Understanding Traditional Ecological Knowledge Through Kwakwaka'wakw Story

by

Irene Isaac
B.Ed., University of British Columbia, 2000

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MASTER OF ARTS

in the Department of Curriculum and Instruction

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ABSTRACT

There is a low percentage of First Nations students participating in senior high school sciences and pursuing the field of science. This thesis describes the development of a cross-cultural science and environmental education program using traditional Kwakwaka'wakw stories as a focus for exploration. Conversational interviews with elders, resource persons and cultural teachers provided invaluable interpretations of time honored stories, their place in Kwakwaka'wakw culture, how they were passed down from generations as teaching stories, and how they tied Aboriginal students to the land and to each other.

Lessons were pilot tested in grade 6/7 at the T'lisalagil'akw Band School in Alert Bay, BC. Observations and a range of evaluative techniques all combined to show that the students understood the Traditional Ecological Knowledge of the people, they understood a range of western science concepts, they practiced mayaxala (respect for the people and land), and they understood what it means to be Kwakwaka'wakw.

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Acknowledgments

This unit of study has been a great opportunity, with many valuable lessons that have strengthened my philosophy of education. I am grateful for all of the lessons and all of the support I have received throughout my learning and would like to say gilakas'la to all who contributed.

First, I would like to say gilakas'la to my major supervisor Gloria Snively for her continued support and encouragement throughout this project. I first met Dr. Snively when she taught a beach unit in Alert Bay when I was seven years old. As teachers we are always questioning if what we are teaching is valid. Three decades later I get the call from Gloria Snively to join this exciting Environmental Education Program and can say, in all honesty, that she has impacted my life, and many of the Aboriginal youth I have worked with throughout my career. As I remember, her lessons were about care; caring for the beach, caring for the environment, and caring for each other. Most Aboriginal students just want to know that people care; this is what gets us through any adversities.

I would also like to say gilakas'la to Dr. Williams for her commitment to Aboriginal Education and to all of the First Nations educators who work on the frontlines. The challenges are huge and I know at times it appears to be a thankless but much needed job. gilakas'la to all of the teachers I have encountered throughout my life, the ones who were convinced I would make it, and the ones who were convinced I wouldn't make it. Both gave me strength and pushed me into the field of education.

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Aboriginal Science Education definitely looks brighter with this group of caring and understanding individuals in it.

Gilakas'la to the 'Namgis First Nation and the Kwakwaka'wakw people. I am so proud to be from this nation. They have been supportive throughout my education and have entrusted me to teach our children. Gilakas'la to all those who have gone before us and struggled throughout history to keep our culture alive and well.

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Chapter 1 Introduction

My name is Irene Isaac and I am Kwakwaka'wakw from the 'Namgis First Nation of Alert Bay, BC. I am the youngest of thirteen children and was born and raised on the 'Namgis reservation. Growing up on the reserve had its advantages and disadvantages but I always looked at our island as "Paradise Island" and recognized how lucky were to be surrounded by such beauty at a young age. One of my very first "Summer Challenge" jobs involved working with elders in the community. We travelled to neighboring communities to visit other elders, where they shared many stories, humor and of course advice. After this, all of my jobs up to graduation involved working with youth between the ages of 6-12 years old. When I reached grade ten I had to take a ferry to our local district school (North Island Secondary School) to graduate. The transition was very difficult both socially and academically. I was comfortable attending school at home because the community was always involved and our school was dominantly 'Namgis First Nations. When I moved to North Island Secondary School we became the minority making up only 2% of the school population and up to this point I had never really had to deal with racism head on. I was automatically put into the "easy" science and math courses but challenged myself to take biology and the regular math program after talking to my grade counselor.

I was lucky to have a strong peer group who supported and looked out for one another. In my age group we had an unspoken deal to make it to grade 12 and all of us did. I remember our school counselor asking "what made the difference for you"? In other words, she wanted to know why so many First Nations graduated in this one year. At the time I had no answer, but now I would contribute our high school completion to the many people (teachers) and experiences that we had (on and off island). The teachers included cultural teachers, music

teachers, and basketball, soccer and volleyball coaches. We were always involved in community and travelling to other First Nations communities. I also realized that many of the students in my class had parents who were extremely supportive and had worked hard to give us the best family life, education, and grounding in culture they could.

Following graduation I was selected to play on a college soccer team, so I decided to take a the 2 year Recreation Leadership Diploma Program. At the same time I was asked to work with Urban First Nations youth at Raycam Community Center ("The Projects") and Britannia Community Center in Vancouver. Again, I found myself working with Aboriginal youth, only this time the realities were harsh. My first days of work were quite emotional as I had a difficult time dealing with what I saw. I can never forget my first day of work at one of the centers was taking a bed off the top of the roof where warm air was blowing out. A "curb kid" was sleeping on the roof above the pool. This was life changing for me. I didn't like what I saw and I figured there must be a reason I keep getting drawn to these Aboriginal youth. I promised myself to be part of the solution and to challenge these youth to challenge themselves.

I found out quite quickly that outdoor challenges and being out in nature is what worked best with these Aboriginal youth. My focus for over a ten year period was outdoor education; I just needed that piece of paper that gave me the okay to teach. After working for Templeton Secondary School I soon realized that I wanted to be in the classroom because there appeared to be something missing in the curriculum and in the understanding of Native youth. So many of our children were failing or only counted as present on that first important month of the year (nominal enrollment).

These experiences and frustrations caused me to return to school and get my teaching certificate at UBC. I graduated from UBC in the year 2000 and returned back to "Paradise

Island" (Alert Bay) to work with my own people. Outdoor Education experiences have always been an important aspect of my teaching. I have come to appreciate that our own traditional Kwakwaka'wakw knowledge and teaching about sense of place has been developed over centuries of living on the land and has worked for our people and me. It seems practical yet deeply meaningful, and I can say with certainty that all of my memorable lessons have involved our ways of knowing and have brought me to this point in time and this research. Enjoy!

The 'Namgis Origin Story

> When the transformer Kaniki'lakw, traveled around the world, he eventually returned to the place where Gwa'nalalis lived. In an earlier encounter, the transformer had beaten Gwa'nalalis, who was ready for his return. Kaniki'lakw asked, "Would you like to become a cedar tree?" Gwa'nalalis replied, "No, cedar trees, when struck by lightning, split and fall. Then they rot away for as long as the days dawn in the world." Kaniki'lakw asked again, "Would you like to become a mountain?" "No" Gwa'nalalis answered, "For mountains have slides and crumble away for as long as the days dawn in the world." The transformer asked a third question, "Would you like to become a large boulder?" Again, Gwa'nalalis answered, "No. Do not let me become a boulder, for I may crack in half and crumble away for as long as the days dawn in the world." Finally, Kaniki'lakw asked, "Would you like to become a river"" "Yes, let me become a river so that I may flow for as long as the days shall dawn in the world", Gwa'nalalis replied. Putting his hand on Gwa'nalalis' forehead and pushing to the ground, Kaniki'lakw said, "There, friend, you will be a river and many kinds of salmon will come to you to provide food for your descendants for as long as the days shall dawn in the world. And so, the man, Gwa'nalalis became the river, Gwa'ni.
>
> Pal'nakwala Wa'kas (Dan Cranmer) 1930
> Adapted from Boas and Hunt, Kwakiutl Tales, 1908

Like the 'Namgis, each of the Kwakwaka'wakw villages have a story of how the people originated. Storytelling has always been an important aspect of indigenous cultures throughout the world. According to Kawagley (1995), "Traditional education processes were carefully constructed around mythology, history, the observation of natural processes and animals' and plants' styles of survival and obtaining food, and use of natural materials to make their tools and implements, all of which was made understandable through thoughtful stories and illustrative examples" (p. 2). In most legends and myths there is always the mention of supernatural beings and the living world. Kawagley (1995) describes "most indigenous worldviews as seeking harmony and integration with all life, including the spiritual, natural, and human domains" (p. 2). Where every culture and Nation of people has a way in which they express themselves, the Kwakwaka'wakw have expressed their culture through stories and the potlatch. In fact, central to the cultural and spiritual practices of Kwakwaka'wakw people is the potlatch, or winter ceremonies.

An important aspect of these ceremonies includes mayaxala. In the Kwak'wala language, mayaxala means "a respect for all things." Mayaxala is a Kwakwaka'wakw perspective that is inclusive of all reality, both physical and metaphysical. The idea that you must "respect all things" stems directly from Kwakwaka'wakw origin stories. Thus, the enacting of these stories through song, dance and storytelling is what holds the Kwakwaka'wakw culture together. At the heart of many of these stories and legends is life—and this in a sense is Kwakwaka'wakw science.

Rationale

In the Kwakwaka'wakw culture the concept of western modern science (WMS) is still fairly new. Traditional Knowledge (TK) however has been around since the beginning of time.

Mr. Mitchell who works for the science department of the Saskatchewan Indian Federated College, Canada's First Nations-controlled university-college describes his experience with science as follows: "…in the natural sense, the practice of science was all around us – in the Native knowledge about the life cycles and habits of the abundant fish, in the detailed words for the anatomy of every part of the animals they trapped and skinned, in their knowledge of seasons and weather patterns, and the use of plants and herbs" (Mullens, 2001, p.8). In general many indigenous people share this experience, as their worldviews stem from their spiritual and religious beliefs, which is connected to all things. In other words we are practicing what is known as science all of the time.

Despite the fact that the experience of *science* is vital to our everyday life there is currently a critical shortage of Aboriginal people in the science and health-related fields. In fact out of the 27, 000 native students in Canadian Universities only 3.2% of them are enrolled in science related courses (Williams, 2005). While the Department of Indian and Northern Affairs Development (DIAND) highlights the fact that the total enrolment in elementary/secondary schools has increased by 20% over the past seven years, nearly 60% of this total enrolment is in the 448 band-operated schools, and these schools tend to provide educational services up to grade ten (Overview of DIAND Program Data, June 2000). This means in the upper grades, and the critical years for student planning, students are likely to go through a shift in cultural values as they move from one community school to another.

