-educator as part of this study.

Background on participating schools.

A total of 23 students had parental consent to participate in this study. Of the total of 23 students that participated in this study, nine were Aboriginal.

The first school, School One and the participating teacher have been involved with the BTG program for three years, and the teacher is well acquainted with the program goals. Approximately 70% of the 24 students in this class are Aboriginal. The classroom teacher described the students as “low functioning” and noted that nine students were EAL. Three of these EAL learners spoke and understood very little English. Of a total of twelve students from School One participating in this study, seven were Aboriginal.

School Two and the participating teacher have been involved with the BTG program for four years, and the teacher is well acquainted with the program goals. Of a total 26 students in this classroom, seven were Aboriginal, with the majority being of Philippino decent. The teacher noted that this was a “high functioning and well behaved” group. Of a total of 11 students from School Two participating in this study, two were Aboriginal.

Limitations

It is important to acknowledge some of the inherent limitations and challenges of this study as outlined below.

Although all efforts were made to get signed consent from the parents of the fifty students in both classrooms, many consent forms were not returned. As a result, the sample size for the

student learning data was small. However, given that the focus of this study was to analyze and reflect upon my own learning and my teaching practice the small sample size was sufficient.

Tacit knowledge, the kinds of knowledge we can only reveal in the way we carry out tasks and approach problems, is knowing *in* the action that is derived from research, and as well as a practitioner's reflections and experience (Schön, 1983). I draw upon my tacit knowledge and prior experience in the BTG Program to help inform my reflection on the student data.

Various other factors influence and affect the teaching and learning process such as the interests of the teachers involved and the specific student demographics. To enhance the validity of the study, teachers and other stakeholders were actively engaged in all phases of the program development, implementation, and the data analysis (Creswell and Miller, 2000, Stringer, 2004).

As a naturalistic study, with no experimental control group, this study was not designed to conclude or suggest that the findings could be generalized beyond the local context (i.e. that the approach used would have the same results for another group of students). As Stringer (2004) insists, action research results are, "truths-in-context" and are "specific to particular contexts and lack stability over time" (p. 55). The intent of this study will, therefore, be limited to developing a better understanding of effective ways of integrating Indigenous knowledge and science in the BTG program for the participating groups of learners. With a focus on improving understanding rather than making generalized conclusions, this is a participatory, culturally accommodating approach, emphasizing collaborative decision-making in the development of the BTG program. The overall goal is to improve understanding and support future program planning not to suggest direct correlation or causal relationships between variables.

Ethics

Prior to undertaking this research, Education/Nursing Research Ethics Board at the University of Manitoba and the Winnipeg School Division approved this research. Written informed consent of the participating superintendent, principals, teachers, students and parents /

guardians was acquired. Teachers and students were invited to participate on a voluntary basis as part of regular classroom learning experiences. The names of the schools, the Elder, teachers and student remain confidential. This study also involves an Aboriginal Elder who has been involved with the BTG program since 2007. This Elder agreed to participate in the BTG program through the sharing of traditional Aboriginal teachings with the students and teachers during the school field trips. The Elder was informed in writing of the ways he would participate in the study and gave written consent... The participating schools and teachers were selected based on their previous experience with, and enthusiasm about, the BTG program. Both teachers verbally indicated via face-to-face conversation that they were willing to participate in this research and assist in acquiring written informed consent from their students and the respective parents / guardians. No confidential records were consulted. The nature of the study and subjects' participation in the study was explained to all subjects in writing as part of the process of requesting written consent (please see attached Appendix B and C).

Chapter 5: Presentation of Student Data

With this research project, the overall goal was to develop a more effective, intercultural approach for BTG by implementing and evaluating the success of the revised program informed by Grunewald's CPP. The focus was on determining my effectiveness as a practitioner by collecting and analyzing quantitative and qualitative data from students who participated in the intervention. I used this data and my interpretation of it, alongside my prior knowledge and experiences working with the BTG Program in the past, to inform my reflection and analysis. As a study of my teaching practice and the BTG Program, the intent was not to evaluate the students, draw correlations between variables or suggest universal truths. Rather I sought to evaluate my success as a practitioner, while improving my understanding of how to include Indigenous knowledges and pedagogies in the BTG Program.

Quantitative student data

Data used to assess student learning involved observations, informal interviews and student journals (which include self-assessment). Each learner was assessed as to their 'Stage of Mastery' on a scale of 1 to 4, for each of the 11 criteria (learning outcomes). This assigned stage was determined with input from the classroom teachers and student input from the self-assessments. With an assigned stage given, results were compiled into table. Sample student journal responses and comments are presented in Chapter 6 to substantiate the stage to which each student was assigned.

Based on observation throughout the activities, anecdotal notes, informal student interviews, a self-assessment and a review of journal responses, a mutually agreed upon ranking for each student was assigned following collaborative analysis and discussion with the Elder, and the co-educators. Student learning data was analyzed within each of the 11 criteria (learning outcomes) using the compiled data, comparing the data for each school, and comparing data from Aboriginal and Non-Aboriginal learners. For some closely related criteria (criteria four and

five; criteria eight and nine; and criteria ten and eleven), the results were analyzed together. The following three tables were then prepared to summarize the results for use in the subsequent analysis and evaluation.

*Compiled data.***Table One: Compiled Data**

Criteria					
	Stage	1	2	3	4
1. Demonstrate appropriate protocols and behaviours when listening to an Elder	0	0	3	20	23
2. Work cooperatively with peers in small groups	0	3	6	14	23
3. Use previously collected data in a new way	0	2	12	9	23
4. Recognize that plant and animal populations interact within a community	0	0	5	18	23
5. Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community	0	2	10	11	23
6. Recognize and appreciate how traditional knowledge contributes to understanding plant and animal interactions	0	1	8	12	21
7. Demonstrate respect for and interest in learning about other cultures	0	0	8	12	20
8. Recognize that humans are animals and part of the natural world	0	0	11	12	23
9. Recognize that humans are dependent on the natural world and that people use living things and natural resources	0	1	16	5	22
10. Indicate and provide a rationale for an interest in environmental stewardship	0	0	9	14	23
11. Share ideas of ways to participate in environmental stewardship	0	0	2	21	23

*School comparison data.***Table Two: School Comparison Data**

Criteria	School One					School Two				
	1	2	3	4	n	1	2	3	4	n
1. Demonstrate appropriate protocols and behaviours when listening to an Elder	0	1	2	9	12	0	0	0	11	11
2. Work cooperatively with peers in small groups	0	3	3	6	12	3	3	3	8	11
3. Use previously collected data in a new way	0	2	5	5	12	0	0	7	4	11
4. Recognize that plant and animal populations interact within a community	0	0	4	8	12	0	0	2	9	11
5. Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community	0	2	6	4	12	0	0	4	1	11
6. Recognize and appreciate how traditional knowledge contributes to understanding plant and animal interactions	0	1	3	6	10	0	0	5	6	11
7. Demonstrate respect for and interest in learning about other cultures	0	0	5	4	9	0	0	2	9	11
8. Recognize that humans are animals and part of the natural world	0	0	7	5	12	0	0	4	7	11
9. Recognize that humans are dependent on the natural world and that people use living things and natural resources	0	1	8	2	11	0	0	8	3	11
10. Indicate and provide a rationale for an interest in environmental stewardship	0	0	6	6	12	0	0	3	8	11
11. Share ideas of ways to participate in environmental stewardship	0	0	0	12	12	0	0	2	9	11

*Aboriginal and non-Aboriginal comparison data.***Table Three: Aboriginal and Non- Aboriginal Comparison Data**

Criteria										
	Aboriginal					Non-Aboriginal				
Stage	1	2	3	4	n	1	2	3	4	n
1. Demonstrate appropriate protocols and behaviours when listening to an Elder	0	1	2	6	9	0	0	0	14	14
2. Work cooperatively with peers in small groups	0	2	5	2	9	0	1	1	12	14
3. Use previously collected data in a new way	0	1	7	1	9	0	1	5	8	14
4. Recognize that plant and animal populations interact within a community	0	0	4	5	9	0	0	1	13	14
5. Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community	0	2	6	1	9	0	0	4	10	14
6. Recognize and appreciate how traditional knowledge contributes to understanding plant and animal interactions	0	1	6	1	8	0	0	2	11	13
7. Demonstrate respect for and interest in learning about other cultures	0	0	3	4	7	0	0	5	8	13
8. Recognize that humans are animals and part of the natural world	0	0	2	7	9	0	0	9	5	14
9. Recognize that humans are dependent on the natural world and that people use living things and natural resources	0	0	8	1	9	0	1	8	4	14
10. Indicate and provide a rationale for an interest in environmental stewardship	0	0	4	5	9	0	0	5	9	14
11. Share ideas of ways to participate in environmental stewardship	0	0	1	8	9	0	0	1	13	14

Qualitative data

Observations, informal interview data, student journal responses and a self-assessment as well as my anecdotal notes, were used to analyze the data qualitatively. Data were reviewed and analyzed to determine specific themes from the responses to inform the overall analysis, draw conclusions and assist in answering the research questions. Due to scheduling and timing constraints, I conducted this analysis independently without input from other co-teachers. Three themes emerged for subsequent analysis: 1) understanding of stewardship in an urban context, 2) recognizing that humans are animals and part of the natural world; and 3) developing environmental stewardship values without providing a rationale for why environmental stewardship should be practiced.

Summary

This study involved collecting and compiling qualitative and quantitative data. Following implementation of the intervention, qualitative data was compiled into three tables: combines data; school comparison data; and Aboriginal-Non-Aboriginal comparison data. These tables, combined with the three themes resulting from the qualitative analysis, were used in the subsequent analysis and assist in answering the research questions.

Chapter 6: Data Analysis and Evaluation

As an action research study, the focus was on analyzing the effectiveness of the intervention used as part of this study to determine: a) if an emphasis on place and employment of place-related educational theories assisted me in my pedagogical planning and provided a suitable means to effectively and respectfully integrate Indigenous knowledges and pedagogies with science based learning outcomes in the Bridging the Gap program for urban Indigenous youth; and b) if the changes made to the original the Bridging the Gap program and implemented as part of this study helped BTG learners move towards the “inhabitation” end of the resident-inhabitant spectrum. The nature and context of this study required that evaluation of the strategy involve more than examination of student learning data alone. As a study designed to improve understanding, one of the most relevant aspects of evaluation was the degree to which my understanding was improved as a result of the study, making critical personal reflection essential.

Student Data

Quantitative analysis

Based on observation throughout the activities, anecdotal notes, informal student interviews, a self-assessment and a review of journal responses, a mutually agreed upon ranking for each student was assigned following collaborative analysis and discussion with the Elder and the co-educators. Student learning data was analyzed within each of the 11 criteria (learning outcomes) using the compiled data, comparing the data for each school, and comparing data from Aboriginal and Non-Aboriginal learners. The rubric in Chapter 4 was used for the quantitative scores of learners’ assessed stages (Stage One: No Attempt; Stage Two: Emerging/Stage Three: Beginning to / Developing; Stage Four: Able to/Mastery). For closely related criteria (criteria four and five; criteria eight and nine; and criteria ten and eleven), the results were analyzed together. The overall results were interpreted as negative if the majority of learners achieved Stage 3 or lower, satisfactory if less than 75% of learners achieved Stage 3 or

4, and positive if greater than 50% of learners achieved Stage 3 or 4.

Criteria one: Demonstrate appropriate protocols and behaviours when listening to an Elder.

This is one of the key cultural learning outcomes in Earth's Medicines. Results for this criterion were based on learners' journal responses, self-assessment and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria one Demonstrate appropriate protocols and behaviours when listening to an Elder	No Attempt; Student interrupts often by whispering, making distracting comments or noises. Statements, responses and/or body language were consistently not respectful.	Student interrupts once or twice, by whispering, making comments or noises that distract others OR moves around in ways that distract others.	Student listens quietly and does not interrupt. Student does not volunteer answers, but willing tries to answer questions she/he is asked.	Student listens quietly and does not interrupt. All statements, body language, and responses are respectful and are in appropriate language.
<i>Compiled</i>	0	0	3	20
<i>Aboriginal</i>	0	1	2	6
<i>Non-Aboriginal</i>	0	0	0	14

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals, self-assessment and informal interview comments help to clarify how the stage of mastery was assigned:

Stage 1: N/A

Stage 2: "I was distracted" (Student 2) - self-assessment

Stage 3: "I was trying to be listening" (Student 3) - self-assessment

Stage 4: "I listened about mother earth" (Student 1) "I think I was good and respectful"

(Student 7) "I listened medicines and respect for earth" (Student 1) "My favorite part was

learning from the teachings" (Student 14) - learners' journals

The overall results were interpreted as positive considering that 20 out of 23 of the learners were at Stage Four, and the remaining students were either at Stage Three or Two. Results indicate that for both classes, the majority of the learners were able to demonstrate appropriate protocols when listening to the Elder. This suggests that future BTG activities should continue to include time to prepare students and make them aware of proper protocols.

No notable differences between the results from the two schools were observed.

When comparing results from Aboriginal and non-Aboriginal learners, non-Aboriginal learners scored somewhat higher for this criterion, with all of the learners in Stage Four.

Criteria two: Work cooperatively with peers in small groups.

This is an important skill for learners in all school subjects including science.