In Alert Bay the 'Namgis First Nation realizes that this transition is a challenge for students and has led to a high percentage of their children failing and even dropping out of school between grades 8-10. In addition, the majority of First Nations students who are progressing past grade 10 are graduating with what has been termed as a "*walking certificate*".

This means these students have not met the provincial requirements to receive their dogwood diploma. It was recognized at a conference titled *Strengthening First Nations Post-Secondary Education in BC* held in Vancouver British Columbia between Indian and Northern Affairs Canada (INAC), the First Nations Education Steering Committee (FNESC), and the Native Education Center that:

> The 46% of public school First Nations students currently graduating have no chance of making it into post secondary education if they do not complete the appropriate math, science and English courses (April, 2005).

In addition, The Deputy Minister of Advanced Education, Dr. Philip Steenkamp, discussed the following need for change in our education system at *the third annual Ministry of Advanced Education Open Space Conference:* held at the University of British Columbia in 2004:

> The Aboriginal population is growing at a faster rate than the non-Aboriginal population. For example, in 2001, Aboriginal people represented 4.4 percent of British Columbia's population compared to just 2.8 percent of the population in 1996. It is now estimated that approximately 5 percent of British Columbia's current population is Aboriginal – and this number keeps growing. Also, 50 percent of the Aboriginal population is under 25 years of age. Indian and Northern Affairs Canada predict that in 2007, the Aboriginal workforce will be just shy of one million people in Canada, with young men and women under the age of 35 representing the bulk of that number. These are all significant statistics when considering British Columbia's future labor pool… recent published reports regarding the educational attainment of Aboriginal people indicate that only 4 out of 10 Aboriginal people in British Columbia complete a post-secondary credential, compared to 6 out of 10 non-Aboriginal students, and that Aboriginal people are particularly underrepresented in university level programs. Also significant is the fact that grade 12 graduation rates for Aboriginal learners,

> although improving, are still significantly lower than the provincial average (February 23, 2004, p.28).

History and research tells us that our ways of knowing has worked for thousands of years. Why then are our children failing? In the traditional sense this knowledge is carried out through the customary practice of our language, singing, dancing and the sharing of our stories. The question then is how does this traditional ecological knowledge (TEK) relate to science as defined by the Ministry of Education? The crisis is that there is little or no connection at all in today's curriculum. The goal then is to create science curriculum that is more relevant to Aboriginal learners who may have previously rejected it because it conflicted with their cultural value systems (Corsiglia & Snively, 1995). Through the sharing and examination of story and its place in Kwakwaka'wakw education, this study provided practical insight into how Kwakwaka'wakw story can be linked to both Traditional Ecological Knowledge (TEK) and Western Modern Science (WMS).

Traditional Ecological Knowledge

Traditional ways of knowing or Traditional Ecological Knowledge (TEK) is defined by Snively & Corsiglia (2000) as experiences "acquired over thousands of years of direct human contact with the environment (p.11) Each group of people live in unique environments and conditions therefore definitions may vary from nation to nation. However, Aboriginal people throughout the world have gained a deep understanding of the complex ways in which the many parts of our environment are interconnected. The Kwakwaka'wakw traditional knowledge has been and continues to be accumulated through time spent living on the land. Most of these teachings have been passed down orally through storytelling and the traditional practice of the potlatch. Thus, story and science have always been interconnected and to separate the two

would detach one from the true meaning of science, which is to live in harmony with the land. Aboriginal scholar Gregory Cajete (1999b) describes this form of education as follows:

> Indigenous education is based on recognition that human interactions with place gives rise to and define cultures and community. The relationships of indigenous peoples to sources of their life and natural world is reflected in stories, metaphors, and images, and expressed in multiple ways through their arts, through their dance, and through their ways of community (p. 194).

Traditionally, Aboriginal students excelled in their own cultural teachings, which had very much to do with life and their natural surroundings, therefore the practical method for learning the 'basics' should be based on traditional knowledge and natural heritage.
In fact a professor of environmental studies, Ralph H. Lutts (1985) suggests that:
"Environmental education should begin with the question, what makes a particular environment personally significant? This question can be answered in terms of our objective physical and biological identity, and it can be answered in terms of our subjective personal and cultural identity" (p.37). In other words we are what we learn and what we learn makes us who we are.

It is not surprising then that a nation that once excelled is now seen as failing, for most of the science curriculum that is used in the classroom today fails to mention the contributions of Indigenous knowledge. In fact Western modern science (WMS) is filled with the values, and beliefs of the dominant society, which is often conflicting with the views of Indigenous knowledge. As a result, it is difficult for the Aboriginal student to identify with the subjects that do not directly relate to them. So today one of the biggest challenges the Aboriginal community is now faced with is overcoming the negative self-image and self-worth that has stemmed from "failure". What better ways to increase confidence but to have Native people learn about their cultures contribution to the world of science?

Towards Traditional Assessment

Traditionally, First Nations societies in Canada were well organized, with strong value systems that were taught to the children through rituals, ceremonies, and social and spiritual events. Responsibility and integration of the children within the family, community and nation was vital for survival. Children would learn the skills to meet their roles in society. Traditional education involved specific skills that were needed for survival within a particular environment and evaluation was simply determined by an individual's ability to carry out their responsibilities within the group. As Kawagley (1995) states, "you either had it, or you didn't, and survival was the ultimate indicator" (p.88).

Success is generally based on what one knows and how well a person is able to access that knowledge in everyday life. According to Stephens (2000) "with the merger of cultural knowledge and science, and with the shift in science education from science as only content to science as a complex combination of attitude, inquiry skills, and conceptual understanding come necessary shifts in assessment" (p.34).

> In other words, if we truly value student growth and understanding of cultural knowledge, then we must find ways to assess such knowledge and we must resist the temptation to merely treat cultural knowledge as a vehicle for science learning. If we truly value students' abilities to: reason scientifically; apply science learning to real life situations; and understand the contexts and constraints under which science functions, then we must assess in all those area as well. And finally, if we recognize that learning includes the process of exploration and the student's autonomous construction of meaning, then we must allow for diverse pathways to and demonstration of understanding (Ibid.).

This is a difficult challenge in British Columbia as most research illustrates traditional knowledge being adapted to fit the already established B.C. Ministry of Education Guidelines.

For instance, in many native band operated schools education boards request that their teaching staff follow the prescribed learning outcomes (PLO's) that are laid out in the B.C. Ministry of Education Integrated Resource Packages (IRP'S).

> Assessment, as defined in all Integrated Resource Packages, is the systematic gathering of information about what students know, are able to do, and are working towards. Teachers use the information collected through assessment activities to evaluate student performance. Students benefit most from assessment when evaluation is provided on a regular, ongoing basis. Students can then use the information to understand their strengths and how they can develop further. (British Columbia Ministry of Education, 1998, p.163).

As said by Stephens (2000) "we are making progress with authentic assessment of all aspects of science, but have less experience with the issues of assessing cultural behavior, knowledge and values – things that are critically important to Native communities" (p. 34). How then can balance be established in both worlds? According to the document entitled *Shared Learnings: Integrating BC Aboriginal Content K-10:*

> Assessment strategies derived from Aboriginal content could reflect the teaching and learning styles of Aboriginal cultures. In traditional Aboriginal Cultures, the entire community was involved in the education of children. Children were taught new skills when it was seen as necessary and/or appropriate to each child's age, abilities, and needs. Teachers and Elders created a safe but challenging learning atmosphere, and the goal was the appropriate development of each child. Assessment and evaluation were an integral part of the teaching and learning process and were use to promote further learning (British Columbia Ministry of Education, 1998, p. 163).

Traditionally, evaluation was community based. Though today many communities are not as healthy as they once were, there are strong leadership groups and representatives who are willing to assist in the area of education and culture (see appendix B for samples).

Purpose

This project examined selected traditional stories, songs and dances of the Kwakwaka'wakw people and developed science units of study that guide students into a process of approaching stories for study with a view toward understanding the implications of native traditional science and applying stories to science instruction. Specifically, this project had a twofold purpose:

1. In collaboration with elders, develop a unit of study that uses traditional stories as a catalyst for exploring science related (TEKW) concepts and processes, and
2. Pilot test sample lessons and obtain feedback from elders and students.

Research Questions

1. What traditional stories do the elders, cultural teachers and storytellers identify that can be developed to teach science related (TEKW) concepts in the classroom?
2. What teachings do the stories provide?
3. How should the stories be represented in the classroom and or in the field?
4. What Aboriginal science related examples (knowledge, concepts, processes, and wisdom) are embedded in the stories?
5. What aspects of Kwakwaka'wakw worldviews are described in the stories?
6. What are the students' experiences during instruction, and how do they respond?
7. What are recommendations for using traditional stories to teach science related concepts in the classroom?

Location

The community of Alert Bay is located on Cormorant Island, a small island off the Northeastern shore of Vancouver Island within the area known as the Broughton Archipelago/Queen Charlotte Strait (see Figure 1). Cormorant Island is most frequently reached via the "Island Highway (Hwy #19), followed by a 40 minute ferry ride from the town of Port McNeill, approximately 450 km north of the Province's capital city of Victoria. Campbell River, 200 km south, is the nearest urban center with a population over 10, 000.

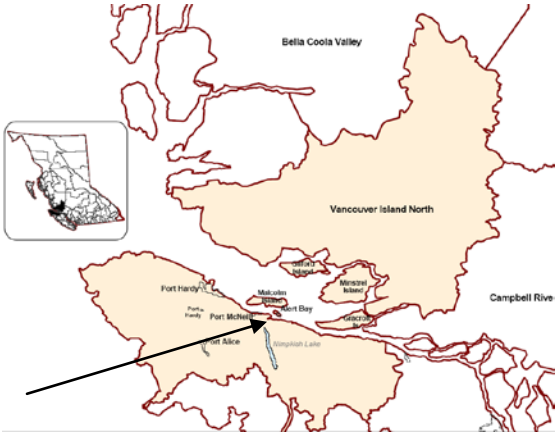

Figure 1. Location
Source: BC Stats

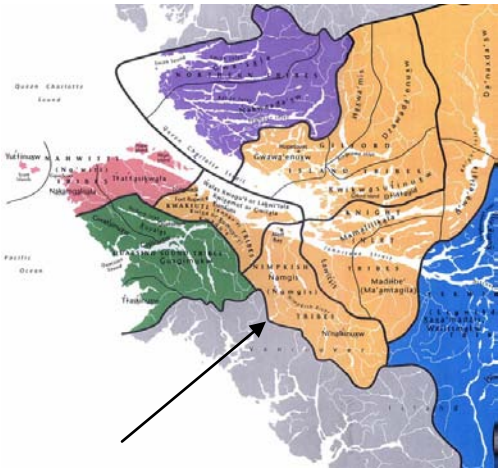

Figure 2. Kwakwaka'wakw Territories
Source: U'mista Cultural Centre

Cormorant Island lies within the traditional territory of the 'Namgis First Nation, one of 16 remaining Kwak'wala speaking Nations (see Figure 2). Directly adjacent to Cormorant Island, on Vancouver Island, is the mouth of the Nimpkish River (Gwa'ni). The Nimpkish watershed is the largest on Vancouver Island. According to the legend of the River's origin, Gwa'ni was placed there by the Creator to support "many kinds of salmon…food for your descendants for as long as the days shall dawn on the world.

It was these salmon runs that gave birth to the Kwakwaka'wakw people. The Island is occupied by the following: the municipality of the Village of Alert Bay, a small unincorporated area (Sanyville), three reserves belonging to the 'Namgis First Nation (IR1, IR1A, and IR2 – a burial site), and Whe-La-La-U, a 12 acre parcel of land set aside by the Department of Indian and Northern Affairs as a home to people from a number of surrounding Kwakwaka'wakw First Nations. Some residents clearly make a distinction between the various co-existing Island communities: "Indian and "White", reserve and non-reserve, 'Namgis reserve and Whe-La-La-U. These divisions and boundaries are historical, political/administrative, social, cultural and racial (Uncertain Futures Workshop October 3, 2006, Alert Bay, B.C.).

Participants

Traditional stories were gathered and analyzed with the assistance of the 'Namgis First Nation Treaty research team, U'mista Cultural Center Archives and employees, and respected cultural teachers and elders in the community. The participants in the pilot project included (18) intermediate school students at the T'lisalagi'lakw band operated elementary School. There were (18) participants with a balance of both male (10) and female (8). The students ranged in age from ten to twelve years old and were of Kwakwaka'wakw ancestry or status Indians.

Methods

There is an increased interest in research that aims to improve the success rate of Aboriginal people in the health and science related field. However, conventional research in the Aboriginal community has a contentious history and has offered limited opportunities to improve the education and well being of the Aboriginal communities.

Because my research had very much to do with sense of place and traditional ecological knowledge (TEK) community involvement was essential. The process that consisted of collaboration with the researcher and the community is known as Community-based participatory research (CBPR). In this process the research was designed to:

1. Engage community members;
2. Employ local knowledge in the understanding of story, science and the design of curriculum;
3. Invest community members in the processes and the result of the research.

In addition, community members were invested in the delivery and use of research findings and ultimately in the increased interest of Aboriginal people in the field of science.

The six people I interviewed were selected for a variety of reasons. First I wanted to make sure that I included people who were well respected in the community and were culturally strong. This meant they had dedicated their time to preserving our rich culture through potlatching, speaking our language, researching our history, or being well versed in Kwakwaka'wakw stories, songs and dances. Secondly, I selected people who were involved in community and contributed to the community. When important events happen they get called on to represent the 'Namgis or the Kwakwaka'wakw. Lastly, I chose people who made an impact on me throughout my schooling experience.

The research was designed as follows*:*

Personal Interviews **–** Personal interview were conducted with elders and cultural teachers. In some instances it was more appropriate to use individual interviews rather than group interviews. Such instances could include: the age of the participant, the need to be in a particular environment, the availability of the participant, the participant's knowledge of story, and the possible need for confidentiality. The number of group and personal interviews was determined as the information was gathered.

Also unstructured questions were used to allow respondents to answer from a variety of dimensions. Sample Questions included:

1. Traditionally, how did you learn about the natural world or science?
2. Traditionally, how were Kwakwaka'wakw stories used?
3. What Kwakwaka'wakw stories do you see relating to the natural world/TEKW?
4. What is the main lesson in this/these stories?
5. How can this/these stories be used to teach our children about the science knowledge and wisdom (TEKW) of the Kwakwaka'wakw people?

6. Who created these stories?

These interviews were video and audio taped by the 'Namgis treaty communications officer and myself. Thus, I relied on a form of oral history where people had the opportunity to speak in their own words, about their life experiences. *Oral history* always has been an important aspect of the Kwakwaka'wakw culture so it made sense to continue the tradition. *Historiography* - is the method of doing historical research or gathering and analyzing historical evidence. This research relied on *archival data* stored at the U'mista Cultural Center Society. The Franz Boas collection at the U'mista Cultural center (assisted by William Wasden and Pewi Alfred) was explored along with the 'Namgis Treaty collection (Diane Jacobson). Suitable stories were chosen from these two collections, as well as stories shared by the participants. These stories then become the basis for developing science units of study. For example, the *'Namgis origin story* could be linked to the science concepts of fish species, harvesting salmon, decaying and composition, living and non-living, fish habitat, interconnectedness, human needs, respect and care for the river. As such, the story could be linked to many prescribed learning outcomes outlined in the grade 5 and grade 7 B.C. Ministry of Education curriculum.

I chose qualitative research, as opposed to quantitative research for a variety of reasons. First, I *relied on the words* that are shared with me through group discussion and personal interviews. Second, this qualitative study was a *follow-up* to a quantitative study that proved there are a low percentage of Aboriginal people pursuing the field of science. Third, it was intended that this research would assist in *laying the groundwork* for further research in the area of First Nations education and science. Lastly, it was my hope that this research would *generate new ideas* or ways of linking Traditional Ecological Knowledge (TEK) and Western Modern Science (WMS) in a cross-cultural science curriculum.

Chapter 2 The Literature Review

Story

Stories tell us where we come from and why we are here. In fact "Creation stories create, or re-create, the world human beings live in, shape what we see and suggest the rules by which we should live" (Suzuki, 1997, p. 185). According to Brems (2005), "Storytelling has been an important means of making sense of the environment and of transmitting information, knowledge, and wisdom from generation to generation among many ethnic groups across the world, including the North American continent" (p. 1). All cultures tell stories; stories function as an entertaining and educative means of introducing the listener to the beliefs and practices of a group of people. Cajete (1999a) states that:

> Storytelling and experience form the foundation for much traditional Native American learning and teaching. Stories give focus to and clarify those things, which are deemed important. Experiencing through watching, listening, feeling and doing gives reality and meaning to important Native American cultural knowledge. Combining story with experience, Native Americans are able to achieve a highly effective approach to basic education. (p. 128)

Therefore, the role of the storyteller is a significant one in cultures that have retained an oral narrative system, such as the Kwakwa̲ka̲'wakw. Stories are passed on from generation to generation to shape the actions of younger members of the cultural group and to help them develop their behaviors according to codes and values of their people. According to Brem (2005) "traditional stories serve to reflect or illustrate typical situations people in a given group might face, thus preparing them for its occurrence and for adjusting to and coping with it" (p. 1). For example, at an early age many Kwakwa̲ka̲'wakw children are told the story of Dzunu̲kwa or the Wild Women of the Woods. Dzunu̲kwa is a mythical female giant with a black, hairy body,

pursed lips who wears a basket on her back. She lurks along the edge of the forest looking for children to grab and eat. This is a story told through masked dancing during the winter ceremonies of the Potlatch. Though there are many lessons within this legend it is meant to scare children from wondering into the forest. As a result children are taught that the very best way to avoid an encounter with Dzunukwa, which represents all of the dangers within the forest, is to stick close to your parents.

As well, traditional Native stories are based on honoring all existence, particularly the animal and plant kingdom, and all of those who have come before us. The following story illustrates the honoring process:

> A Northern California basket maker named Mrs. Matt was hired to teach basket making at a local university. After three weeks, her students complained that all they had done was sing songs. When, they asked, were they going to learn to make baskets? Mrs. Matt, somewhat taken back, replied that they were learning to make baskets. She explained that the process starts with songs that are sung so as not to insult the plants when the materials for the baskets are picked. So her students learned the songs and went to pick the grasses and plants to make baskets. Upon their return to the classroom, however, the students again were dismayed when Mrs. Matt began to teach them yet more songs. This time she wanted them to learn songs that must be sung as you soften the materials in your mouth before you start to weave. Exasperated, the students protested having to learn songs instead of learning to make baskets. Mrs. Matt, perhaps a bit exasperated herself at this point, thereupon patiently explained the obvious to them: "You're missing the point," she said, "a basket is a song made visible" (West, 2004, pg. 35).

There is a reason things are done a certain way and this is called protocol. Protocol has been defined in the Webster's Dictionary as: "the code and rules of diplomatic and state etiquette." Principles of organization and function are embedded in all stories; therefore

recognizing the purpose and the function of stories becomes an integral part of the teaching/learning process. For this reason the first standard of Indian education is spirituality; at its center is respect for the spiritual relationship that exists between all living things (Hampton 1988). For instance, a prayer and ceremony would accompany harvesting cedar bark and if proper protocol is not followed there is a belief that things may not go well, and that possibly bad luck may even come about. In the same way the traditional potlatch is conducted by very strict rules and protocol. If protocol is out of order the hosts often have to pay their witnesses to correct their fault.

Stories have been presented in a variety of forms but a majority of the lessons relate to a respectful relationship with plants, animals and all of nature. Where we are reminded to ask ourselves "how does what we receive in our educational experience impact the preservation and sensible use of lands and how does it affect the continuing existence of our tribes?" (Deloria, 1991). Undoubtedly, at the very core of many of these stories is the answer to these questions and this is defined as Indigenous science. As Cajete (1999a) points out:

> Because many Native American myths relate the learner to paradigms of proper relationship to plants, animals and all of nature, as well as to the consequences of a poor relationship to nature, they provide a place to begin a greatly humanized discussion of the general areas and underlying assumptions of modern science (p. 129).