Results for this criterion were based on learners' journal responses, self-assessment and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria two Work cooperatively with peers in small groups	No Attempt; Does not listen to, share with, or support the efforts of others.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Usually listens to, shares, with, and supports the efforts of others.	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.
<i>Compiled</i>	0	3	6	14
<i>Aboriginal</i>	0	2	5	2
<i>Non-Aboriginal</i>	0	1	1	12

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals, self-assessment and informal interview comments help to clarify how the stage of mastery was assigned:

Stage 1: N/A

Stage 2: “I wanted to draw instead” (Student 8)

Stage 3: “I was distracted” (Student 2)

Stage 4: “We were working together and we were helping each other to” (Student 7) “I worked with everyone and was good” (Student 5) “I was helping others and doing my work” (Student 9)

The overall results were interpreted as satisfactory, with 14 out of 23 of the learners at Stage Four.

On the whole, both groups of learners were scored in high stages for this criterion All Class Two learners were determined to have reached Stage Three or higher.

For School One, only half were at Stage Four. However, the classroom teacher indicated that, in her opinion, the class typically has problems working in groups (i.e. the satisfactory results reflect the typical characteristics of these learners’ ability to work cooperatively with peers in small groups).

When comparing results from Aboriginal and non-Aboriginal learners, non- Aboriginal learners scored somewhat higher for this criterion, with 12 out of 14 of the learners in Stage Four.

Criteria three: Use previously collected data in a new way.

The ability to use and apply information in new contexts is another important skill in science. Results for this criterion were based on my observations during lesson two, when students were asked to use data from the field trip to assist them in completing the Medicine Wheel activity.

Stage	1	2	3	4
Criteria three Use previously collected data in a new way	No Attempt; Student does not willingly participate	Some attempt made: Most responses are not clear, accurate or thorough. Student does not refer to previous data.	Emerging/Developing; Most responses are clear, accurate and thorough, and student refers to and uses previous data once or twice.	Most responses are clear, accurate and thorough, and student refers to previous data frequently.
<i>Compiled</i>	0	2	12	9
<i>Aboriginal</i>	0	1	7	1
<i>Non-Aboriginal</i>	0	1	5	18

In addition to the description from the scoring rubric for this criterion, the following descriptions of my observations help to clarify how the stage of mastery was assigned:

Stage 1: N/A

Stage 2: Students were observed attempting to complete the activity, but do not refer to their previous data.

Stage 3: Students were observed checking and using their previous data once or twice to complete the activity.

Stage 4: Students were observed referring to and using their previous data frequently to complete the activity.

The overall results were interpreted as satisfactory, with the most of the learners at Stage Three. Even with prompting, many students seemed reluctant to refer to the field trip data sheets, preferring to complete the Medicine Wheel activity using information constructed elsewhere. For future BTG activities, this suggests that additional supports and/or encouragement are needed to ensure students follow the instructions.

No notable differences between the results from the two schools were observed.

No notable difference is noted when comparing results from Aboriginal and non-Aboriginal learners.

Criteria four: Recognize that plant and animal populations interact within a community and Criteria five: Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community.

As key concepts in school science, these two criteria are taught within the context of food webs and energy flow within a habitat community, therefore, the results are reported and analyzed together. Results for these criteria were based on learners' informal interviews as well as my observations.

Stage	1	2	3	4
Criteria four Recognize that plant and animal populations interact within a community	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
<i>Compiled</i>	0	0	5	19
<i>Aboriginal</i>	0	0	4	5
<i>Non-Aboriginal</i>	0	0	1	13
Criteria five Predict, based on their investigations, how the removal of a plant or animal population may	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
<i>Compiled</i>	0	2	10	11
<i>Aboriginal</i>	0	2	6	1
<i>Non-Aboriginal</i>	0	0	4	10

In addition to the description from the scoring rubric for this criterion, the following responses from learners' informal interview comments and my observations help to clarify how the stage of mastery was assigned:

Criteria four:

In my informal interviews with the students I asked them talk about relationships or connections between specific plants and animals within a community.

Stage 1: N/A

Stage 2: N/A

Stage 3: "I think they (deer) might eat it (the plant) or something" (Student 2)

Stage 4: "The squirrel hides the acorn and then it makes a new tree" (Student 12)

Criteria five

In my informal interviews with the students I asked them what would happen if a specific plant or animal was removed from a community. For example, "[W]hat would happen to the dragonflies if their where no mosquitoes?"

Stage 1: N/A

Stage 2: "Maybe something bad might happen" (Student 8)

Stage 3: "There wouldn't be as many bugs" (Student 8) "They would have more room to fly" (Student 1)

Stage 4: "The beavers wouldn't have as much food so some might die" (Student 10)

The overall results were interpreted as positive. However, the learners were better able to recognize that plant and animal populations interact within a community, than to predict consequences of plant or animal removal from the community.

No notable differences between the results from the two schools were observed.

Not surprisingly, with both classes, more students were able to demonstrate reaching higher stages of mastery for criteria four than they were for criteria five. This suggests that in the future:

a) more time should be spent using the completed Medicine Wheels in individual and large group discussions, reviewing the effects of removing a specific habitat population and allowing students to use this to predict changes as a population of plants or animals is removed or the size of the population is altered; and/or b) that additional or modified supporting activities are required for this specific sub-concept.

No notable difference is noted when comparing results from Aboriginal and Non-Aboriginal learners.

Criteria six: Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions.

This is one of the key cultural learning outcomes addressed in *Earth's Medicines* and a key concept in science. Results for this criterion were based on learners' journal responses, and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria Six Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough. Student is able to give some examples.
<i>Compiled</i>	0	1	8	12
<i>Aboriginal</i>	0	1	6	1
<i>Non-Aboriginal</i>	0	0	2	11

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals and informal interview comments help to clarify how the stage of mastery was assigned:

Stage 1: N/A

Stage 2: "I still don't understand" (Student 8)

Stage 3: "A habitat is medicine...give food water shelter and space" (Student 4) "Mother earth is like medicines" (Student 5)

Stage 4: "The medicine wheel teaching showed me about habitats and showed me how animals survive" (Student 7) "The elder teaches us about mother earth respect for animals and our homes" (Student 12)

The overall results were interpreted as positive because 57% of the learners were at Stage Four. Many of the learners had clearly made connections between the Medicine Wheel teachings and the concept of habitat.

No notable differences between the results from the two schools were observed. In both schools, many learners indicated previous engagement with Indigenous knowledge and in School Two some students had learned previously about the Medicine Wheel. The percentage of learners that demonstrated they were in Stage Three or above is a positive finding.

When comparing results from Aboriginal and non-Aboriginal learners, 11 of 13 non-Aboriginal learners were at Stage Four and none were below Stage Three, whereas the 6 of 9 Aboriginal learners were at Stage Three, and some at Stage Two. As one of the key cultural learning outcomes in the revised BTG program, this noted difference for Criterion six raises interesting questions. For example, there is a good likelihood that culturally relevant programs such as BTG can be as beneficial for non-Aboriginal students as Aboriginal students.

Criteria seven: Demonstrate respect for and interest in learning about other cultures.

This is one of the key cultural learning outcomes addressed in *Earth's Medicines*. Results for this criterion were based on learners' journal responses, and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria seven Demonstrate respect for and interest in learning about other cultures	No Attempt; Statements and responses are consistently not respectful.	Statements and responses are usually respectful but student is not able to give some examples of why respecting other cultures is important.	Statements and responses are always respectful. Student is able to give some examples of why respecting other cultures is important.	Student is able to give several detailed examples of why respecting other cultures is important.
<i>Compiled</i>	0	0	8	12
<i>Aboriginal</i>	0	2	3	4
<i>Non-Aboriginal</i>	0	0	5	8

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals and informal interview comments help to clarify how the stage of mastery was assigned:

Stage 1: N/A

Stage 2: N/A

Stage 3: "Because I care about others" (Student 15) "If not it would be mean" (Student 10)

Stage 4: “It would really hurt their feelings because all people are different” (Student 7)

“Everyone is related” (Student 10) “We are all brother and sisters” (Student 11) “My favorite part was learning about habitats and cultures” (Student 12)

The overall results were interpreted as positive because all learners were at Stage Four or Three, and 12 out of 23 of the learners were at Stage Four. Learners’ comments in particular indicated that in addition to respecting Aboriginal cultures, they respect all people. This is a positive finding given that both groups of learners were scored in high stages for this criterion.

No notable differences between the results from the two schools were observed.

No significant difference is noted when comparing results from Aboriginal and non-Aboriginal learners.

Criteria eight: Recognize that humans are animals and part of the natural world, and

Criteria nine: Recognize that humans are dependent on the natural world and that people use living things and natural resources.

These are key cultural learning outcomes addressed in Earth’s Medicines and key concepts in school science. Results for these two criteria were based on learners’ journal responses, and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria eight Recognize that humans are animals and part of the natural world	No Attempt; No responses are clear, accurate or thorough.	Most responses are not clear, accurate or thorough.	Emerging/Developing; Most responses are clear, accurate and thorough.	All responses are clear, accurate and thorough.
<i>Compiled</i>	0	0	11	12
<i>Aboriginal</i>	0	0	2	7
<i>Non-Aboriginal</i>	0	0	9	5

Criteria nine Recognize that humans are dependent on the natural world and that people	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
<i>Compiled</i>	0	1	16	5
<i>Aboriginal</i>	0	0	8	1
<i>Non-Aboriginal</i>	0	1	8	4

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals and informal interview comments help to clarify how the stage of mastery was assigned:

Criteria eight:

Stage 1: N/A

Stage 2: N/A

Stage 3: "I live on the earth" (Student 5) "I respect the earth" (Student 9)

Stage 4: "I am part of mother earth" (Student 12) "We are living because we came from earth...everyone and everything is part of nature" (Student 10)

Criteria nine:

Stage 1: N/A

Stage 2: "I'm not an outdoor person" (Student 8)

Stage 3: "We need the earth" (Student 12)

Stage 4: "We need air and the earth to be healthy" (Student 14) "if we did not have mother earth we would die" (Student 13)

The overall results were interpreted as satisfactory. A larger percentage of the learners were generally better able to recognize that humans are animals and part of the natural world, than recognize human dependence on the natural world for survival. This is, perhaps, a reflection of their urban situation, age and/or education level.

No notable differences between the results from the two schools were observed.

Unlike past my experiences with the BTG program, the majority of the learners in this study were able to recognize that humans are animals. This is a positive finding of this study. Fewer learners were able to demonstrate mastery of Criterion nine, human dependence on natural resources to survive. This suggests that more time and/or additional activities that engage learners in exploring the origins of “urban habitat components” and the connections to natural resources (e.g. original sources of food investigations) should be considered. There is also the possibility that revised assessment strategies are needed.

When comparing results from Aboriginal and non-Aboriginal learners for criterion eight, 1 of 9 of Aboriginal learners were at Stage Four, compared with 4 of 13 non-Aboriginal learners.

Criteria ten: Indicate and provide a rationale for an interest in environmental stewardship, and Criteria eleven: Share ideas of ways to participate in environmental stewardship.

Criteria ten and eleven are key components of Bridging the Gap, addressing multiple disciplines. These two criteria are closely connected and, therefore, were analyzed together. These are important cultural learning outcomes addressed in *Earth's Medicines*, and reflect the broader goals of the BTG Program. Results for these criteria were based on learners' journal responses, and informal interviews as well as my observations.

Stage	1	2	3	4
Criteria ten Indicate and provide a rationale for an interest in environmental stewardship	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough.
<i>Compiled</i>	0	0	9	14
<i>Aboriginal</i>	0	0	5	5
<i>Non-Aboriginal</i>	0	0	5	9
Criteria eleven Share ideas of ways to participate in environmental stewardship	No Attempt; Student does not willingly participate	Some attempt made; No responses are clear, accurate or thorough.	Emerging/Developing; Some responses are clear, accurate and thorough.	Most responses are clear, accurate and thorough. Student is able to give one or two examples.
<i>Compiled</i>	0	0	2	12
<i>Aboriginal</i>	0	0	1	8
<i>Non-Aboriginal</i>	0	1	1	13

In addition to the description from the scoring rubric for this criterion, the following responses from learners' journals and informal interview comments help to clarify how the stage of mastery was assigned:

Criteria ten:

Stage 1: N/A

Stage 2: N/A

Stage 3: "Yes nature is important" (Student 12) "I have to respect people and nature too"

(Student 13)

Stage 4: “Habitats are important because the earth keeps us alive” (Student 1) “without earth we would live no longer” (Student 15) “Earth is what you live on and if you don't take care of it something bad will happen” (Student 10)

Criteria eleven:

Stage 1: N/A

Stage 2: N/A

Stage 3: N/A

Stage 4: “not littering, learning about nature” (Student 8) “always show respect to one another” (Student 9) “ride a bike instead of a car” (Student 9) “recycle, plant ride a bike and not drive” (Student 11)

The overall results were interpreted as positive with high percentages of learners in Stage Four for both criteria.

No notable differences between the results from the two schools were observed. For both classes, learners were able to indicate and share ideas of ways to participate in environmental stewardship, but fewer were able to provide a rationale for why they would do this.

No notable difference is noted when comparing results from Aboriginal and non-Aboriginal learners.

Qualitative analysis

Observations, informal interview data, student journal responses, self-assessments, as well as my anecdotal notes, were then used to analyze the data qualitatively. Observer impression (Creswell, 2003; Denzin & Lincoln, 2005; Dey, 1993) was the interpretive technique used for the qualitative analysis of data. I observed and examined the data, interpreting it by forming an impression and reporting this impression using themes. Data were reviewed and analyzed to determine specific themes from the responses to inform the overall analysis, draw

conclusions, and assist in answering the research questions. Qualitative analysis was performed once, using the compiled data.