Traditional stories provide an ideal opportunity to look at the world of science through a more subtle approach, possibly to the point where many children may not be conscious that they are embracing science but come to an understanding that their ways of knowing have always been with them. Ogawa (2005) says, "Indigenous science may be of a nature such that even the individuals living in that culture may neither recognize its existence nor be aware of being governed by it tacitly" (p. 2). In other words science is so much a part of everyday living and

responsibility that often one may not be aware of the connection. Similarly Kawagley (1995) states " I know my people are intelligent and ingenious as reflected in their metaphysics and handicrafts…how then did this come about? " (p. 31). Through direct experiences native peoples practice what Doyle (1985) defined as science: "Science is experiment, science is trying things. It is trying all possible alternatives in turn, intelligently and systematically, and throwing away what won't work and accepting what will" (12). Stories are a starting point for these trials and errors and they provide a vehicle for answering the "how's" the "when's" and the "whys."

Furthermore, Cajete (1999a) explains, "Through the process of storytelling, skills in listening, thinking and imagining are creatively molded" (p. 128). The use of traditional stories as a view of science and a means to develop scientific skills is not new to Indigenous cultures. In fact Native peoples choose to succumb to the will of nature, and see everything in the universe as alive. For instance, "Hawaiians traditionally have viewed the entire world as being alive in the same way that humans are alive. They have thought of all of nature as conscious – able to know and act – and able to interrelate with humans…Hawaiians also viewed the land, the sky, the sea, and all the other species of nature preceding them as family – as conscious ancestral being who had evolved earlier on the evolutionary ladder, who cared for and protected humans, and who deserved similar treatment (aloha'aina [love for the land]) in return" (Suzuki, 1997, p. 189). So there is an unspoken law that involves reciprocity where nature will take care of people if people take care of nature. As MacIvor (1995) states, "through traditional stories, 'generations of understanding' about the natural world, and the philosophy and values which guided the Aboriginal people's interaction with it, are kept alive" (p. 80).

On a philosophical note, Connelly and Clandinin (1990) called human "storytelling organisms who, individually and socially, lead storied lives. The study of narrative, therefore, is

the study of ways humans, experience the world." They also claim that "education is the construction and reconstruction of personal and social stories: teachers and learners are storytellers and characters in their own and others' lives" (p. 2-14). Similarly Barman, Hebert and McCaskill (1987) recognize:

> The primary function of education is the socialization of the young into a society. Primary socialization occurs through child-rearing practices in the home and within the family system. Secondary socialization usually occurs through more formal institutions. In societies with schools, students are taught the values, beliefs, skills, and roles deemed desirable by a particular culture through an appropriate curriculum. (p. 3)

In Aboriginal societies it is through story that children develop their individual personalities and their ideas on how they will live their life. By presenting cultural stories that carry the message of healthy, responsible living, they learn to become caring, compassionate citizens of the world. The stories that come from the heart are rooted deep within the earth. Generation after generation the stories within ritual, ceremony, festival and other social and religious events provide the skills necessary to maintain a give and take relationship with the natural world.

Sense of Place

Sense of place refers to "an experientially based intimacy with the natural world processes, community, and history of one's place" (Sanger, 1997, p. 4). Place plays an important role in the development of one's identity and worldview. Wendell Berry, America's best-known bioregionalist, says, "if you don't know where you are, you don't know who you are" ("Discovering A Sense of Place," n.d.). Similarly, many elders in the Kwakwaka'wakw community have lectured to the young ones that if you don't know who you are or where you come from you will not make it in today's world. In other words sense of place and identity are

so interrelated that one cannot exist without the other. Though there have been strategies suggested to include sense of place education (Kawagley, 1995; Cajete, 1999b; Snively, 1990), much improvement is needed within our own educational systems to increase the awareness of its importance and place. Lutts claims (1985):

> A fundamental step towards understanding our natural surrounding may lie in an increased emphasis on *sense of place education*. Environmental education should foster an exploration of the place within which we each live…We must cherish our place in our environment as home, and we should protect and improve it as we would our home – for indeed it is. Stories provide a psychologically powerful tool for understanding our environment and our relationships with it. Environmental educators should make good use of place, home, and story in their teachings. (p. 37)

Primarily, sense of place education develops awareness, knowledge, and commitment, which will result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the land (Saul, 1999). The first step in developing a connection to the land requires experiential learning and "effective education brings the real world in face to face contact with the student, enabling them to explore and examine ideas to reach new understandings based in actual experience and reality" (Martin & Hopp, 1999, p. 8). For example, choosing a problem like poor water quality, habitat loss or cultural misunderstanding offers opportunities for student to synthesize learning and to engage in meaningful problem solving. Saul (1999) refers to this concept as *environmental service learning*. He stated, "By getting students out into the community, service learning advances their understanding and their relations to problems through hands-on experience as students actively work to apply knowledge in their local area" (Saul, p. 18). As a result, sense of place is individually and collectively built through narratives, personal connections, emotions, and so on.

Gregory Smith (1992) argues that: “the current education system defines a non-place-based modern/industrial world view” (p. 15). He claims that modern schools indoctrinate students into a life theory and practice of detachment from their experiences of place and community. There is a concern that “the educational experience of students works to undo the same elements that create a strong and healthy sense of place” (Sanger, 1997, p. 4). According to Sanger (1997) there are several ways in which this detachment is achieved in our schools but the three main behaviors include:

1. First our schools promulgate a view of the individual as an autonomous being, stressing independence necessary to succeed in our modern market society and the need to reach our full potential as individuals.
2. Second, the language of the modern-industrial worldview forms the basis for the detached practices, values, and ways of thinking that schools create and perpetuate.
3. Third, the use of an impersonal authority such as textbook undermines local forms of knowledge and the personal connections of an oral tradition (p. 4).

Fortunately, there are alternative solutions available that involve teacher, student and community. In fact, effective sense of place education does not require expert environmental educators or lengthy trips to wilderness. As Sanger states, “ by taking students outside to experience whatever accessible natural processes exist around them, teachers can provide a crucial element in good education and sense of place” (p .5). In some ways sense of place education can be less stressful to the teacher, especially if children have personal connections to the outdoors. “One means of bringing students into closer contact with the wealth of nature and eco-friendly projects in their community is to engage them in creating neighborhood green maps – visual representation of local environment and cultural sites” (Zuber, 1999, p. 6). Educational

lessons such as this “heighten students’ interest in their neighborhood and give them confidence in their ability to help make those neighborhoods healthier, more attractive, more sustainable places to live” (Ibid.). Another powerful tool for sense of place education is the creative journal. According to Hammond (1997), “the environmental education (EE) journal is consistent with brain research which has shown us that drawing and writing something we have just experienced fixes that experience in long-term memory and stimulates relational thought” (p. 34). The journal develops a sense of place and personal connection to the natural environment by observing and recording their new discoveries. Naturally, one of the most powerful messages we can send to our children is a respect and appreciation for the place where they live: the land, the rivers and oceans, the weather, and especially the non-human beings that share the land (Lassman, 1997).

Sense of place allows us to find inspiration in the past, create meaning for the present and plan for the future. As sense of place educators, we are teaching in the present, preparing students for the future. Sanger (1997) claims “If they can see themselves as part of a continuous line from past to present, they will visualize and value their role in the future” (p. 5). Without a doubt the impact of our teaching methods will be determined by the next generation.

WorldView

A world view (or worldview) “is a term to describe how one’s beliefs are used to view the world. The “Worldviews” group, which includes people from disciplines as diverse as engineering, psychiatry, theology, theoretical physics, sociology and biology produced a short book entitled *World Views from fragmentation to Integration* (Aerts et al., 1994) that lists seven fundamental components of world view:

1. A Model of the World. It should allow us to understand how the world functions and how it is structured. "World" here means the totality, everything that exists around us, including the physical universe, the Earth, life, mind, society and culture. We ourselves are an important part of that world. Therefore, a worldview should also answer the basic question: "Who are we?

2. Explanations. The second component is supposed to explain the first one. It should answer the questions: "Why is the world the way it is? Where does it all come from? Where do we come from?" This is perhaps the most important part of a worldview. If we can explain how and why a particular phenomenon (say life or mind) has arisen, we will be able to better understand how that phenomenon functions. It will also help us to understand how that phenomenon will continue to evolve.

3. Futurology. This extrapolation of past evolution into the future defines a third component of a worldview: futurology. It should answer the question "Where are we going to?" It should give us a list of possibilities, of more or less probable future developments. But this will confront us with a choice: which of the different alternatives should we promote and which should we avoid?

4. Values. This is the more fundamental issue of value: "What is good and what is evil?" The theory of values defines the fourth component of a worldview. It includes morality or ethics the system of rules that tells us how we should or should not behave. It also gives us a sense of purpose, a direction or set of goals to guide our actions. Together with the answer to the question "why?," the answer to the question "what for?", may help us to understand the real meaning of life.

5. Action. Knowing what to strive for does not yet mean knowing how to get there, though. The next component must be a theory of action (praxiology). It would answer the question "How should we act?" It would help us to solve practical problems and to implement plans of action.

6. Knowledge. Plans are based on knowledge and information, on theories and models describing the phenomena we encounter. Therefore, we need to understand how we can construct reliable models. This is the component of knowledge acquisition. It is equivalent to what in philosophy is called "epistemology or "the theory of knowledge". It should allow us to distinguish better theories from worse theories. It should answer the traditional philosophical question "What is true and what is false?"

7. Building Blocks. The final point on the agenda of a worldview builder is not meant to answer any fundamental question. It just reminds us that world views cannot be developed from scratch. You need building blocks to start with. These building blocks can be found in existing theories, models, concepts, guidelines and values, scattered over the different disciplines and ideologies. This defines the seventh component: fragments of worldviews as a starting point (Pages 13-20).