The following themes emerged:

1. Understanding of stewardship in an urban connect

As a program in an urban connect, the revised BTG Program was designed to be more locally relevant, emphasizing BTG's unique place-specific attributes. The learners responses revealed they have a sense of how to participate in stewardship within a city. Rather than more abstract examples, such as saving tropical rainforests, many learners were able to share ideas of how to participate in environmental stewardship that they themselves could practice regularly. Responses and comments such as, "we cannot litter", "we should learn about nature", "recycle", and "instead of driving we can ride a bike", demonstrate that the revised program assisted learners in knowing how to participate in stewardship within a city. Learner responses also indicate that their experiences have transcended into new types of understandings of environmental stewardship, which reflect both ecological and cultural learning. In many cases their verbal and written feedback illustrates that they acknowledge the intrinsic eco-cultural connectedness within the concept of environmental stewardship. For example, when asked to provide examples of how to practice stewardship, student responses included "always show (ing) respect to one another," and "being kind to others." A positive outcome with both classes was that almost all of learners as well as the classroom teachers expressed interest in learning more about habitat, stewardship and related traditional knowledge. In the informal feedback from learners, learners indicated that listening to the Elder was their favourite part of the lesson.

2. Recognizing that humans are animals and part of the natural world

As a key cultural learning outcome embraced in the revised BTG program, student responses indicate that the new approach has supported understanding of humans as animals and, therefore, humans as part of the natural world. Responses and comments such as, "everyone and

everything is part of nature,” “I am part of mother earth,” “The elder teaches us about mother earth respect for animals and our homes,” and “we came from earth,” demonstrate the success of the revised program in assisting learners in coming to know this fundamental ecological tenet.

Summary

- On the whole, compiling the data from both schools was acceptable, with no notable differences when comparing the quantitative results from the two schools.
- When comparing the results from Aboriginal and non-Aboriginal participants, for most criteria, no significant differences were noted although non-Aboriginal learners generally scored higher for each criterion or group of criteria. Non-Aboriginal learners scored higher for Criteria six: Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions. As one of the key cultural learning outcomes in the revised BTG program, this noted difference for criterion six raises interesting ideas related to the potential value of culturally relevant programs for both Aboriginal and non-Aboriginal learners
- Two themes emerged from the qualitative analysis: 1) understanding of stewardship in an urban context; and 2) recognizing that humans are animals and part of the natural world.

Practitioner Reflection

As an environmental educator, I am determined to think carefully about the choices I make when developing programs, as I become critically aware of the various influences that impact my decision making process. Embedded in this study is my story, my connections to BTG and motivations for the decisions I have made in the past and continue to make.

This study provided me with an understanding of the complexity of the issues and topics addressed, and contributed valuable ideas for me to move forward with the on-going development of the Bridging the Gap Program. I feel I have used a CPP to improve the BTG Program and generated new ideas for future development. What is interesting and perhaps

equally valuable is the process of self-actualization and transformation I experienced as the primary researcher in this study. One of the most satisfying accomplishments involved my own process of “coming to knowing”. In my journey as a co-learner in BTG, there was a transformation of my own thinking as a researcher-practitioner and an emerging willingness to be patient, while becoming more critical of my preconceived notions of how success can be measured in environmental learning and how I can make more informed decisions about program modifications and revisions. I am now more aware of the diverse forms of knowledge and types of educational expertise. For example, I have transitioned from a narrow view of Elders as “educational resources” to now considering these men and women as my colleagues, advisors, and co-educators. My involvement with Elders through this study has helped me learn more about my Aboriginal ancestry. As a result, I have expanded upon my own preconceived ideas of who environmental learning experts are and what “environmental learning” is. In essence, I have enhanced my own understanding while contributing to the creation and development of a beneficial educational program. With my evolving conceptions, there has emerged a new level of trust in my own professional expertise and willingness to challenge pressures to conform to externally imposed standards and mandates.

I am just starting to be more comfortable with walking between worldviews and cultures. An Aboriginal colleague told me, “You know what, we’re all Elders in training.” I’m learning to be okay with this. Essentially, I’m learning to think of myself as being a part of this cultural identity as well. It’s resonating with the fact that I do have an Aboriginal heritage and my personal journey towards becoming an inhabitant.

As the educator in this setting, it is also important to acknowledge my limitations and process of learning. I am someone still developing both my own pedagogical practice and my own understanding of traditional Indigenous worldviews. It is, therefore, imperative that part of the process of addressing this dilemma includes a commitment to ongoing professional

development as the program developer, both in the traditional “training” sense and in learning more about my cultural background, and developing closer relationships with local Elders. A continued process of meaningful reflection is also important. I should not expect that the program will ever reach a point of “perfection”, but recognize that it will continue to evolve to address current problems and new ones as they arise as I improve my understanding of the various issues involved. As alluded to by several of people who know me well enough to point it out, I have personal visions for change that sometimes interfere with the ability to take a step back, see things from the outside and take a more practical approach. I can perhaps aspire to be part of larger solutions, akin to the environmental mantra, “think global act local”.

One of the most important lessons I’ve learned during this reflective process (and will still struggle to be mindful of) is the importance of pacing, both in my daily activities and teaching practice, and when setting my short and long-term goals. As my friends and family never hesitate to remind me, I am and have for many years been a workaholic and a perfectionist and have been referred to on many occasions as having “Type A Personality Disorder”. I’ve been known to frequently walk a fine line between being dedicated, passionate, devoted, and neurotic and fanatical – a trend that I would speculate is fairly common amongst environmental educators. I worked with a very experienced teacher once who was nearing the end of her teaching career. She continued to remind me about the importance of pacing myself and knowing my limits, As I continue to remind myself to put this advice into practice, my students, family and friends, and overall health will undoubtedly benefit.

I’m beginning to see my teaching practice as a developmental process where I cannot expect perfection. In fact, in times when I feel most ineffective, I’m likely to be most able to improve my teaching by reflecting on the choices made and rethinking some possible alternatives. Therefore, much of what I can learn about teaching will be from mistakes I make (i.e. being imperfect) because these mistakes provide information to help me become a better

teacher. Perhaps if I begin to think of mistakes as "learning opportunities" the perfectionist in me will be better able to cope.

Perhaps the greatest obstacle for me to overcome will in fact be to admit my "humanness". In order to truly pursue greater learning opportunities, and strive to be the best teacher, environmental educator, or even human being that I can, I will need to learn to openly admit my imperfections and even occasional incompetence to my colleagues and peers. I have so much yet to learn.

I have come to accept that it is okay to leave things unanswered. What is important is to at least think about my teaching and more importantly think about my own thinking, and the potential causes and influences of my thoughts and practices. Moreover, I have come to a genuine appreciation of the value of self-knowledge - understanding my own personal bias, my influences and how this transcends my teaching and daily life practices and affects how I respond in different situations. By thinking critically about my teaching – seeing myself on the outside – I feel as though I've come to a better understanding of myself. This self-knowledge has truly become transformative for me, giving me new insight or a "back of the mind perspective" on my teaching, and changing my relationships with students and colleges as I begin to consider more critically the complex influences on each individual in developing their own beliefs, opinions and ways of thinking.

As I become more aware of my own limitations, I am intrigued by other additional benefits of the BTG program, beyond my goals for student learning. In fact, one of the most positive outcomes of this study is the more thorough understanding I have gained of the value of the multi-stakeholder, multi-sectoral approach to teaching and learning I have been part of. As the primary researcher and a non-formal educator, my ability to build on existing networks, acquire funding to bring Elders into these classes lead to a tremendous "value-added role" for the BTG program - a valuable role as facilitator, supporting teachers who may be struggling to

integrate Indigenous knowledge in their own classroom programming, demonstrating “how it can be done” and giving the Elders an opportunity to be invited into the classroom in meaningful contexts. In this study, the two teachers and the Elder were very grateful for this opportunity. BTG no longer duplicates existing teaching and learning activities. It provides a value-added, facilitative role, supporting classroom teachers who in several cases suggest they struggle to find ways to integrate traditional Indigenous knowledge in their own programming. BTG has modeled one approach to doing this while providing the participating Elders with an opportunity to be invited into the classroom in a meaningful context.

As a researcher in this study and a non-formal educator, it was also interesting to come to a point of realizing that this sector is well positioned to add incredible value to formal learning in the classroom. Realizing that in the past, the BTG program, focused on assessment through teacher evaluation forms, this study has revealed the potential of using this partnership approach to developing an integral student assessment process (i.e. assessment of changes in learners understanding as an indication of the success of the program). This is another positive outcome in terms of the study and has developed a measurable result to present to BTG program funders to justify the need for a broader scope and greater length of the program. The BTG program is now well positioned to engage in requesting additional funding. This study has therefore contributed to my own understanding while improving the BTG program, and has the potential to provide valuable insight for others.

From the assignments in my teacher training, to the requirements for applying for teaching positions, an emphasis on the importance of reflection seems to have become commonplace. Although it seems logical that regular reflection would be a good professional practice, I have never truly enjoyed what was delicately referred to as “fluffy stuff”. Ironically, it has only been in the process of writing this reflection, documenting ideas that were previously only in my head, that I’ve truly been able to recognize trends, relationships between different

areas of my life and possible explanations. Through this process, I feel that I've been able to be more critical and hope that I will have now gained greater perspective and control over my own development as a teacher and my plans for the future. I continue to gain more understanding each day of how every decision and action I make is rooted in a belief or experience I've had, and how I can use this increased understanding of myself, and my motivations, biases and weaknesses to become a better teacher, researcher and person. I am further convinced of this approach and re-inspired to "tackle invitations" presented in my future work. My suggestion to others is to be very open-minded, be willing to recognize and acknowledge that you don't know everything and that you are constantly learning and evolving in your understanding.

Action Phase

A key component of using an action research approach is also planning for an action phase (Stringer, 2004). Based on the outcomes from this study, consideration of additional program modifications and outlining next steps is, therefore, essential, supporting the creation of a cyclical format for ongoing, systematic program evaluation and improvement, to ensure that the program continues to evolve and adapt over time.

The results of the student data suggest several ways for me to improve future BTG activities including:

- Development of a comprehensive teacher input format (e.g. documented interview) to assist in understanding the dynamics of BTG classes and improve learner assessment as part of BTG activities;
- Providing additional supports and/or encouragement to ensure students follow the instructions provided for activities related to using previously collected data in a new way;

- Development of activities to engage learners in exploring the origins of “urban habitat components” and the connections to natural resources, and/or revised assessment strategies;
- Seeking engagement of program stakeholders in all phases of the program development, implementation, and the data analysis to enhance the validity of the study (Creswell & Miller, 2000; Stringer, 2004). For example, by modifying journal questions and interview protocols in collaboration with the school staff and parents, or otherwise directly engaged stakeholders and community members. Active participation of the teachers, parents and other members of the community will not only enhance the study’s validity, but also support stronger “buy-in” from the individuals directly or indirectly affected by the program.

This study also gave me new ideas for future research as outlined below:

Science Learning and Sense of Place – I am interested in measuring, documenting and explaining children’s sense of place. This research project will explore children’s sense of place in an urban inner-city, and how this sense of place is affected through participation in culturally relevant environmental learning programs.

Bridging the Gap: Teacher Self Efficacy and Elder Perspectives - Over the years, many teachers and different Elders have participated in the Bridging the Gap Program. This research project will explore: the changes in the self efficacy of the participating teachers in working with Elders and traditional knowledges; and the perspectives of the participating Elders.

I also looked for and will continue to seek out opportunities to share my learning from this study with others in multiple contexts. The following are examples of how I have been doing just this:

- Swayze, N and Kazina, D. (2009). *Bridging the gap*. Green Teacher: Two-Eyed Seeing: Integrative Science Two-Eyed Seeing. Issue 2086.

- Swayze, N. (2008). Engaging Indigenous urban youth in environmental learning.. *Canadian Journal of Environmental Education and Communication, 14*
- Swayze, N. (2007). *Bridging the gap: Engaging inner city youth in stewardship using principles of Indigenous science*. Paper presented at the 2007 annual meeting of the North American Association For Environmental Education
- Canadian Aboriginal Science and Technology Society, (CASTS) 8th National Aboriginal Science and Technology conference *Calgary, Alberta.(Published in Conference Proceedings)*
- Graduate Student Research Symposium – University of Manitoba *March 7th 2008*
- SAGE Conference – University of Winnipeg *March 13th 2008*
- American Education Research Association (AERA) - *Research on Schools, Neighborhoods, and Communities: Toward Civic Responsibility March 24-28th New York, NY*
- The Fifth Annual Aboriginal Education Research Forum: Shawane Dagoiwin - Ethics of Honouring Indigenous Knowledge Bundles and Elder Teachings for Research Relevance

Chapter 7: Discussion

Introduction

In this study, the modified program was the intervention to address the research problem - moving from “token” attempts to include traditional Indigenous perspectives to a more holistic approach to making the BTG program culturally relevant. As a qualitative study, the overall goal was to improve understanding and support future program planning not to suggest direct correlation between variables or to assess individual students. Throughout this research, I focused on exploring place as a concept underpinning Indigenous pedagogies and environmental education. I aimed to embrace BTG’s unique social, environmental and economic contexts, and develop and implement a revised teaching and learning strategy that is contextualized at the local level. This study provided an opportunity to critically evaluate and improve practice, and the effectiveness of my teaching and my revisions to in BTG.