This theory of worldview is extremely large but each of these ideas comes into play when looking at our own worldview. Much of any person's worldview is shaped by his or her culture and upbringing. In fact, "the concept of worldview is very closely related to the definitions of culture and cognitive map" (Kawagley, 1995, p. 7). Each person's "life understanding" takes shape over time as the individual grows and develops, as he or she engages in new events and experiences, interacts with others and with his or her surroundings, and derives answers to questions about life and living from fellow human beings. "Young people learn these principles,

including values, traditions, and customs, from myths, legends, stories, family, community, and examples set by the community leaders" (Ibid.). So whoever most controls a child's early environment will likely be most influential in directing the developmental course and bringing about desired ends. Parents and educators can hope to produce a preferred outcome by exposing a child to selected experiences and instruction by way of narratives (story) and rituals.

Exposure to different cultural stories and rituals has caused chaos to Indigenous peoples' views and perspective about the natural world. "This attempt to assimilate Indigenous peoples' views into the Western materialist view of manipulation of resources is based on the premises of progress and domination of the natural world… supposedly for an improved quality of life" (Cajete, 1999a, p. 49). According to Cajete (1999a) "the reality is that Indigenous peoples' worldviews are about integration of spiritual, natural and human domains of existence and human interaction. Characteristics of this reality include:

1. A culturally constructed and responsive technology mediated by nature;
2. A culturally based education process constructed around myth, history, observation of nature, animals, plants and their ways of survival;
3. Use of Natural materials to make tools and art, and the development of appropriate technology for surviving in one's "place"; and
4. The use of thoughtful stories and illustrative examples as a foundation for learning to "live" in a particular environment. (p. 49)

These steps are vital for the formation of a worldview and they are what make Indigenous people distinct. "Native peoples have developed many rituals and ceremonies with respect to motherhood and childrearing, care of animals, hunting and trapping practices and related ceremonies for maintaining balance between the human, natural and spiritual realms"

(Kawagley, p. 9). Today most of these teaching are left to Western educational systems that consistently attempt to modify Indigenous worldview and understanding about the world around them. According to Snively (1990):

> In considering the possible interactions between students' views and science instruction, researchers have generally addressed the notion of constructed meaning by analyzing children's cognitive beliefs about a narrow set of science concepts. However, an important additional consideration which may determine whether a given student accepts or understands a given concept is the set of values which the student brings to the instructional setting. When the accepted scientific view is presented in a classroom setting, this cluster of prior ideas, beliefs, values, and emotions serves as the initial set of interpretive categories, and it is the potential match between these exiting cognitive commitments and the new information which determine how the student will respond to the instructional inputs (p. 44).

Every system of education is built upon some way of looking at life and the world. This is what forms the foundation upon which children and young people think and act in the world. A worldview is to education what a foundation is to a building. The development of worldview takes place over several generations. It is influenced by the instruction and experiences of daily living and education. Every teacher will consciously or subconsciously teach from his or her worldview. Because worldview affects one's basic outlook on life it is important that teachers aim for a middle ground, or a better balance in their teaching practices. Effective teaching in all areas, including science education, depends on the integrity and skill of individual teachers who think carefully, with wisdom and courage, about desirable goals, who build a solid foundation by adequate preparation and planning, and who carry out their plans with sensitivity and respect. This means including Indigenous people in the process as "the worldviews of the

traditional…Native peoples have worked well for their practitioners for thousands of years" (Kawagley, p. 8).

Western Modern Science and Traditional Ecological Knowledge and Wisdom

Including definitions to this topic is important as: "It would seem that the dispute over how science is to be taught in the classroom turns on how the concepts 'science' and 'universality' are to be defined" (Snively & Corsiglia, 2000, p. 7). The American Heritage Dictionary defines science as: "the observation, identification, description, experimental investigation [scientific method], and theoretical explanation of phenomena. Such activities restricted to a class of natural phenomena. Such activities applied to an object of inquiry or study." The Ministry of Education (2005) defines science "as a process" where students learn skills such as observing, classifying, predicting, inferring and hypothesizing (p.12). Science is defined further by breaking the concept down into the following three categories:

1. *Life Science* – This is the study of the diversity, continuity, interactions, and balance among organisms and their environments. By using the skills, processes, and attitudes of science, students extend their understanding of the living world and their places within it.
2. *Physical Science* – This is the study of matter and energy, and their interactions. By using the skills, processes, and attitudes of science, students build a foundation for their understanding of the physical world.
3. *Earth and Space Science* – This is the study of the Universe and the structure of the Earth. By using the skills, processes, and attitudes of science, students develop an understanding of the force, processes, and dynamic life-supporting qualities of the Earth (Ibid.).

Ogawa (1989) would argue, “Science as interpreted by them [Western scientists] is undoubtedly the science born and developed in modern Western society” and recognized as *Western modern science* (p. 247). Western modern science as defined by Ogawa (1995) is: “a collective rational perceiving of reality, which is shared and authorized by the scientific community itself. All other institutions have been excluded from the ‘inquisition’ of scientific justification, and are expected to accept it without objections or doubts” (p. 2). There are literally hundreds of definitions of science and each is unique to its cultural make-up. Ogawa (2005) provides the following statement as an example: “if ‘western modern science’ is defined as ‘a collective rational perceiving or reality, which is shared and authorized by the scientific community,’ ‘western modern science’ can be regarded as the science of a specific professional named scientist. Or, in fact, we can say that which I call ‘western modern science is the Culture of Scientific Community” (p. 3). Therefore “the goal of conventional science teaching has been to transmit to students the knowledge, skill, and values of the scientific community” (Aikenhead, 1996). With the diverse cultures within *science* itself it is no wonder most teachers would rather define *science* as just *science*.

Perhaps it is because Indigenous knowledge differs from Western scientific knowledge in a number of ways. “Western science tends to emphasize compartmentalized knowledge (by disciplines) which, is often de-contextualized and taught in the detachment of a classroom or laboratory setting” (Kawagley, p. 87). For instance, as mentioned previously children in British Columbia learn science under the disciplines of *life science*, *physical science* and *earth* and *space science*. A relationship to the natural environment is based on science as a process for observation, classifying, predicting, inferring and hypothesizing. “This distortion revolves around the perception that the scientific method, if followed explicitly, is infallible, the

completely objective and unbiased way to uncover the facts and reach truth" (Hayward, 1984, p. 66). The stories and narratives that native peoples have relied on as their truths are dismissed as myths and pure fantasy. In addition Cajete (1999a) claims students are led to believe that:

1. Time is uniform and flows in a single linear direction from a past to a present and on to a future;
2. Matter is made of particles that obey universal laws which never change;
3. Our mind is our brain;
4. Only the fittest survive through the process of natural selection;
5. Modern science will eventually solve all the major mysteries of the universe; and
6. Scientists are totally objective and scientific knowledge is universally applicable (p. 37).

The student becomes detached from nature and according to Kawagley (1995) "For a Native student imbued with a Native experiential/scientific perspective, the typical classroom-based disciplinary approach to the teaching of Western science can present an impediment to learning, to the extent that it focuses on compartments of knowledge without regard to how the compartments relate to one another or to the surrounding universe" (p. 88). As a result background knowledge and beliefs become inconsequential. However, "Native people…have traditionally acquired their knowledge of the world around them through direct experience in the natural environment, whereby the particulars come to be understood in relation to the whole and so-called laws are continually tested in the context of everyday survival" (Ibid.).Therefore "the application of knowledge is of paramount importance in Native cultures and has traditionally been equated with the ability to survive" (Stephens, 2000, p. 17).

This concept has come to be known as Traditional Ecological Knowledge or TEK. According to Snively & Corsiglia (2000) “TEK generally represents experience acquired over thousands of years of direct human contact with the environment” (p. 11). Knowledge is acquired through time spent living on the land where the knowledge is then passed on to the next generation. Cajete (1999a) further says “the goal of all such basic education was self-knowledge, ‘seeking life’ through understanding the creative process of living, sensitivity to and awareness of the natural world, knowledge of one’s role and responsibility in the social order and receptivity to the spiritual essence of the world” (p. 54). All of life was sustained because of a profound understanding of the complex ways in which our environment is interconnected. Traditional Ecological Knowledge and Wisdom (TEKW) are defined by the Ministry of Education (2005) “as the study of systems of knowledge developed by a given culture. It brings the concept of wisdom to our discussion of science and technology. TEKW tends to be holistic, viewing the world as an interconnected whole where humans are not regarded as more important than nature. It is a subset of traditional science, and is considered a branch of biological and ecological science” (p.13).

Though educators may differ in their perspective of science education Stephens (2000) claims culturally responsive science curriculum has powerful implications for students for at least three reasons:

1. A student might conceivably develop all of the common ground skills and understanding while working from and enhancing a traditional knowledge base;
2. Acquisition of the common ground, regardless of route, is a significant accomplishment;

3. Exploration of a topic through multiple knowledge systems can only enrich perspective and create thoughtful dialogue. (p. 10)

Western science is here to stay but in order for Indigenous people to be successful a common ground must be met. Certainly having a strong cultural foundation will create strengths in both worlds and is the key to the success of any student.

As mentioned previously and as the Table 1 illustrates (refer to p. 54), evaluation must involve the community.

Cross Cultural Science Education

According to Aikenhead (1997) a cultural perspective on science education rests on a number of points: (1) Western science is a cultural entity itself, one of many subcultures of Euro-American society; (2) people live and coexist within many subcultures identified by, for example, language, ethnicity, gender, social class, occupation, religion and geographic location; (3) people move from one subculture to another, a process called "cultural border crossing;" (4) people's core cultural identities may be at odds with the culture of Western science to varying degrees; (5) science classrooms are subcultures of the school culture; (6) most students experience a change in culture when moving from their life-worlds into the world of school science; therefore, (7) learning science is a cross-cultural event for these students; (8) students are more successful if they receive help negotiating their cultural border crossings; and (9) this help can come from a teacher (a culture broker) who identifies the cultural borders to be crossed, who guides students back and forth across those borders, who gets students to make sense out of cultural conflicts that might arise, and who motivates students by drawing upon the impact Western science and technology have on the students' life worlds. The assumptions posited here are described in detail in Aikenhead (1996; 1997).