To this end, my thesis addressed the following research questions:

1. Can an emphasis on place and employment of place-related educational theories assist me in my pedagogical planning and provide a suitable means to effectively and respectfully integrate Indigenous knowledges and pedagogies with science based learning outcomes in the Bridging the Gap program?
2. Will the changes made to the original the Bridging the Gap program and implemented as part of this study help BTG learners move towards the “inhabiting” end of the inhabiting-residing continuum?

As stated earlier, Question One was focused on my reflection of my teaching and my broader learning. For Question Two, I did not do pre-instructional and post-instructional tests when collecting student data, and drew on my prior experiences with the BTG Program to help answer this question. When seeking to answer this question, my interpretation of student data was not an

evaluation of the learners, but a means to evaluate my practice and the changes I made to BTG as part of this study.

Answers to Research Questions

1. Did an emphasis on place and employment of place-related educational theories assist me in my pedagogical planning and provide a suitable means to effectively and respectfully integrate Indigenous knowledges and pedagogies with science based learning outcomes in the Bridging the Gap program?

In this study I implemented a revised approach to the original BTG program, which was informed by Gruenewald's CPP. With its two intertwined objectives of reinhabitation and decolonization, Gruenewald's CPP fits well with the reality of the BTG program, and was therefore used in the process of developing the revised approach to the BTG program. The revised BTG Program was based on a sound rationale for place-based education, designed to be more locally relevant, while also following a set of guiding principles for integrating Indigenous knowledges and pedagogies in science teaching. Acknowledging that learning about, in, and for the environment requires moving beyond generic or universalized approaches, I chose to de-emphasize the role of broad mandates and resist demands for standardization. Instead, by "embracing the local," BTG's unique place-specific attributes became the starting points when developing new program goals and selecting teaching and learning strategies. The adapted approach for the BTG Program was designed to: a) embrace place-specific ecological attributes; b) embrace place-specific cultural attributes; c) de-emphasize the formal curriculum; and d) generate realistic goals for student learning. I then analyzed the success of these modifications and reflected upon whether an emphasis on place and employment of place-related educational theories allowed me to more effectively and respectfully integrate Indigenous knowledges and Indigenous pedagogies and improve BTG learners ability to connect Indigenous knowledges and pedagogies with science based learning outcomes related to environmental stewardship. As

a result of the modifications made, when compared to the original program, the revised BTG Program, has more effectively and respectfully integrated Indigenous knowledges and pedagogies with science-based learning outcomes for science. The success realized in improving the program resulted largely by having embraced place-specific ecological and cultural attributes.

Another important component of this study was the opportunity to critically evaluate and improve practice. From my perspective, a CPP also provided an ideal structure to revise and improve my understanding of the BTG program and my pedagogical decision making process, while expanding my views on the ways in which place-based education can be applied, and the role of critical, place-based approaches within broader educational reform movements. An emphasis on place and employment of place-related educational theories assisted me in my pedagogical planning. The revised approach, included specific assessment strategies which provided a more comprehensive understanding of the degree to which I effectively and respectfully integrated Indigenous knowledges and pedagogies with science based learning outcomes in the Bridging the Gap program.

My interpretation of the student learning data, informal feedback from classroom teachers, and my own reflection seem to indicate that the revised approach has helped the BTG program move from “token” attempts to include traditional Indigenous perspectives to a more holistic approach to making the program culturally relevant. With the revised approach, the Elders involvement and the inclusion of Indigenous knowledges in the program created a program that was more relevant and meaningful. Rather than being included in the program as an add-on, Elders were involved throughout, and their teachings were connected to the learning outcomes for students.

More exposure to Elders and Indigenous perspectives now facilitates opportunities for relationship building. In lesson two, the students worked with the Elder to explore the teachings

of the Medicine Wheel. With the guidance of the Elder, the Medicine Wheel was used in as a model to depict an ecological web, helping students to visualize the interdependencies and connectedness among all life forms. Students also had the opportunity to interview the Elder and to ask questions about traditional relationships with the land, perspectives on natural resource use and ways to show respect for the land and nature's gifts. Students were also prepared in advance to ensure their awareness of proper protocols for working with an Elder, for example, in the ceremonial presentation of tobacco. These important changes appear to have helped to insure that Indigenous perspectives are shared with students in a more authentic and meaningful way.

With the revised BTG program implemented in this study, student feedback indicates that their experiences seem to have transcended into new types of understandings of environmental stewardship, which reflect both ecological and cultural learning. Not only did many learners demonstrate recognition and appreciation of how traditional knowledge contributes to understanding plant and animal interactions, but in many cases their verbal and written feedback also suggested that they acknowledged the intrinsic eco-cultural connectedness within the concept of environmental stewardship. For example, when asked to describe ways to participate in environmental stewardship, one response was "always show respect to one another". This reply was much different than responses expressed in my previous experience with the Program.

Endeavouring to teach from within a culture rather than about a culture, and through dialogue with the participating Elder, the program goals were revised to ensure that Indigenous knowledges are presented as being interconnected with many areas or fields of thought. This reflects a holistic point of view that is not bounded by a narrow, discipline specific context. In a marked shift from its original focus on addressing learning outcomes in the provincial science curriculum, BTG now integrates several complementary curricular outcomes in learning experiences. In marked contrast to the original program, children participating in BTG activities while working with an Elder experience Indigenous perspectives related to environmental

stewardship with teachings framed around relationships such as the interconnectedness of humans, animals, plants, the earth, and the Creator.

With the extended learning activities in BTG that involve Elders, children are now provided with more opportunities to practice proper protocols for working with these teachers. In fact, some of the children participating in BTG were not only fully aware of the proper protocols for working with an Elder, but also indicated that listening to the Elder is one of the highlights of their experience in the program. The Elder also expressed gratitude for being able to participate in the program, viewing the experience as an opportunity to rekindle traditional forms of intergenerational knowledge sharing. Using this customized, participatory approach helped to ensure that the Elder was not viewed as a decorative or symbolic component of the program, and also created richer, more authentic learning experiences for the children, while facilitating Elder engagement in the education system in a more meaningful way.

One of the reasons that modifications to the BTG program were made was to reflect the high percentage of Winnipeg's population of Aboriginal youth attending school in the inner-city (Statistics Canada, 2003) as large percentages of learners who participate in BTG are usually of Aboriginal descent (Métis, First Nations, or Inuit). In this study, however, only nine participants were Aboriginal and the majority of the participants were either of Philippino descent or recent immigrants. The non-Aboriginal learners scored higher in qualitative results related to key cultural learning outcomes. This raises interesting questions related to learning about traditional knowledges and values, and the potential for culturally relevant programming to be beneficial for Aboriginal and non-Aboriginal learners.

2. Did the changes made to the original the Bridging the Gap program and implemented as part of this study help BTG learners move towards the “inhabiting” end of the inhabiting-residing continuum?

Gruenewald (2003) explains the distinction between inhabiting and residing in a place. An

inhabitant has detailed knowledge of, and an intimate connection to a place, and has developed a deep sense of care as someone who “dwells” in that place. A resident has little connection to a place beyond its ability to gratify and is more of a temporary occupant. As a researcher-practitioner, I was intrigued by the notion of “inhabiting” vs. “residing” in a place and the potential existence of a continuum between these two. My belief is that learning is a lifelong journey, one that all educators embark upon along with the learners they teach, ideally moving ever closer to the “inhabitant” end of this continuum..

Acknowledging that process of decolonization and rehabilitation exists as part of a lifelong continuum, I along with the students I worked with in this study, appear to be drawing towards the inhabitant end of the continuum. For example, one positive outcome with the students in both classes was that nearly all of the students as well as the classroom teachers expressed an interest in learning more about habitat, stewardship and related traditional knowledge. In the informal feedback from learners, the majority of the students indicated that listening to the Elder was their favourite part of the lesson. This is an exciting realization, and can be construed as an important starting point for engaging early years students in Indigenous knowledges, the teachings of Elders and concepts of environmental stewardship. By reinforcing place as a primary experiential/educational context, the BTG program now employs adaptive and locally relevant methods, learning content, and strategies that attempt to address various aspects of social and ecological marginalization and to support a continued process of reinhabitation. I am excited about the positive changes that have been made, and the indications of success to date. I have also become mindful that reinhabiting and decolonizing place takes time and is a lifelong process. A final positive outcome of this study is the generation of potential assessment ideas for developing and testing an instrument to measure sense of place and the inhabiting-residing continuum.

What is interesting and of equivalent value is the process of self-actualization and transformation I experienced as the primary researcher in this study. One of the most satisfying accomplishments realized involved my own process of “coming to knowing”. In my journey as a co-learner in BTG there was a transformation of my own thinking as a researcher-practitioner and an emerging willingness to be patient, while becoming more critical of my preconceived notions of how success can be measured in environmental learning and how to make more informed decisions about program modifications and revisions. I am more aware of the various influences on how I learn and have learned to learn, both scientifically, reflectively, and from a cultural perspective. I am also more aware of the diverse forms of knowledge and types of educational expertise. For example, I have transitioned from a narrow view of Elders as “educational resources” to considering them my colleagues, advisors, and co-educators. As a result, I have expanded upon my own perceptions of who environmental learning experts are and what “environmental learning” is. In essence, I have enhanced my own understanding while contributing to the creation and development of a beneficial educational program. With my evolving conceptions, there has emerged a new level of trust in my own professional expertise and willingness to challenge pressures to conform to externally imposed standards and mandates.

Conclusions

Overall, this study was successful, effectively addressed the research problem and allowed me to answer the research questions, thus, satisfying the need for outcome validity (Creswell & Miller, 2000). This study provides an understanding of the complexity of the issues and topics addressed and contributed valuable ideas to move forward with the on-going development of the Bridging the Gap Program. As a practitioner reflection, this study was about my story and journey as an educator, researcher and person, as I sought to improve my practice. In addition to the self-actualization I realized, and acknowledgement of my own process of coming to know, I was able to use a more constructive approach to trying to include Indigenous

knowledges and pedagogies in the BTG Program, drawing on both my own practitioner knowledge and a relevant theoretical framework. My hope is that my work will inspire other to take a constructive, critical approach to their work as I am learning to do.

Life is full of choices. Yet sometimes the most influential aspects of our lives are those that we don't choose. Our families, our ethnicity, the places where we grow up-- these reflect the critical "unchoices" in our lives. As an environmental educator, researcher, and human, I am becoming increasingly aware of the impacts these "unchoices" have on me, and the children that I teach and learn with. I am determined to think carefully about the choices I make when developing programs, as I become critically aware of the various influences that impact my decision making process. I encourage others to do the same.

"Experience is not what happens to you... experience is what you do with what happens to you"

Aldous Huxley

A friend of mine once gave me the following advice – "When you bump your head against a new experience, take time to figure out what happened and why." Teaching is a developmental process and much of what we learn comes from mistakes made and challenges encountered. John Dewey often said that we learn not simply by doing but by reflecting on what we do. Paul Freire's theories also support my growing conviction of the importance of reflection – examining our own thoughts, beliefs, and actions allowing us to identify centering truths while in dialogue with others – ultimately leading to heightened consciousness and improved practice. Teaching like many professions is a fast paced, complex and demanding profession, affording little time to engage in reflective practice the way Dewey intended. Undertaking this study reinforces the value of reflecting on past "bumps on the head" in a meaningful way in order to improve understanding and teaching practice. It provided a format to gain additional perspectives and see issues and challenges from the outside. Inevitably, this study has lead to several "aha"

moments for me but more importantly provided a means to move from “aha” to “action” - a promising way to bridge the theory-practice gap.

Moving beyond the form of reflection that takes place on the ride home as we “unwind” from the day, to actually documenting challenges encountered, organizing thoughts and soliciting feedback from others, we are able to be more critical of past events, gain a greater perspective and use this to address challenges in constructive ways. As educators, the times when we feel we are most ineffective provide key opportunities to improve practice through meaningful reflection, and these challenges and dilemmas become valuable “learning opportunities.” By thinking critically about dilemmas encountered and seeing them from the outside, a transformation occurs. With new insight and perspective we are able to see dilemmas as an opportunities and invitations to improve practice.

Suggestions for future development and research

This study has provided new ideas for future research as outlined below:

Science Learning and Sense of Place – I am interested in measuring, documenting and explaining children’s sense of place. This research project would explore children’s sense of place in an urban inner-city, and how this sense of place is affected through participation in culturally relevant environmental learning programs.

Bridging the Gap: Teacher Self Efficacy and Elder Perspectives - Over the years, many teachers and different Elders have participated in the Bridging the Gap Program. This research project would explore the changes in the self efficacy of the participating teachers in working with Elders and traditional knowledges as well as the perspectives of the participating Elders.

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Education and Small Schools.

Please note:

- **if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Eveline Saurette in the Office of Research Services, (e-mail eveline_saurette@umanitoba.ca, or fax 261-0325), including the Sponsor name, before your account can be opened.**

- **if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html) in order to be in compliance with Tri-Council Guidelines.

Appendix B Winnipeg School Division Approval Certificate



WINNIPEG SCHOOL DIVISION
INVESTING IN THE FUTURE

Research, Planning and Systems Management Dept.
1180 Notre Dame Avenue, Winnipeg, Manitoba R3E 0P2
Telephone: (204) 789-0474 Fax: (204) 775-1999
www.wsd1.org

Douglas R. Edmond
Director of Research, Planning and Systems Management

October 22, 2009

Dear Ms. Swayze:

RE: "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning"

The proper offices of the Winnipeg School Division have reviewed and approved the above mentioned research project. Please contact the following school administrators to discuss your data collection procedures.

- Victoria Albert School – Aida Rodrigues, Ph 943-3459
- Mulvey School – Peter Correia, Ph 786-3469

Participation in your research study is voluntary; the participants who agree to participate may withdraw at any time during your data collection procedures. Please note that the 2 principals will have the option to require informed consent or a general letter to all parents with those parents not wanting their child to complete this study to contact the school office.

As a result of the Winnipeg School Divisions participation a copy of your research results is to be provided to this office.

Please contact me if you have any questions regarding this matter.

Good luck with your research.

Best regards,

D.R. Edmond,
Chief Research Advisory Committee

Pc: K. Seiler
 A. Rodrigues
 P. Correia

Appendix C Sample Consent Forms



UNIVERSITY
OF MANITOBA

Letter of Information and Consent for Superintendent to Participate in an Education Research Project

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

(Month, day), 2009

Dear (name of superintendent),

I am a Master's of Education Candidate in the Department of Curriculum, Teaching and Learning at the University of Manitoba. This letter of consent requests your participation in my thesis research project. The content of the letter explains the project and how the (name of school division) would participate in the project, if you so choose. In addition to a request for you to participate, there is also the way for you to indicate your willingness to do so.

The project has the title, "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning". The primary purpose of the project is to study the effectiveness of my teaching and the changes made in the Bridging the Gap program, to improve understanding and support future program planning. I am trying to improve my understanding of how my attempts to include Indigenous Knowledge in the program will affect the knowledge and pro-environmental behaviours of the program participants.

"Bridging the Gap" is an environmental education program administered by the City of Winnipeg, Naturalist Services Branch in partnership with Nature Manitoba. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, your students, your teachers, (name of school), or the (name of school division). The Naturalist Services Branch oversees the design of promotional and educational materials as well as supervision of all restoration, trail improvement or other activities that occurred as part of this study. I participate in BTG as a Program Coordinator with Naturalist Services, and am responsible for all aspects of BTG program delivery (including fund development, marketing, planning, program scheduling, development of material, and preparing project reports). My advisor does not have any connections to the BTG program. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, students, teachers, schools or the (name of school division). Teachers and their students are invited to participate on a voluntary basis as part of regular classroom learning experiences.

In the first weeks of the 2009/2010 school year, two Grade Four teacher from (name of school division) and their classes will be invited to participate in the “Bridging the Gap Program.” If you consent to participate, two Grade Four teacher from (name of school division) and their classes and their class, will visit the Assiniboine Forest and Living Prairie Museum in the fall as part of a six-hour field trip, and complete the three-hour in-class follow-up activity. The dates for the field trip and the in-class activity will be scheduled sometime during the months of October, November and December 2009, at the convenience of the Grade Four teachers.

If you consent to participate in the study, two Grade Four teacher from (name of school division) and their classes will be asked to (a) complete a written journal entry while at school and (b) participate in informal, large group discussions and no more than two one-on-one discussions with me during the field trip and in-class activities. If you consent to participate in the study, two Grade Four teacher from (name of school division) and their classes will each participate in approximately two large-group discussions and two one-on-one discussions with me. The written journal entry is part of the follow-up activity and will require no more than 45 minutes. The journal entry and informal discussion will focus on children’s understanding of habitats, the environment, and traditional Indigenous Knowledge. An Aboriginal Elder who has been involved with the program in 2007 and 2008, will provide traditional teachings related to habitats, the environment, and traditional Indigenous Knowledge for the students and teacher (a) for one hour at the beginning of the field trip and (b) for one hour at the beginning of the in-class activity. I will be writing notes based on children’s verbal responses and my observations of them while they are participating in the program during the field trip and in-class activities. I would also like to include direct quotations from the verbal and written responses, but will make no reference to specific student names, teacher names or the name of specific schools. At no point in these informal discussions will the teacher or students be deceived or put at risk. I will be asking the classroom teachers to assist me recording comments made by their students during BTG lessons. This will not include information the teachers obtain on a day-to-day basis as a classroom teacher-for example grades, behaviour issues etc. During the course of the BTG the teachers will only be providing observations on the questions and comments made by students.

I will be the only individual who will read the completed journal entries and written notes, which will be stored in a locked study cabinet in my advisor’s, Dr. Dawn Sutherland, office at the University of Winnipeg. No one will have access to the data other than Dr. Sutherland and I, and all data will be destroyed after I have finished my research and defended my thesis. These records will be destroyed three months after my thesis has been successfully defended. No identity information will be shared or made public. There will be no reference to specific student names, teacher names or the name of participating schools in my thesis or any public materials. For example, I will change children’s names and the name of their school and teachers. There may be an opportunity for me to publish results of this study in education journals or magazines, which may include direct quotations from the participants known only by pseudonyms.

If you, Principals, or teachers choose not to participate in this study, teachers and students will still be welcome to participate in all BTG program activities as part of their regular classroom activities, and I will not collect data for my research study. If individual parent/guardians or individual students choose not to participate in this study, all students will still be welcome to participate in BTG program activities and I will not collect or use data from individuals who choose not to participate in my research study.

Should you wish to receive a summary of the final research report please check the appropriate box at the end of this letter and include your postal address. The summary will be mailed to the address you

provide. This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It gives you the basic idea of what the research is about and what your participation will involve.

Your signature on the following consent form indicates that you have understood to your satisfaction the information regarding your participation in this research project and agree to participate. In no way does this waive your legal rights nor release the researcher, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time and without consequence, and can do so by contacting me by telephone or e-mail. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The Education/Nursing Research Ethics Board at the University of Manitoba will be asked to approve this research. If you have any questions, concerns or complaints about the ethical aspects of this project you may contact Margaret Bowman, the University of Manitoba's Human Ethics Secretariat at 474-7122 or by e-mail at margaret_bowman@umanitoba.ca

If you have any concerns or questions, please free to contact me. My contact information is provided immediately below.

Sincerely,



Natalie Swayze
c/o Dr. Dawn Sutherland
Faculty of Education, University of Winnipeg
Winnipeg, MB, R3B 2E9
T: (204) 996-2784 / E: nswayze@gmail.com



UNIVERSITY
OF MANITOBA

Consent Form Copy 1 of 2

(To be signed by participating Superintendent)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009



UNIVERSITY
OF MANITOBA

Consent Form Copy 2 of 2

(To be signed by participating Superintendent)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009



UNIVERSITY
OF MANITOBA

Letter of Information and Consent for Principals to Participate in an Education Research Project

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

(Month, day), 2009

Dear (name of principal),

I am a Master's of Education Candidate in the Department of Curriculum, Teaching and Learning at the University of Manitoba. This letter of consent requests your participation in my thesis research project. The content of the letter explains the project and how (name of school), would participate in the project, if you so choose. In addition to a request for you to participate, there is also the way for you to indicate your willingness to do so.

The project has the title, "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning". The primary purpose of the project is to study the effectiveness of my teaching and the changes made in the Bridging the Gap program, to improve understanding and support future program planning. I am trying to improve my understanding of how my attempts to include Indigenous Knowledge in the program will affect the knowledge and pro-environmental behaviours of the program participants.

"Bridging the Gap" is an environmental education program administered by the City of Winnipeg, Naturalist Services Branch in partnership with Nature Manitoba. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, your students, your teachers, (name of school), or the (name of school division). The Naturalist Services Branch oversees the design of promotional and educational materials as well as supervision of all restoration, trail improvement or other activities that occurred as part of this study. I participate in BTG as a Program Coordinator with Naturalist Services, and am responsible for all aspects of BTG program delivery (including fund development, marketing, planning, program scheduling, development of material, and preparing project reports). My advisor does not have any connections to the BTG program. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, students, teachers, schools or the (name of school division). Teachers and their students are invited to participate on a voluntary basis as part of regular classroom learning experiences.

In the first weeks of the 2009/2010 school year, one Grade Four teacher from (name of school) and their class will be invited to participate in the “Bridging the Gap Program.” If you consent to participate, one Grade Four teacher from (name of school) and their class, will visit the Assiniboine Forest and Living Prairie Museum in the fall as part of a six-hour field trip, and complete the three-hour in-class follow-up activity. The dates for the field trip and the in-class activity will be scheduled sometime during the months of October, November and December 2009, at the convenience of the Grade Four teacher.

If you consent to participate in the study, one Grade Four teacher from (name of school) and their class will be asked to (a) complete a written journal entry while at school and (b) participate in informal, large group discussions and no more than two one-on-one discussions with me during the field trip and in-class activities. If you consent to participate in the study, one Grade Four teacher from (name of school) and their class will participate in approximately two large-group discussions and two one-on-one discussions with me. The written journal entry is part of the follow-up activity and will require no more than 45 minutes. The journal entry and informal discussion will focus on children’s understanding of habitats, the environment, and traditional Indigenous Knowledge. An Aboriginal Elder who has been involved with the program in 2007 and 2008, will provide traditional teachings related to habitats, the environment, and traditional Indigenous Knowledge for the students and teacher (a) for one hour at the beginning of the field trip and (b) for one hour at the beginning of the in-class activity. I will be writing notes based on children’s verbal responses and my observations of them while they are participating in the program during the field trip and in-class activities. I would also like to include direct quotations from the verbal and written responses, but will make no reference to specific student names, teacher names or the name of specific schools. At no point in these informal discussions will the teacher or students be deceived or put at risk. I will be asking the classroom teacher to assist me recording comments made by participating students during BTG lessons. This will not include information the teacher obtains on a day-to-day basis as the classroom teacher—for example grades, behaviour issues etc. During the course of the BTG the teacher will only be providing observations on the questions and comments made by students.

I will be the only individual who will read the completed journal entries and written notes, which will be stored in a locked study cabinet in my advisor’s, Dr. Dawn Sutherland, office at the University of Winnipeg. No one will have access to the data other than Dr. Sutherland and I, and all data will be destroyed after I have finished my research and defended my thesis. These records will be destroyed three months after my thesis has been successfully defended. No identity information will be shared or made public. There will be no reference to specific student names, teacher names or the name of participating schools in my thesis or any public materials. For example, I will change children’s names and the name of their school and teachers. There may be an opportunity for me to publish results of this study in education journals or magazines, which may include direct quotations from the participants known only by pseudonyms.

If you, the (name of school division) Superintendent, or the classroom teacher choose not to participate in this study, the teachers and students will still be welcome to participate in all BTG program activities as part of their regular classroom activities, and I will not collect data for my research study.. If individual parent/guardians or individual students choose not to participate in this study, students will still be welcome to participate in all BTG program activities and I will not collect or use data from individuals who choose not to participate in my research study.

Should you wish to receive a summary of the final research report please check the appropriate box at the end of this letter and include your postal address. The summary will be mailed to the address

you provide. This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It gives you the basic idea of what the research is about and what your participation will involve.

Your signature on the following consent form indicates that you have understood to your satisfaction the information regarding your participation in this research project and agree to participate. In no way does this waive your legal rights nor release the researcher, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time and without consequence, and can do so by contacting me by telephone or e-mail. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The Education/Nursing Research Ethics Board at the University of Manitoba will be asked to approve this research. If you have any questions, concerns or complaints about the ethical aspects of this project you may contact Margaret Bowman, the University of Manitoba's Human Ethics Secretariat at 474-7122 or by e-mail at margaret_bowman@umanitoba.ca

If you have any concerns or questions, please free to contact me. My contact information is provided immediately below.

Sincerely,



Natalie Swayze
c/o Dr. Dawn Sutherland
Faculty of Education, University of Winnipeg
Winnipeg, MB, R3B 2E9
T: (204) 996-2784 / E: nswayze@gmail.com



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OF MANITOBA

Consent Form Copy 1 of 2

(To be signed by participating principal)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009



UNIVERSITY
OF MANITOBA

Consent Form Copy 2 of 2

(To be signed by participating principal)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

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This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009



UNIVERSITY
OF MANITOBA

Letter of Information and Consent for Teachers to Participate in an Education Research Project

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

(Month, day), 2009

Dear (name of teacher),

I am a Master's of Education Candidate in the Department of Curriculum, Teaching and Learning at the University of Manitoba. This letter of consent requests your participation in my thesis research project. The content of the letter explains the project and how you and your students would participate in the project, if you so choose. In addition to a request for you to participate, there is also the way for you to indicate your willingness to do so.

The project has the title, "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning". The primary purpose of the project is to study the effectiveness of my teaching and the changes made in the Bridging the Gap program, to improve understanding and support future program planning. I am trying to improve my understanding of how my attempts to include Indigenous Knowledge in the program will affect the knowledge and pro-environmental behaviours of the program participants.

"Bridging the Gap" is an environmental education program administered by the City of Winnipeg, Naturalist Services Branch in partnership with Nature Manitoba. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, your students, (name of school), or the (name of school division). The Naturalist Services Branch oversees the design of promotional and educational materials as well as supervision of all restoration, trail improvement or other activities that occurred as part of this study. I participate in BTG as a Program Coordinator with Naturalist Services, and am responsible for all aspects of BTG program delivery (including fund development, marketing, planning, program scheduling, development of material, and preparing project reports). My advisor does not have any connections to the BTG program. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, students, teachers, schools or the (name of school division). Teachers and their students are invited to participate on a voluntary basis as part of regular classroom learning experiences.