To what extent then, and how, can First Nations students learn non-Aboriginal school subjects such as science without being harmfully assimilated by sciences dominant Western culture? Particularly if the goal of conventional science teaching has been to - transmit to students the knowledge, skills, and values of the Western scientific community. One way for teachers to avoid assimilative practices is to sensitively integrate students' indigenous knowledge of nature with the content of Western science (Cajete, 1986; Kawagley, 1995). A culturally sensitive science curriculum would provide "science for all" aimed at developing in students the facility to cross cultural borders between their everyday world of family and friends into the "foreign" culture of school science, without running the risk of assimilation (Aikenhead, 1997). Most science teachers might ask what this science curriculum looks like. Four such sciences were identified by Ogawa (1995). First, students reflect on their own understanding of the physical and biological world. Second, students come to know the Aboriginal commonsense understanding held by their community. Third, students may encounter ways of knowing of another culture, including other Aboriginal peoples. Fourth, students are introduced to the norms, beliefs, values and conventions of Western science — the culture of Western science. Negotiating among these four sciences in school science is known as "multi-science education" (Ibid.).

The quality of students' learning in a science classrooms will depend on a teacher's recognition and understanding to the cultural differences between a student's daily world and the worlds of science. This is because crossing over form one area of meaning to another is especially hard. As statistics show Aboriginal students are not experiencing any success in managing these transitions. Phaelan, Davidson and Cao (1991), researchers in science education and in cultural anthropology, suggests that differences between students' world create four types

of transitions: congruent worlds support smooth transitions, different worlds require transitions to be managed, diverse worlds lead to hazardous transitions, and highly discordant worlds cause students to resist transitions which therefore become virtually impossible. Crossing over requires students to think in a different way. In other words students do not cross borders smoothly because of their cultural conflicts (Costa, 1995). Teachers who recognize these conflicts can assist the student in moving back and forth between their indigenous culture and the culture of Western modern science. Of course the success of any curriculum will depend on the willingness of the teachers and the powers that be.

Chapter 3 Interview Analysis

To help me gain valuable insight into how Kwakwaka'wakw story can be linked to both Traditional Ecological Knowledge (TEK) and Western Modern Science (WMS) I interviewed members of the 'Namgis First Nation who have dedicated their efforts to preserving our rich Kwakwaka'wakw culture. The purpose of these interviews was to examine story and its place in Kwakwaka'wakw education. These interviews were fundamental to the development of sample lessons I created for my research.

Fortunately, for me the people I interviewed all live in the community of Alert Bay and are all members of the 'Namgis First Nation. This made it easier to schedule interviews and also made the interviews much more relaxed. By having similar backgrounds in relation to home, culture and education and by listening to the interviewee's comments, and by focusing many questions on the interviewee's previous comments, a much more informal feel to the interview was achieved, like an open discussion.

The gathering of local knowledge was instrumental to the development of the curriculum used for this research. Following my interviews, I was able to develop a new view on teaching science by examining the *how* and *why* things were and still are taught to the Kwakwaka'wakw. It was very apparent that there is a reason for everything.

Community members all agreed that as we gain more and more control over our own education, health and economics, the need and the choice to integrate our ways of knowing becomes more and more practical and commonsensical. Though many efforts have been made in the past few years to include cultural content into the science curriculum the drop-out rates and low achievements among First Nations students continues to soar in all areas of education. Following my interviews it became clear to me that the need for community involvement was greater now more than ever. Traditionally First Nations had always solved their own issues. In

other words, we knew what was best for us. These systems had been successfully developed over hundreds of years with community involvement and community in mind.

Every culture is unique and complex and this includes the Kwakwaka'wakw culture. Nine main themes or patterns emerged during my interviews and these are the themes I kept in mind while developing my sample lesson plans.

1. ***Rules, regulations, and protocols*** are what guide us in doing things right. The Kwakwaka'wakw rules were communicated through their stories and ceremonial practices. There are messages within stories that prepare us for what is to come about. Wa (William Wasden), one of the respected cultural teachers in the Kwakwaka'wakw community, shares his thoughts:

   > There's a lot of rules and regulations that go along with it and they usually start from the beginning of those rivers - where the origin stories teach about whoever created the river, whoever brought the river to life had a lot of rules and regulations guide them in how those resources should be taken care of…it's like the eulachon. There are lots of rules when we go there [Knight Inlet] and those rules are laid down. As soon as the ancestors started finding out about eulachon then everybody started laying the law down (Personal interview July 14, 2008).

These rules and regulations took care of our resources and ensured that there would always be enough for everyone in the community. Kwakwaka'wakw had *ways of knowing* that ensured the return of the things we relied on the most. 'Namgis Treaty Researcher Diane Jacobson reminds us of this knowledge that was embedded in story:

> …there's one woman is a twin and she turns into a dog salmon. She told all about the fish carcasses that they had to be thrown back into the river. This way our old people knew that the carcasses fed the future fry coming up when they emerged. This knowledge was passed on with the stories so anytime they cut up the fish and heads that they used, it went back into the river and it rotted and became algae

> and phytoplankton and whatever for the fish to eat so that was ecologically friendly to our own river system (Personal interview July 16, 2008).

Kwakwaka'wakw way of life and the continuation of life depended on people following these rules that were laid down through story. On the flip side, if these strict laws were broken the stories speak of terrible things happening. Diane Jacobson explains:

> Prayers were said before anything was ever taken, anything I've ever read in the stories. There's usually an ending in the story where somebody would lose a supernatural gift if it was abused or not used properly. So it was a teaching tool to respect everything at all times. Almost every story has it. If you misbehave they take it away from you (Personal Interview July 16, 2008).

In the story *Raven Steals the Light* the Raven has a supernatural gift to transform from one form to another. This gift is to be used sparingly and is never to be abused. The moral of this story relates to greed because neither the Raven nor the chief want to give up possession of the sun. In the end the chief and the Raven lose because of this greed, and the sun is released into the sky for all livings things to benefit.

Significant messages were also found within traditional songs and like so many other Oral teachings they were passed on when it was considered the right time. William Wasden shares his feelings as both a singer and composer of Kwakwaka'wakw song:

> So there are a lot of metaphors and poetic justice to the song…these old composers…tell you some really amazing…stories that inspired a lot of the songs but there are a lot of really serious sacred songs. I mean they are serious but if you knew the composers they were human too… (Personal interview July 14, 2008).

2. ***Life Lessons*** are found in all Kwakwaka'wakw stories. Stories were used as an educational tool to educate people about how to survive and sustain a way of life. What's more, children learned right from wrong through the experiences played out in stories. Elder Pauline Alfred explains her use of story:

> I always taught the kids when I was teaching that there is a moral to every legend and usually the moral is you don't to that…whatever this boy or girl did in the legend. A legend isn't just a legend. It's a teaching legend and I always tell the kids that now you know you can't do that because look at what happened to this boy in the story (Personal interview July 21, 2008).

Also, story identifies where things originate and therefore give one a better understanding of self. Diane Jacobson shares her explanation:

> Oh what William said earlier that every one of our Kwak'wala stories up and down the coast and what I've read all talk about a Flood story. Same thing he talked about earlier. We knew about tides. It was told in origin stories… when to go pick clams, all that kind of stuff. We knew about medicinal plants. They told you how they did it, how they cooked it, how to prepare it. They talked about the environment, weather and they talked about different fish and plants and how to use it and how to respect it. That's all in origin stories (Personal interview July 16, 2008).

Many of the lessons provided through aboriginal storytelling were just as, if not more; important as the stories we rely on today in the education field. While entertaining and sometimes strict, Kwakwaka'wakw stories influenced the student to become responsible citizens. What's more this form of oral history served as the main resource for education. Story was the Kwakwaka'wakw text book and curriculum guide. Yet, story was also meant to be fun, educational and entertaining. Humor and storytelling made abstract ideas meaningful, interesting and memorable to the child. Vera Newman shares one of her memories:

> …my grandpa used to add his own little words like (Kwak'wala) you have been given to me a gift even though I'm a stink old man and he did that just to be funny and we used to think he was really funny. So those, like humor is a major part of teaching and fun. I think we should not forget to have fun and it should be fun to learn (Personal interview July 16, 2008).

While we learn from the lessons within story we are reminded that the teachings that stick with us the most are the ones that fill us with happiness and laughter.

3. ***Spirit and interconnection*** In Kwakwaka'wakw culture there is mention of several supernatural being who do not have a physical body but are able to use their magical powers to transform. We see an example of this in the legend of *Raven Steals the Light* when Raven transforms himself into a salmonberry so that he is able to trick the chiefs' daughter into eating him (the salmonberry). Once he is in the daughters' stomach Raven then transforms himself into a baby boy and the chief's daughter gives birth within four days of eating the salmonberry. Spirits such as the Raven were given gifts that allowed them to connect with all things in nature. There are many consistencies found within story and song that illustrate our close connections to nature and to the animal world. William Wasden explains:

> Then like what the information that we have is that one of our men was named Umeł from here. The Brown family descends from. In our records they say that he was from the Nimpkish people went to the West Coast and stole fire because he was fast like a deer. So you know there is some consistency to this Umeł. The deer was an important character of our people. So whether it was a man or a mythical creature to us we believe it was a man that did it. So who is to say Umeł wasn't a leader amongst all the people that one time when the tribes were very small and people regarded him as the Raven who flew to many cultures around the world, the raven is the most powerful spiritual symbol or most intelligent creature that they know So Umeł wasn't just a man but maybe he was an ancestor that was actually a man way back when they told the story… it was like the songs… (Personal interview July 14, 2008).

Andrea Cranmer, a respected cultural teacher for the Kwakwaka'wakw and a trainer in Psychology of Vision describes her view:

> So the belief of our people or the way I choose to acknowledge that we're connected to everything, because we're spirit…spirit driven beings. We're connected to the trees and connected to the water and all the animals and all the elements of weather. So Kwakwaka'wakw belief is that we're connected to all living things. Things we can see and things we can't see so through our song and dance it's always a reenactment of that connection (Personal interview July 21, 2008).