In the first weeks of the 2009/2010 school year, you and your students will be invited to participate in the “Bridging the Gap Program.” If you consent to participate, you and your class will visit the Assiniboine Forest and Living Prairie Museum in the fall as part of a six-hour field trip, and complete the three-hour in-class follow-up activity. The dates for the field trip and the in-class activity will be scheduled sometime during the months of October, November and December 2009, at your convenience.

If you consent to participate in the study, your students will be asked to (a) complete a written journal entry while at school and (b) participate in informal, large group discussions and no more than two one-on-one discussions with me during the field trip and in-class activities. If you consent to participate in the study, your students will participate in approximately two large-group discussions and two one-on-one discussions with me. The written journal entry is part of the follow-up activity and will require no more than 45 minutes. The journal entry and informal discussion will focus on your students’ understanding of habitats, the environment, and traditional Indigenous Knowledge. An Aboriginal Elder who has been involved with the program in 2007 and 2008, will provide traditional teachings related to habitats, the environment, and traditional Indigenous Knowledge for the students and teacher (a) for one hour at the beginning of the field trip and (b) for one hour at the beginning of the in-class activity. I will be writing notes based on children’s verbal responses and my observations of them while they are participating in the program during the field trip and in-class activities. If you consent, I would also like you to assist me by writing your own notes based on your observations. I would also like to include direct quotations from the verbal and written responses, but will make no reference to specific student names, teacher names or the name of specific schools. At no point in these informal discussions will you or your students be deceived or put at risk. I would also like you to assist me in recording comments made by participating students during BTG lessons. This will not include information you obtain on a day-to-day basis as the classroom teacher—for example grades, behaviour issues etc. During the course of the BTG you will only be providing observations on the questions and comments made by students.

I will be the only individual who will read the completed journal entries and written notes, which will be stored in a locked study cabinet in my advisor’s, Dr. Dawn Sutherland, office at the University of Winnipeg. No one will have access to the data other than Dr. Sutherland and I, and all data will be destroyed after I have finished my research and defended my thesis. These records will be destroyed three months after my thesis has been successfully defended. No identity information will be shared or made public. There will be no reference to specific student names, teacher names or the name of participating schools in my thesis or any public materials. For example, I will change children’s names and the name of their school and teachers. There may be an opportunity for me to publish results of this study in education journals or magazines, which may include direct quotations from the participants known only by pseudonyms.

If you, the (name of school division) Superintendent, or the (name of school) Principal choose not to participate in this study, you and your students will still be welcome to participate in all BTG program activities as part of your regular classroom activities, and I will not collect data for my research study. If individual parent/guardians or individual students choose not to participate in this study, students will still be welcome to participate in all BTG program activities and I will not collect or use data from individuals who choose not to participate in my research study.

Should you wish to receive a summary of the final research report please check the appropriate box at the end of this letter and include your postal address. The summary will be mailed to the address

you provide. This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It gives you the basic idea of what the research is about and what your participation will involve.

Your signature on the following consent form indicates that you have understood to your satisfaction the information regarding your participation in this research project and agree to participate. In no way does this waive your legal rights nor release the researcher, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time and without consequence, and can do so by contacting me by telephone or e-mail. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The Education/Nursing Research Ethics Board at the University of Manitoba will be asked to approve this research. If you have any questions, concerns or complaints about the ethical aspects of this project you may contact Margaret Bowman, the University of Manitoba's Human Ethics Secretariat at 474-7122 or by e-mail at margaret_bowman@umanitoba.ca

If you have any concerns or questions, please free to contact me. My contact information is provided immediately below.

Sincerely,



Natalie Swayze
c/o Dr. Dawn Sutherland
Faculty of Education, University of Winnipeg
Winnipeg, MB, R3B 2E9
T: (204) 996-2784 / E: nswayze@gmail.com

Consent Form Copy 1 of 2
(To be signed by participating teacher)



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OF MANITOBA

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland
Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009



UNIVERSITY
OF MANITOBA

Consent Form Copy 2 of 2

(To be signed by Participating Teacher)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009

Letter of Information and Consent for Students to Participate in an Education Research Project

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

(Month date), 2009

Dear Student,

My name is Natalie Swayze. I am a graduate student at the University of Manitoba, and(continue on with next sentence).I'm writing this letter to invite you to be part of my research project called "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning"?

If you agree to participate in my study, this is what you will be doing:

First, in the fall you will come to the Assiniboine Forest and Living Prairie Museum with (name of classroom teacher) and your classmates for a free field trip. Second, we will do an activity in your classroom. You will write in a journal during this activity and also share some ideas outloud. You will not be marked on this work, but I will take some notes on the things you and your classmates say. Your name won't be on your work or my notes and no one else will see your journal or the notes I write.

If you would like to be part of my research please sign your name on the next page. Your parents will be asked to sign a form too. If you do not want to be part of my research, you can still participate in all BTG program activities but I will not collect or use any data from you.

If you would like, I can also share information from my research report with you.

If you have questions, you can phone me at 996-2784

Sincerely,



Natalie Swayze

c/o Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Winnipeg, MB, R3B 2E9

T: (204) 996-2784 / E: nswayze@gmail.com

Consent Form Copy 1 of 2
(To be signed by Student)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

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Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009

Consent Form Copy 2 of 2
(To be signed by Student)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009

Letter of Information and Consent for Parents/Guardians to Participate in an Education Research Project

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

(Month day), 2009

Dear Parent/Guardian,

I am a Master's of Education Candidate in the Department of Curriculum, Teaching and Learning at the University of Manitoba. This letter of consent requests your child's participation in my thesis research project. The content of the letter explains the project and how your child would participate in the project, if you so choose. In addition to a request for you to participate, there is also the way for you to indicate your willingness to do so.

The project has the title, "Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning". The primary purpose of the project is to study the effectiveness of my teaching and the changes made in the Bridging the Gap program, to improve understanding and support future program planning. I am trying to improve my understanding of how my attempts to include Indigenous Knowledge in the program will affect the knowledge and pro-environmental behaviours of the program participants.

"Bridging the Gap" is an environmental education program administered by the City of Winnipeg, Naturalist Services Branch in partnership with Nature Manitoba. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, your child(ren), their teacher, (name of school), or the (name of school division). The Naturalist Services Branch oversees the design of promotional and educational materials as well as supervision of all restoration, trail improvement or other activities that occurred as part of this study. I participate in BTG as a Program Coordinator with Naturalist Services, and am responsible for all aspects of BTG program delivery (including fund development, marketing, planning, program scheduling, development of material, and preparing project reports). My advisor does not have any connections to the BTG program. The program provides full-day field trips for Grade Four students, coordinates related in-class activities and provides resources for participating schools - at no cost to you, students, teachers, schools or the (name of school division). Teachers and their students are invited to participate on a voluntary basis as part of regular classroom learning experiences.

In the first weeks of the 2009/2010 school year, your child will be invited to participate in the "Bridging the Gap Program," along with (name of classroom teacher) and their fellow classmates. If you consent to your child's participation, your child will visit the Assiniboine Forest and Living Prairie Museum with (name of teacher) and classmates in the fall and complete the in-class follow-up activity. The dates for the field trip and the in-class activity will be scheduled sometime during

the months of October, November and December 2009, at (name of classroom teacher)'s convenience.

If you consent to your child's participation in the study, your child will be asked to (a) complete a written journal entry while at school and (b) participate in informal, large group discussions and no more than two one-on-one discussions with me during the field trip and in-class activities. If you consent to your child's participation in the study, your child will participate in a total of approximately two large-group discussions and two one-on-one discussions with me. The written journal entry is part of the follow-up activity and will require no more than 45 minutes. The journal entry and informal discussion will focus on your child's understanding of habitats, the environment, and traditional Indigenous Knowledge. An Aboriginal Elder, who has been involved with the program in 2007 and 2008, will provide traditional teachings related to habitats, the environment, and traditional Indigenous Knowledge for the students and teacher (a) for one hour at the beginning of the field trip and (b) for one hour at the beginning of the in-class activity. I will be writing notes based on children's verbal responses and my observations of them while they are participating in the program during the field trip and in-class activities. I would also like to include direct quotations from the verbal and written responses, but will make no reference to specific student names, teacher names or the name of specific schools. At no point in these informal discussions will your child be deceived or put at risk.

I will be the only individual who will read the completed journal entries and written notes, which will be stored in a locked study cabinet in my advisor's, Dr. Dawn Sutherland, office at the University of Winnipeg. No one will have access to the data other than Dr. Sutherland and I, and all data will be destroyed after I have finished my research and defended my thesis. These records will be destroyed three months after my thesis has been successfully defended. No identity information will be shared or made public. There will be no reference to specific student names, teacher names or the name of specific schools in my thesis or any public materials. For example, I will change children's names and the name of their school and teachers. There may be an opportunity for me to publish results of this study in education journals or magazines, which may include direct quotations from the participants known only by pseudonyms.

If you, the (name of school division) Superintendent, the (name of school) Principal, your child's teacher, or your child choose not to participate in this study, the your child will still be welcome to participate in all BTG program activities as part of their regular classroom activities and I will not collect or use data from these individuals who choose not to participate in my research study.

Should you wish to receive a summary of the final research report please check the appropriate box at the end of this letter and include your postal address. The summary will be mailed to the address you provide. This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It gives you the basic idea of what the research is about and what your child's participation will involve.

Your signature on the following consent form indicates that you have understood to your satisfaction the information regarding your child's participation in this research project and agree to his/her participation. In no way does this waive your legal rights nor release the researcher, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw your child from the study at any time and without consequence, and can do so by contacting me by telephone or e-mail. Your child's continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your child's participation.

The Education/Nursing Research Ethics Board at the University of Manitoba will be asked to approve this research. If you have any questions, concerns or complaints about the ethical aspects of this project you may contact Margaret Bowman, the University of Manitoba's Human Ethics Secretariat at 474-7122 or by e-mail at margaret_bowman@umanitoba.ca

If you have any concerns or questions, please free to contact me. My contact information is provided immediately below.

Sincerely,



Natalie Swayze
c/o Dr. Dawn Sutherland
Faculty of Education, University of Winnipeg
Winnipeg, MB, R3B 2E9
T: (204) 996-2784 / E: nswayze@gmail.com

Consent Form Copy 1 of 2
(To be signed by Parent/Guardian)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

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Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009

Consent Form Copy 2 of 2
(To be signed by Parent/Guardian)

Title of Research: Bridging the Gap: Engaging Indigenous Urban Youth in Environmental Learning

Name of Researcher: Natalie Swayze, MEd Candidate

Institutional Affiliation: Faculty of Education, University of Manitoba

Thesis Advisor: Dr. Dawn Sutherland

Faculty of Education, University of Winnipeg

Please complete and sign both copies of this consent form. Return one copy to the researcher and keep one copy for your records.

Please check the boxes below:

I _____ (your name) have read and understood the terms and conditions of this study and agree to participate.

I would like to receive a copy of the summary of the results of this study, sent by mail to the following address.

This summary can be sent to the following (email or postal address):

Your Name (please print): _____

Signature: _____ Date: _____

Principal Investigator's Signature:  _____ Date: September 30 2009

Appendix D Intervention

Overview “Bridging the Gap” is an environmental education program with several funding sponsors. The program provides programming for Grade Four students and resources for participating schools - at no cost to teachers, students, individual schools or the Winnipeg School Division. The program seeks to foster within the participating students not only increased awareness and appreciation of our local natural areas, but also a lifelong commitment to stewardship principles. In the first weeks of the 2009/2010 school year two classes will visit the Assiniboine Forest and Living Prairie Museum and complete the in-class follow-up activity. The dates for the two lessons: a) field trip; and b) in-class activity are scheduled during the months of October, November and December.

Target Curriculum Learning

Outcomes: Science

4-0-7D Construct meaning in different contexts by connecting new experiences and information to prior experiences and knowledge.

4-1-01 Use appropriate vocabulary related to their investigations of habitats and communities.

4-1-02 Recognize that each plant and animal depends on a specific habitat to meet its needs.

4-1-03 Identify the components of an animal habitat.

4-1-09 Recognize that plant and animal populations interact within a community.

4-1-13 Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community.

4-1-14 Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations.

4-1-15 Describe how their actions can help conserve plant and animal populations and their habitats.

4-1-17 Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal populations and interactions.

Aboriginal Languages and Cultures

3.1.2: A-10 demonstrate awareness of the origin of purchased goods

3.2.2: C-4 illustrate the connection of things in the physical environment to natural and human resources development (e.g., the wooden parts of tables are made from trees by people who work in manufacturing plants)

3.3.2: E-4 suggest ways in which the local environment is or can be respected, maintained, and sustained (e.g., recycling, renovations, road repair, respect for private property)

4.2.3: B-4 describe the traditional Aboriginal perspective on natural resources (e.g., no ownership of natural resources, resources are to be shared)

4.2.3: C-4 discuss how knowledge of plant and animal populations and interactions helped Aboriginal peoples to survive in the past

4.2.3: D-4 suggest ways to help conserve plant and animal populations and their habitats (e.g., clean up a local stream)

4.1.2: A-4 demonstrate understanding of appropriate protocols and behaviours associated with storytelling

4.2.3: G-4 give examples of traditional and contemporary teachings of Aboriginal cultures that illustrate respect for the land (e.g., planning an activity for Earth Day celebrations)

Social Studies

KL-023 Identify issues related to environmental stewardship and sustainability in Manitoba.

KL-024 Give examples of Aboriginal peoples' traditional relationships with the land. Education for Sustainable Development

4M—Demonstrate behaviours that contribute to the well-being of the environment, at home, at school, and in the community

Student Learning Objectives:

Students will be able to:

- Demonstrate appropriate protocols and behaviours when listening to an Elder
- Work cooperatively with peers in small groups
- Use previously collected data in a new way
- Recognize that plant and animal populations interact within a community
- Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community
- Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions
- Demonstrate respect for and interest in learning about other cultures
- Recognize that humans are animals and part of the natural world
- Recognize that humans are dependent on the natural world and that people use living things and natural resources
- Indicate and provide a rationale for an interest in environmental stewardship
- Share ideas of ways to participate in environmental stewardship

Lesson One: Field Trip

Overview

The field trip offered to BTG participants is a fall outdoor habitat study, working with a local Aboriginal Elder and City of Winnipeg staff, in which students visit three habitats in Winnipeg (tall grass prairie, wetland and forest) that are accessible by public transportation. During the full-day programs, students engage in curriculum based, hands-on learning activities and participate in plantings, trail repair, clean-up events and other stewardship initiatives.

An Elder is involved in all Bridging the Gap field trip programming. Each program opens with their 30-45 minute presentation, which provides an overview of the Seven Sacred Teachings, specifically focusing in on the Teaching/Law of respect, which is represented by the bison or buffalo. Students participating in Bridging the Gap are familiar with these teachings, as Winnipeg School

Division has adopted these within their schools. However, these teaching are place specific and therefore would not be appropriate for all audiences. These teachings are intended to help all people have a good, healthy and balanced life. The buffalo teaches respect as it once provided many of turtle islands nations with food, shelter and the tools needed to survive. Materials such as bison tallow (soap), hide (drum), tail hair (rope), dung (fuel), and stomach (pouch to carry water) are shown to students to highlight prior uses of the buffalo among Aboriginal people. Each presentation is always different, in that a buffalo song or story might be shared however the theme of bison and respect is always central. Tobacco is passed to the presenter for each individual program. Speaking with an Elder gives students the opportunity to explore a different perspective on the role of humans in the natural world. The class learns about environmental stewardship, human interrelationships, and our reliance on animals, plants and the earth for survival.

The study of each habitat involves a hike and recording of information into data booklets. Students spend the morning at the Living Prairie Museum and explore and collect data (using a copy of “Manitoba Habitats” Data Collection Booklet p. 3-6) on a pristine prairie habitat in the context of its unique ecological components and significant cultural value. Afternoons are spent at the Assiniboine Forest where students replicate their data collection activities and discussions in Forest Habitat and Wetland Habitats. During the hike, students are introduced to the resident animals, plants and unique features of the habitat. The hike is taken slowly to give students time to notice small details and to stop and listen. Discovering signs of wildlife prompts them to think of the animals that make the habitat home. The Elder sharesteaching about traditional uses for plants encountered along the hike. The hike concludes with a review and recording of information about the components of the habitat. A variety of relevant games are incorporated as well opportunities for students to plant wildflowers, build wood-chipped trails and/or assist with clean-up efforts.

Time: Full Day

9:30 am Bus arrival at the Living Prairie Museum

9:30 - 9:45 Introduction and orientation

- 9:45 -10:30** Elders teaching
- 10:30 - 11:30** Prairie hike and data collection
- 11:30 - 12:30** Lunch
- 12:45** Travel to the Assiniboine Forest
- 1:00 - 2:00** Forest and Wetland hikes and data collection
- 2:00 - 2:30** Wind-up activity/game; Trail building, clean-up and/or planting
- 2:30** Bus departs the Assiniboine Forest

Manitoba Habitats

What are some of the parts of an animal habitat?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

We will visit three types of Manitoba Habitats today.
These are:

1. _____
2. _____
3. _____

What are some of the animals that use these habitats as home?

1. _____
2. _____
3. _____

Prairie



Humans		Animal: _____
Needs	Food	
	Water	
	Shelter	
	Space	
Other Information		



Parkland Forest

		Humans	Animal: _____
Needs	Food		
	Water		
	Shelter		
	Space		
Other Information			



Wetland/Pond

		Humans	Animal: _____
Needs	Food		
	Water		
	Shelter		
	Space		
Other Information			

Lesson Two: Earths' Medicines

Overview: In this activity, students explore traditional knowledge and contemporary teachings related to respect for the land and animal habitats. This lesson is completed in three parts. In Part A, students brainstorm questions to ask an Elder who has been invited to speak with the class as a guest teacher. In Part B, students work in groups to use a Medicine Wheel to represent an animal's unique habitat needs using data collected during the field trip to the Living Prairie Museum and Assiniboine Forest. *"Using a medicine wheel in this way is okay because it help the kids see how what they are studying is connected to something larger"* (McLeod, B, 2008). As a class, students then participate in a large group discussion of how humans meet their habitat needs: a) traditionally - reviewing data collected during their field trip, and b) in contemporary life in a city – through guided discussion. In Part C, students interview an Elder to ask questions about traditional relationships with the land, perspectives on natural resource use and ways to show respect for the land and natures gifts, and complete a journal entry.

Recommended Time: 3 hours { 30 min (*Part A*) + 75 min (*Part B*) + 75 min (*Part C*) }

Student Input: Students are familiar with sitting in the class meeting area, listening to presentations, and doing brainstorming activities.

Classroom set-up/organization: Students will meet in the class meeting area for presentations and discussions, and return to their desks for writing activities.

Materials:

Student: a) Completed "Manitoba Habitats" booklets used in field trip; b) Scrap paper, markers, pencils, crayons, glue; and c) Thinking About Habitats and Natures Gifts journal entry sheet (one per student)

Teacher: a) Chalk Board, Chalk

Required preparation:

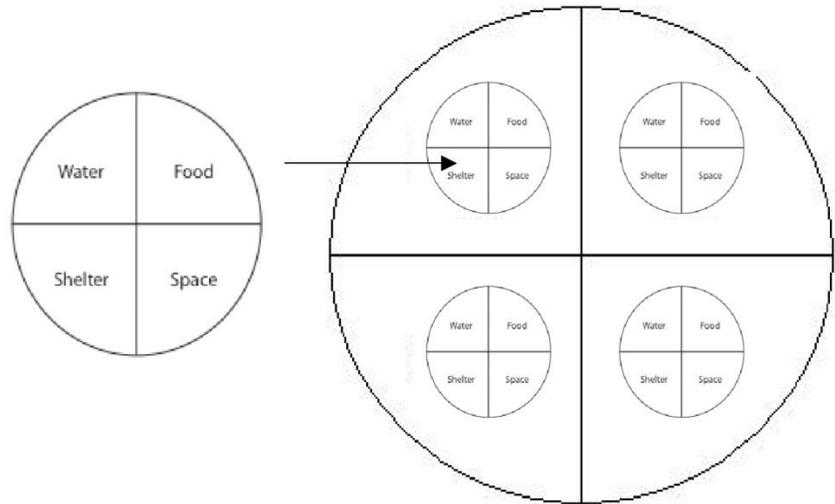
For Part A/C: The Elder should be contacted several weeks in advance and then again several days before the scheduled date of the lesson. The Elder should be informed of the unit being studied, what students have been studying on the topic, and will also need to be aware that the students will be asking questions following the Elder's teaching.

For Part B:

Use a sheet of paper to cut four circles. Pre-cut each circle into four segments. Construct a large medicine wheel that the students will use to place their smaller habitat wheels within **see example below

1. Four smaller
Medicine Wheels for
student groups, on
plain paper, each circle
cut into four

2. One larger
medicine wheel for
the class



Procedure: Part A -Generating Elder Interview Questions

30 minutes

“In maintaining the dreams and visions of our ancestors, listen to what the Elders have to say. 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

Introduction

Elders are held in high regard as they contribute to the community by sharing traditional knowledge, maintaining an important link between the past, present and future generations. Knowledge, skills, values, beliefs, customs and traditions can be learned by listening to and watching Elders. During the *Natures Gifts* activity, students will have the opportunity to interview an Elder to ask questions about habitats and traditional relationships to the land. The purpose is for students to use the interview as an opportunity to seek out and document local knowledge to improve understanding of habitats and ways to respect the earth and its habitats, while generating ideas for further class investigations. Students will be learning how to listen and demonstrating proper etiquette while interviewing the Elder.

Instructions

1. Ask students to remember their field trip to the Assiniboine Forest and Living Prairie Museum.
2. Tell students that the program interpreters will be coming to the class for an afternoon to do some additional activities. Tell students that during this in-class activity, they will have a chance to interview Brian McLeod, a local Aboriginal Elder, and ask questions to help them understand habitats and ways to respect the earth and its habitats.
3. Remind students that they will be expected to demonstrate proper listening behaviours and etiquette during the interview.
4. As a class, brainstorm, compile and record a list of questions to ask the Elder during the classroom visit.

Sample Questions

- How did knowledge of plant and animal populations and interactions help Aboriginal peoples to survive in the past? How can we use this knowledge today?

- What is the traditional perspective on natural resource use?
 - How can the local environment be respected, maintained, and sustained?
 - How can we show respect for nature's gifts?
 - What are some of the traditional uses of plants and animals for food, medicine, spiritual or cultural purposes? How did you learn this?
5. Finally, as a class brainstorm a gift that they can be made/found to give the Elder after the interview as a gesture of thanks and sign of respect.

Part B - Medicine Wheel Teachings 75 minutes

Instructions

1. 5–10 minutes

Invite students to gather in a circle to discuss and review their trip to the Living Prairie Museum and Assiniboine Forest, using their completed “Manitoba Habitats” field guides Focusing questions:

- What did you learn during the trip? What did they enjoy?
- How did we define habitat? What are the four components of habitat we studied? (Review hand signals for food, water, shelter and space)
- What were the three types of habitats we studied? (Prairie, Forest, Wetland)

2. 15–20 minutes

Invite the Elder to introduce the Medicine Wheel, explaining its various representations and how it will be used in today's lesson it will be used to represent four animals (In this activity the spirit world could be discussed, having an elder come in to talk about the medicine wheel is recommended). As a class choose four animals/insects studied during the field trip, based on Medicine Wheel directions. Students will work in groups using one of the four animals or insects to visually represent its habitat needs on a section of the smaller wheels. For each direction ask students to use the animals studied during the field trip and select an animal that fits the description for each direction.

Animal examples:

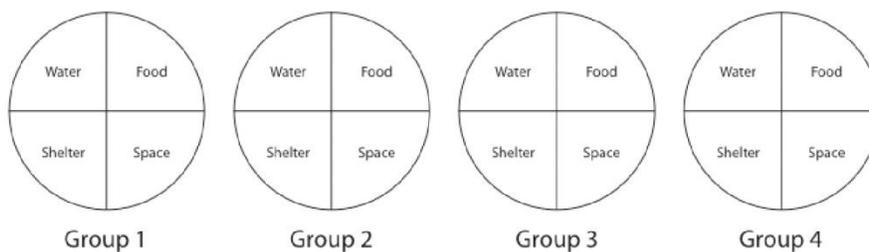
Prairie: Monarch, Buffalo, Deer, Forest:
Fox, Rabbit, Owl Wetland: Beaver,
Duck, Frogs,

NB Include traditional names for animals where possible

3. 15 – 20 minutes

Divide students into 4 groups, assigning each group to an animal. Provide each group with four sections of the smaller medicine wheels, as seen below. Each portion of the wheel that is handed out will represent one of the four habitat components; food, water, shelter and space. These segments should be separated; to emphasize and help students identify the importance of having all habitats' needs met.

Groups of student take their smaller medicine wheel and divide the four segments amongst their group. Groups of student work together or independently to visually depict the chosen animal's habitat needs: food, water, shelter or space, on each of the four segments. Allow the students to be creative in their in display, inviting them to write words or make a poem, draw, colour, or collage. Provide markers, crayons, magazines, scissors and glue. The groups should work together to complete the their wheel.

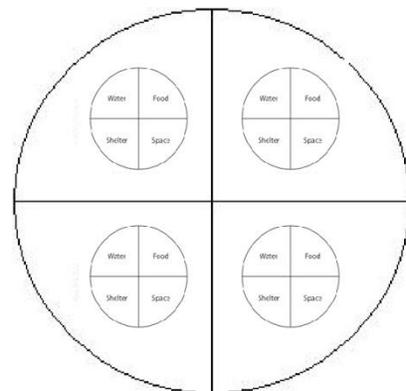


7. 15 – 20 minutes

When each group has completed the their smaller Wheels, gather the class together into a circle. Place each of the smaller Wheels completed by the four groups into the larger Medicine Wheel.

Review the class Medicine Wheel, as a collaborative effort of displaying four animals habitat needs. Invite each group to present their smaller Wheel and describe how the animal studied meets its habitat need.

Following the presentations, detach a segment from one of the smaller Wheels. Ask students what would happen to this animal if this section or habitat need disappeared? Does this affect any of the other animals?



Through additional guided questioning, help children to recognize:

- Similar features within all of the wheels
- Unique features within all of the wheels
- The common need for all habitat needs to be met
- The interdependence of all of the animals and habitat components
- For any particular habitat, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- The supplies of many natural resources are limited.