Elder Pauline Alfred shares similar ideas in relation to the animal world:

> I'm going to talk about the Animal Kingdom from where I'm from…there's a cave at home and you can tell how much the old people respected the animals because we have a legend about the Animal Kingdom and every animal that's here in our part of the world…there's a mask for it and they act out the animals that they are in when they go out and dance. So that's proof that our old people love and respected the animals. If you think about the Animal Kingdom that comes from Gilford you will know what I mean (Personal interview July 21, 2008).

At one time many of these reenactments through song, dances, ceremonies and potlatches were prohibited and First Nations were not allowed to make these connections and today we see the effects. Kwakwaka'wakw were no longer able to give thanks for the things they were given. People no longer took only in moderation and connections were lost between the spirit world and the people. It has only been within the last few decades that these reconnections have been made. Vera Newman talks about her role in making these connections:

> One of the things we started to work in the school…we always give thanks to the cedar tree when we remove the bark from it. I've seen my granny do that with the food but when we started to work in the school we started to ask questions about those kinds of things and I had one aunt who refused to call it a prayer because she was so angry with those Christian beliefs that were imposed on us. So I'm always careful in saying that we always give thanks to the Creator…like you

> know when you're taught not to be greedy, you don't go and strip the whole forest down (Personal interview July 16, 2008).

We are all part of the same; we are all connected. If there is no reciprocity the things we rely on the most will no longer come back to us as they used to. It is that much more apparent that *spirit and interconnectedness* need to be made important when teaching First Nations the science curriculum. History has shown us that what Western Modern Science (WMS) deems important is not always in line with what First Nations deem important. However, now that we have progressed into the year 2009, and we know that culture is always evolving; we can look at our needs, as we have always done, and make the best plans for our community and the generations that follow. I am certain that the success of any science program geared towards First Nations must include spirituality, it is what connects us to all things, and it is as the Latin's would describe "to breathe."

4. ***Respect*** is mentioned in all of my interviews in one form or another. Most speak of *mayaxala* which means a respect for all things. As Andrea Cranmer expresses:

> …you don't just disrespect, our big teaching is mayaxala. So how do you teach that to people? Well you have to firstly believe that in yourself and live that in yourself so that you can respect all the things around you and I believe that, that's teaching the people…taking that one thing and go anywhere with that teaching because the belief is that if you give thanks for living things around you like animal life, fish, and plant life, then they will come back (Personal interview July 21, 2008).

Today, most often what teachers preach and what they do are often two separate things. We often take what we are taught in formal education as truthful when important aspects are often left out. Andrea Cranmer explains:

> The reality is there is a legend about Jack Peters (elder) was a teacher of our new school and he said don't kill a spider. They're our friends. Well we used grew up

> all our life without hearing this particular part of being educated about spiders and he said that the spiders save one of our tribes when there was war in the cave the tribe hid and then the spiders went back and forth making its web covering up the cave so the people thought they could attack because they know they were in the cave so when he said that it kind of registered in my mind going yeah okay…that makes sense…why would I want to do that? So in our belief we are connected to everything so why would we want to go and kill something… (Personal interview July 21, 2008).

In traditional Kwakwaka'wakw times, the teachers respected the knowledge that was passed down to them and the learners respected the opportunities that were given. William Wasden shares a personal experience:

> …we know the winter dances are very sacred to our people. There's a certain ceremony that McKenzie taught me the songs for, and the whole first beginning, this is when the dance curtain is happening. The whole song is a warning to the people and if you were to truly understand the meaning of the song they had messages for the people or healing in it for the people …or tell stories about the dancer. So if you're really well versed in the songs you would be able to understand these songs and I was lucky to get [the songs] from McKenzie because he was real sure in teaching you the meaning of words, and sometimes he would sing a song that he made that it might not necessarily even mean what you think it means (Personal interview July 14, 2008).

Mayaxala then teaches us to have a respect for all things, with the most important being self. Once there is a respect for self all other things naturally fall into place. Messages of mayaxala are seen throughout Kwakwaka'wakw stories, legends, songs and dances as Diane Jacobson (Honey) explains:

> Well one thing I find in all my stories is that they talk about constantly is respect for the land and sea. I think that should be a real priority in our teachings. Every

> story that they taught over and over was, "take only what was needed," and a clear understanding of why we should only take what was needed and don't be greedy. They say that over and over, you don't take too much (Personal interview July 16, 2008).

Today anyone who is a part of the Kwakwaka'wakw culture will speak of *mayaxala.* It is a term that can never be overused. It is a term that is used in all areas at all times. It is easy to detect the people who practice the concept of *mayaxala*. Their behaviors speak for themselves. Vera Newman shares her teachings:

> When I was growing up…the most important teachings was to mayaxala and the closest you can translate that into English is respect. So when you use the word respect it doesn't mean you just respect everybody it means you respect yourself. It means you respect your family. You respect your property. You respect your village. Your respect the world…There's more to it …like you don't just dump your garbage and make a mess…when we used to meet with our grandmother, her house was on the beach in Village Island…every time we had food she said gilakas'la!...thank you for coming so we won't be poor, we have food to eat and she would put the bones and the left over stuff back into the water. I always remember that… (Personal interview, July 16, 2008).

Though *mayaxala* involves everything, putting the spirit of *mayaxala* into place can be quite simple. For instance, we simply have to include respect in all aspects of the development of science curriculum: the goals, the objectives, the lesson plan, the materials used and the evaluation. In other words we have to continuously question: how are the goals related to First Nations? How are the objectives observable and possibly even measurable in relation to First Nations? How do the lessons relate to First Nations? How is the material used relevant to First Nations? And how are the evaluation methods in line with those used by First Nations?

5. ***Community*** can be the most powerful part of any lesson, and this is no surprise as the students are the stakeholders. Educating using local community knowledge can make

significant contributions to the curriculum and can be of great personal benefits to the teachers and students. Kwakwaka'wakw language and cultural teacher, Donna Cranmer shares her personal experience:

> …you know, we don't have so many potlatches all the time and so you don't get to see that kind of interaction between all these people working together to have this one successful event...Any of the food preparation or any of the just every day stuff could be brought into the classroom. I think bringing in the old people and bringing is as many resource people as you can, because you know when I was teaching I knew all these different things so I didn't think to bring in people but now… I can see the value…it is so much more valuable or meaningful and then it connects community members with our school, and kids see them [the elders] in a different light… (Personal interview July 24, 2008).

Traditionally, community involvement was vital to the education of our children. Therefore, it seems practical to involve community if we hope to strengthen our current education system. By involving community we add knowledge and wisdom that is not available in the standard resources we are required to use. More importantly, we bring an enthusiasm and sense of pride that comes from working together towards a common goal.

6. ***Land*** forms the foundation for what we know as science. Any Kwakwaka'wakw story we come across originates, or tells a story about a specific time or place in Kwakwaka'wakw history. Stories provide a view of the local history and way of life prior to contact. Through story we begin to have a better understanding of the landscapes within our traditional territories and our impact on these lands. More importantly, our ancestors passed to future generation's experiences and stories that are rooted within the land. Many Kwakwaka'wakw people will tell you that it is a different feeling when they are on the Nimpkish Lake or at Woss Lake, because they feel they are surrounded by

their ancestors. Therefore, it is important to make these connections from our stories to the land and its place in science. Andrea Cranmer explains:

> The best thing we can do is actually bring them [the students] out to the natural resource. Bring them out to the land. It is important if you're teaching, especially science, to bring people out on to the land so they can see with their eyes what you're talking about. Sometimes the book thing is kind of boring…you know the story about Dzunukwa, well you bring the kids to the forest with cedar trees then you give them a lesson on cedar trees or bring the kids to learn about things on the water and you can bring legends on how we blessed the salmon. They either see it or hear it, feel it and that's what they're going to remember. That's what is going to stay inside them. Actually see and feel tangible things that we talk about (Personal interview July 21, 2008).

As students learn more about their land they are more likely to have a vested interest in taking care of their land because they have experienced its beauty and rich history.

7. ***Behavior and morals*** are embedded in all Kwakwaka'wakw stories. Andrea Cranmer shares her personal experience:

> The Wild Woman of the woods…in our time…was used to keep us in line even in the 1970's. That story in particular has been used every generation because of the known fact that the Dzunukwa ate children that most times don't use their ears… (Personal interview July 21, 2008).

Our stories give us a sense of what is right and what is wrong. How we conduct ourselves is a reflection of how we were taught. So we are always representing ourselves and our family. Elder Vera Newman shares her experiences:

> …the first thing I had to learn and I still have a hard time doing is listening. I grew up in a time in Village Island where I had just about every night with my grandparents, and that's what they talked about. They talked how we conduct ourselves. We had tea with our Granny and our Grandfather and sometimes he told us legends. Sometimes he danced for us and Ada would sing and it was

> always teaching us…how we respond…Just as an example, this 2008 my sister Eva had her two grandsons…they weren't listening to their Ada. They call her Ada too. I said…"Eva is there anybody misbehaving in here? Look there is a Dzunukwa running around out here". My sister said, "Wow, thank you for that because that's what she's been using…because when we were young when we misbehaved the Dzunukwa was going to come…the only time she comes out is when kids are being naughty" (Personal interview July 16, 2008).

Though it is not often talked about, behavior is one of the main reasons students are dismissed from an education. Stories and ceremonies reinforce how one should conduct oneself and when a student is made accountable for their actions they are more likely to become responsible citizens. Donna Cranmer explains:

> You know there's a certain way you behave when you're on the dance floor and there's a certain way you're suppose to behave in the Big House and it all just comes back to the main teachings…I think it is all connected (Personal interview July 24, 2008).

So when elders, such as Vera Newman, entrust a student with the knowledge that has been handed down to them, there is a certain responsibility that falls upon the student. It is these responsibilities that shape the individual, the community and even the world.