Additional Sample Probing Questions:

- Is it possible for one animal to survive in the habitat of another animal?
- What happens if all of the water is polluted?
- What happens if all of the “beaver” are trapped and none are left?
- What can we do to keep the Wheel complete?
- What happens to the wheel when a specific habitat decreases? Which plants and animals are dependent on each other?
- Organisms interact with one another in various ways besides providing food.
- Describe the changes that would occur if one predator or one prey were removed from this area? How would other organisms in the food chain be affected?
- What happens to human consumption when one food animal is no longer available?
- Why are some animal no longer found in their original area?
- What are some ways we can show respect for these animals and their habitats?

8. *5 minutes*

Ask which animals we forgot to review during today's lesson that was studied on our field trip. Solicit student responses until "human" is mentioned. Review the data collected during the field trip about how humans meet their need in each of the three habitat types visited. Lead students in a guided discussion of how this compares to modern life in a city, and the ways in which most of use meet our habitat needs.

Part C - Elder Interview and Reflection 75 minutes

1. *30 minutes*

Students will gather in a large circle. Using pre-generated questions, students will interview the Elder take turns asking questions.

Students will thank the Elder for his teachings and present him with a thank you gift. 2. 30 minutes

Ask students to return to their desks to complete the *Thinking About Habitats and Nature Gifts* journal entry

3. *Closure 15 minutes*

Ask volunteers to share their responses to the journal entry questions and lead a class discussion about the responses. Inform the students their homework for the evening is to write a letter of thanks to the Elder for taking time to come to speak to the class.

Thinking About Habitats and Earths' Medicines

QUESTION 1

Circle One:

1. I think I was a good team member when we worked in groups to create a
Medicine Wheel

2. I don't think I was a good team member when we worked in groups to
create a Medicine Wheel

QUESTION 2

Circle One:

1. I think I listened and showed respect for the Elder

2. I don't think I listened and showed respect for the Elder

I think this because _____

QUESTION 3

Circle one:

1. I think the Medicine Wheel and the Elder's teaching helps me understand habitats.

2. I don't think the Medicine Wheel and the Elder's teaching helps me understand habitats.

I think this because _____

QUESTION 4

Circle one:

1. I think the Elder's teaching helps me think of ways to show respect for habitats and nature's gifts.

2. I don't think the Elder's teaching helps me think of ways to show respect for habitats and nature's gifts.

I think this because _____

QUESTION 7

Circle one:

1. As a human, I think I am part of nature.
2. As a human, I do not think I am a part of nature.

I think this because _____

QUESTION 9

What did you like about today's activities?

Is there anything you didn't like?

QUESTION 8

A city is a type of habitat. It is called an Urban Habitat. In an Urban Habitat we can do things everyday to respect the habitats of animals like to ones we talked about today.

Can you think of some ways?

QUESTION 10

What else do you want to know about habitat?

How can we find out?

Assessment:

Based on observation throughout the activity, anecdotal notes, informal student interviews and self-assessment and a review of journal responses, a mutually agreed upon ranking for each student is assigned following collaborative analysis and discussion with the Elder, and the co-educators. Ranking based on a scale of 1-4 based on the following criteria to determine stage of development and set goals for future learning (see attached rubric for scoring)

Checklist:

Checklist:

- Demonstrate appropriate protocols and behaviours when listening to an Elder
- Work cooperatively with peers in small groups
- Use previously collected data in a new way
- Recognize that plant and animal populations interact within a community
- Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community
- Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions
- Demonstrate respect for and interest in learning about other cultures
- Recognize that humans are animals and part of the natural world
- Recognize that humans are dependent on the natural world and that people use living things and natural resources
- Indicate and provide a rationale for an interest in environmental stewardship
- Share ideas of ways to participate in environmental stewardship

Stage One: No Attempt	1
Stage Two: Emerging	2
Stage Three: Beginning to / Developing	3
Stage Four: Able to/ Mastery	4

Students is able to:

- 1** Demonstrate appropriate protocols and behaviours when listening to an Elder
1 2 3 4
- 2** Work cooperatively with peers in small groups
1 2 3 4
- 3** Use previously collected data in a new way
1 2 3 4
- 4** Recognize that plant and animal populations interact within a community
1 2 3 4
- 5** Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community
1 2 3 4
- 6** Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal interactions
1 2 3 4
- 7** Demonstrate respect for and interest in learning about other cultures
1 2 3 4
- 8** Recognize that humans are animals and part of the natural world
1 2 3 4
- 9** Recognize that humans are dependent on the natural world and that people use living things and natural resources
1 2 3 4
- 10** Indicate and provide a rational for an interest in environmental stewardship
1 2 3 4
- 11** Share ideas of ways to participate in environmental stewardship
1 2 3 4

Additional Suggested Activities

Title: Creation Story/Braided Story

Overview An Elder is invited to share a creation story - A legend or belief that answers questions about the universe (ex: the origin of the world, mankind and nature. Students then recreate the creation story or invent their own by attaching items to a cloth they have braided to help them convey the creation story. The braid represents the braid of the Mother Earth. This activity engages students in thinking about and giving meaning to the life/creation. This can help bring roots to the idea of habitat as home providing meaning to protection and stewardship - recognition of the importance/respect of the Mother Earth or Environment, habitat and its protection becomes meaningless. It allows the student become aware of their connection to the earth, and provides meaning to their role in environmental stewardship.

NB This activity could be done as an exchange with another classroom participating in BTG, with each student writing or recording their story and sending it with their braid to a student in another classroom.

Subject Areas: Science, Social Studies, Mathematics, Aboriginal Languages and Cultures, Visual Arts, English Language Arts

Title: Monarch Butterfly Quilt/Hanging Wall

Overview

Student recall their outdoor habitat study and discussions about the Monarch butterfly, habitat, life cycle and migration. Working groups, students develop lists of the Monarchs habitat needs: food, water, shelter and space and compare findings. As a class, students review and discuss Monarch predators and habitat changes at the local as well as areas along the monarch's annual migration route (e.g. effects of pesticides in Manitoba and the logging that occurs in Mexico) and the importance of habitat sanctuaries. A naturalist and Elder provide share additional stories about on the mutual relationship between monarchs and the milkweed plant, and the relationships humans hold with the earth and how this negatively or positively affects the Monarchs habitat, and how the habitat destruction can be mitigated.

After completing a journal log about the discussions, each student then uses square cloth to make a unique square for the butterfly quilt. The cloth square can be drawn on or items could be sew or glue on, be creative. Finished squares designs should include any ideas or knowledge that the students have learned about the monarch butterfly. This could include Stages in the life cycle: egg, larva (the caterpillar stage), pupa (the chrysalis phase), and adult monarch butterfly and any of the habitat components. Completed class quilts are then displayed and/or exchanged with another BTG school.

Subject Areas: Science, Social Studies, Mathematics, Aboriginal Languages and Cultures, Visual Arts, English Language Arts

Title: Mural of Local Habitat

Overview

The mural/collage/artwork of students' local habitat could be one of the following activities:

Indoor: Wall: The focus is on allowing the student to look at the components of habitat (food, water, shelter and space) within their own local context. Students will be asked to brainstorm as a classroom and then they will be split into groups to work in creating a mural/collage of their local habitat. This could include homes, grocery/corner stores, as well as any wildlife that shares this space. Finished work is displayed

Outdoor painted mural: Past/Present Mural: A mural could be created that encompasses both a historical look at the local landscape and a current picture of the local area. The murals could include memories the children have of their visit to the prairie museum and the Assiniboine forest. It could also be a mural of a habitat of a specific Manitoba animal and its habitat needs. The mural could be painted on a surface of the participating school.

Subject Areas: Science, Social Studies, Mathematics, Aboriginal Languages and Cultures, Visual Arts, English Language Arts

**Title: Ethnobotany Activity, Traditional vs. Contemporary Conventional Foods -
Three Sisters Garden program**

Overview Ethnobotany explores the relationships between plants and humans, the plant knowledge of social groups of people, and how this relates to food, clothing, ceremonies, etc. To display how our human habitat need of food has significantly changed as a result of urbanization and how this alteration of the landscape has in many ways changed our relationship to food. Discuss what type of foods we currently eat? What did you have for breakfast or what will you have for lunch? Discuss where our food comes from, how we currently dependent on a particularly limited number of foods (we eat mainly 5 crops...our diet isn't varied) and how food may be processed many times before it reaches your plate. Along with the processing, discuss the transportation of our food over millions of km's, where in a traditional diet it would be consumed locally either through hunting, gathering or local agriculture. Ask students if they can recall any plants or know of any plants that are edible? Ask what kinds of food can we grow locally in Manitoba. Construct a Traditional food pyramid for Manitoba and contrast this with a Modern food pyramid. The Traditional food pyramid could be done as a class and each student could do the Modern food pyramid individually.

Optional: Students then spend a half-day (approximately 1.5 hours) planting and learning the story of The Three Sisters; Corn, Bean and Squash. Led by a gardener and horticultural therapist, students learn how the Three Sisters complement each other and how this relationship is connected to humans. The presenter will also cover plant growth, food nutrition, wellness and the associated positive health aspects. The goal of this activity is to teach students the lesson of working together and the complementary relationship found in these sisters and in humans. For classrooms, which do not have an on school or community garden site, a classroom version of this program is an alternative, where students take home their own Three Sisters Garden in a pot.

Possible Extensions: Creating a school vegetable or traditional prairie food garden; Creating a medicine wheel identifying plants in Manitoba

Subject Areas: Science, Social Studies, Mathematics, Aboriginal Languages and Cultures, Physical Education and Health, English Language Arts

Resources/Books:

Patterns in Relationships: Ethnobotany: <http://www.evergreen.ca/en/lg/lg-resources.html#curriculum>

Food is Medicine <http://nativeharvest.com/node/113>

The Sugar Bush <http://nativeharvest.com/node/113>

Appendix E Bridging the Gap Program – Year Two

BRIDGING THE GAP: Engaging Inner-City Youth in Stewardship



PROGRAM OVERVIEW:

Students will spend the morning at the Living Prairie Museum and explore a pristine Prairie Habitat in the context of its unique ecological components and significant cultural value. Following a bannock bake, bagged-lunch and teachings with a local Aboriginal Elder, students will travel to the Assiniboine Forest to replicate their data collection activities and discussions in Forest and Wetland Habitats. The day will finish with a relevant cooperative game and an opportunity to plant wildflowers, build woodchipped trails and/or assist with clean-up efforts.

The Elder shares a teaching called “Friends with Relations”. The Elder describes to the students the principle of humans as being of “one-blood” with the animals. Like animals, the Elder describes how people also rely on plants and Mother Earth for survival, resulting in a need to be mindful of our responsibility to respect Earth/Mother and our fellow relations/animals.

PROGRAM GOALS:

- ❖ Promote student awareness and appreciation of our local natural heritage in the context of curriculum related activities in real world settings
- ❖ Foster a sense of empowerment, pride and personal growth in students
- ❖ Support the development of a life-long commitment to the principles of environmental stewardship

PROGRAM OBJECTIVES:

Students will be able to:

- ❖ Identify and give examples of habitat components – food, water, shelter, space
- ❖ Investigate and describe three Manitoba habitats
- ❖ Acknowledge that people and other living things are part of an interdependent family using nature as home
- ❖ Reflect on personal behaviours and attitudes towards nature and identify issues related to environmental stewardship and sustainability in Manitoba.
- ❖ Participate in activities that show respect, gratitude and appreciation of Manitoba's natural environment

N.B. The focus of the current program addresses specific learning outcomes from the Manitoba Science Curriculum (Cluster 1 - Habitats and Communities) .We have endeavored to incorporate Aboriginal perspectives on nature and ecology, and expose students to a worldview that recognizes the intrinsic value and interdependence of all living things. An Aboriginal Elder from Winnipeg's inner-city community will share relevant teachings and stories with students during a bonfire and bannock bake over the lunch hour (see Program Itinerary on the following page).

PROGRAM ITINERARY

9:30 am Bus arrival at the **Living Prairie Museum – 2795 Ness Ave**

9:30 - 9:45 Introduction and orientation

9:45 -10:30 Habitats and Communities – presentation and activity

10:30 - 11:30 Prairie hike and data collection

11:30 - 12:30 Elders teaching (“Friends with Relations”) bannock bake, lunch

12:45 pm Bus leaves the Living Prairie Museum - Travel to the
Assiniboine Forest (Parking lot - Grant Ave. & Chalfont Rd.)

1:00 - 2:00 Forest and Wetland hikes and data collection

2:00 - 2:30 Wind-up activity/game; Trail building, clean-up and/or planting

2:30 Bus departs the **Assiniboine Forest**

What are some of the parts of an animal habitat?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

We will visit three types of Manitoba Habitats today.
These are:

1. _____
2. _____
3. _____

What are some of the animals that use these habitats as home?

1. _____
2. _____
3. _____



Prairie

		Animal One	Animal Two
Needs	Food		
	Water		
	Shelter		
	Space		
Other Information			



Parkland Forest

		Humans	Animal One
Needs	Food		
	Water		
	Shelter		
	Space		
Other Information			



Wetland/Pond

		Animal One	Animal Two
Needs	Food		
	Water		
	Shelter		
	Space		
Other Information			

Pre/Post Activity: One of the goals of Bridging the Gap is to incorporate mechanisms for on-going program improvement and opportunities to assess student learning. In order to address this goal, a pre and post program activity will be used. A description of this activity will be sent to you shortly. We will ask you to have the activity completed by your students at school *before your scheduled field trip* and repeated again *after the field trip*.