8. ***Family*** influence***s*** us to become who we are. All of our important teachings happen within family. Stories confirm one's rights and privileges and explain where families originated. William Wasden uses the Flood Story to explain:

   > Well it's like the reason for the flood…that our ancestors were really mistreating the land and the animals, especially animals. Taking too much and disrespect in what they were taking and not sharing and that sort of stuff. Yet there was real strict rules and regulations and it wasn't so much through legends but it was through family rights and who was the traditional land keeps and then those people, like they say that the First chief was the one in charge of great potlatches and , and the second chief was the lower chief, the third one was involved in

> smaller feasts…the fourth chief…is the one in charge of the land to make sure the resources were being managed properly. There's certain chiefs that had roles in taking care of the rivers and checking if that resource was coming back strong enough in order to be able harvest . Those chiefs because of their long lineage…were able to say to everybody no, we can't fish this year there's not enough resources. So there's a lot of stuff and then it may not necessarily connect to these legends but they definitely connect to families and families have origin, the ones that come from the first original families (Personal interview July 14, 2008).

Traditionally, First Nations did not leave the home to learn what they needed to be successful in life. It was the responsibility of the parent and extended family members to come together to teach essential life skills and to find peoples' gift. William Wasden explains how this breakdown has affected our children:

> You know where I think the real breakdown for our children is that the lack of knowing connection to each other. You know how we were raised, we were raised to know that we're related to each other…I remember I was fighting with Tony Dawson…and his granny yarded me in really fast…she said, "You know we're family with your granny" I think that at some point in the school system they should really work on huge family trees and teach our traditional family system (Personal interview July 14, 2008).

It is our family members who shared with us the stories we remember the most. Grandparents, aunties, uncles, and those who were exceptional story tellers, would use as many opportunities as they could to communicate our connections within family and place. Donna Cranmer speaks of her Granny Axu's gift:

> I know there's a story that my sister said that Granny AXU shared with them...a wife and one group went into this cave and then the spider for some reason chose to help those people that went into the cave and then wove this big web to protect them so those other people that they were fighting against couldn't come in.

> That's pretty wild when you think about a spider weaving its web to go protect humans. So you know you have a different look at spiders (Personal interview July 24, 2008).

So, the most memorable and teachable experiences often happened within family and the lessons stayed with that individual to carry on to their children and their children's children. This form of oral history was effective and the Kwakwaka'wakw relied on it to pass on important messages.

9. ***Visions for the future*** have always been an important aspect of Kwakwaka'wakw culture. Whether a person dipped in the river, spent time alone in the forest or completed a ceremonial experience, there was always room for growth. The Kwakwaka'wakw, like many other nations, are always evolving and looking for improved ways to do things. Today First Nation Education is in a crisis state. Education, especially science education, is not effective to the majority of First Nation people. Diane Jacobson explains some of the ways she feels the education system can be meaningful in the area of science:

> …Give lessons on overfishing and the things that you can tie in with this is how overfishing today, over logging, pollution, fish farms, the poaching of clam beds…reasons why we can't eat our food today and why we're all sick today and diabetes. You can delve back into that. They would be a part of your science proof why we're all so sickly compared to what we used to be (Personal interview July 16, 2008).

So there are things happening in our own back yard that confirm the urgent need to get back to our traditional ways of knowing. Elder Pauline Alfred shares her observations:

> I think you should maybe have curriculum on saving our natural habitat because we're just allowing it to happen even in our territories. Nobody is trying to stop it…they're heli-logging at night…taking homes away from the animals…you see bears in back yards…they don't have a home anymore… I think that would be really good for our children to know that we looked after Mother Nature. Pretty soon we're not going to have anything…last year we never got any fish. This

> year I hear we are not getting any food fish again because people aren't respecting our waters. Over abundance of fishing, draggers, trollers, and they keep blaming the Indian food fish but it's not (Personal interview, July 21, 2008).

There are several meaningful stories that teach about the way things were done and they all fall under the same concept of mayaxala. Mayaxala was not divided into separate subjects like today. Donna Cranmer explains:

> What I know about traditional stories is…the way our old people taught kids…how to live…you know our biggest teaching is to mayaxala. So in those stories there would be examples of that. It would be…this is mayaxala…it was around about way of teaching kids this is how you treat nature and this is how you treat plants around us or this is how you treat people. It's not like how we do it in school where we have math over here and our science over there. It was all together as one. (Personal interview July 24, 2008).

Stories reinforced how all things are interconnected and that in some way all subjects are interconnected. In today's classroom so many teachers are concerned about deviating from the required curriculum and often cultural teachings are left to the cultural teachers. Resources are limited but there is a definite need and desire to develop curriculum that will reach First Nations students, curriculum that can be used by anyone. Vera Newman shares her dream:

> My dream Irene is that we can develop our own little character where we could reach the children through the computer games…and T.V. We see Barney. We see Sesame Street…make our own with our language (Personal interview, July 16, 2008).

Using what interest children seems to always go back to identity. First Nations people want to feel proud of who they are. Self-esteem stems directly from knowing who you are and where you originated. Children feel most proud when they are immersed in their culture, their family, and their place.

It was story that educated us about conservation and it was conservation that guided story. As a result, issues like pollution, overharvesting and loss of habitat did not exist. There was little impact on the natural environment because the stories passed down from generation to generation say to “take only what you need”. These were the things that were necessary for survival not the things required for monetary gain (greed). Kwakwaka'wakw and many Native Americans stories speak of something *terrible* happening when a gift that has been given to us is abused or used in the wrong way. Origin stories tell us that Mother Earth is a gift as well and today we see the *terrible* things happening as the gift is abused. First Nations education relied heavily on story, as a result the natural world benefited. The educational processes today continue to show that something *terrible* is happening. It is reflected in the success rate of Aboriginal students, and it is reflected in the continued abuse of land within the traditional territories of many First Nations people.

Kwakwaka'wakw ways of knowing respected the gifts that were given to them by the creator. Giving prayers of thanks before harvesting cedar or returning fish carcasses back to river was based on a relationship they had with the natural world. So as long as there was a display of gratitude there would continue to be an abundance of natural resources. McGregor defines science as the following:

> Aboriginal understanding of TEK tends to focus on relationships between knowledge, people and all of creation (the natural world as well as spiritual). TEK is viewed as the process (a verb) of participating fully and respectfully in such relationships (McGregor, 2003, p.2).

Story reminds us of the valuable relationships and understandings we have with the natural world. There are so many valuable teachings within story. I have only touched on the themes that were generously shared with me. My goal is to be mindful of what has worked for the

Kwakwaka'wakw since the beginning of time and that my lessons are a reflection of the Kwakwaka'wakw.

Chapter 4 – Curriculum in use

This chapter focuses on the students' experiences. It is presented in the order that the students received the lessons as each lesson builds on the previous understandings. Part 1 of the lessons focus on the first story *The Mortuary Customs of the Kwakwaka'wakw* and Part 2 focus on the story of how *Raven Steals the Light*. It is important to note that among these stories many other forms of story take place that were not planned, but naturally occurred. Kwakwaka'wakw teachings were introduced, songs were shared, and prayers of thanks were given.

Quotes are used in some sections to share the participant's personal responses and opinions as they occurred. Photos are inserted to illustrate the students' experiences and present the beauty of the natural resources within the 'Namgis territory. The student's data provide samples of the learning that took place while *Combining Kwakwaka'wakw Story with Experience*.

The chapter is divided into two sections. The first section describes the lessons, how elders and resource persons contributed to the teaching and learning process, and how the students responded to the instructional input. The second section describes the evaluation of student learning that took place, and the researcher's thoughts about evaluation.

Part One – What We Did

I introduced the grade 6/7 students to my lesson unit - *Combining Kwakwaka'wakw Story with Experience* - by discussing the term Indigenous Knowledge (IK) and Traditional Ecological Knowledge (TEK) as it is outlined in the *BC Science Probe 7* (Chapman, 2005) text. Students were comfortable with these terms as they had just finished a unit of study on the traditional uses of the eulachon, where the subject matter was parallel to my lesson unit. Following this discussion I asked the students to reflect on the words *Indigenous* and *Knowledge* (IK) and to tell

me in their own words what these two words represented to them. One of the memorable responses was *"Isn't it just what we know, like making grease (tlina,) and doing fish?"* Another response that interested me was when a student said, *"What is indigenous…you mean Indian like us?"* It was helpful to assess the students' background knowledge around the terminology that I would be using. I imagine students of all cultures and races struggle with these terms.

Once the students were comfortable with their definitions I started with Part 1 Lesson 1 (*Definition of Traditional Ecological Knowledge*) of my curriculum unit. Students were given a worksheet titled *Internet Search on Definition* to extend their understanding on the meaning of Traditional Ecological Knowledge (TEK), and to stimulate prior knowledge. Students did a word search on this definition and then named people in the community who contributed to Traditional Ecological Knowledge (TEK). I found it interesting that several of the students identified people from their own families as the people who contributed to traditional ecological knowledge (TEK). Some of the students also selected the cultural teachers and elders that I chose to interview for this research project. Their responses confirmed to me that the Kwakwaka'wakw is rich in local knowledge.

The following table illustrates data from the student's responses:

People in the community who contribute to Traditional Ecological Knowledge (TEK):
• Wa (William Wasden) sings and tells stories. • Dawn Cranmer makes medicine with plants. • Bruce Alfred makes steam bentwood boxes. • Don Svanvik – carves and teaches about harvesting cedar. • Pauline Alfred is an elder. • George Hunt is an artist. • Beau Dick is a carver. • Patrick Hunt is a carver. • Donna Cranmer - Weaving cedar head pieces. • The Kwakwaka'wakw knowledge of bentwood boxes are that they were used as burial boxes. • Chris Hunt is an artist

Table 1. Students named people in the community who contribute to Traditional Ecological Knowledge (TEK).

Before we started our first out of school lesson I reviewed with the students the *Kwakwaka'wakw Teachings*. William Wasden produced this handout with information he had gathered from elders in the community (see Table 2). *Kwakwaka'wakw Teaching* was introduced to students as guidelines to follow as they participated in this unit of study and in any experiences in and out of school. Students were reminded that how they behave reflects not only on them but on their family and the school. The following guidelines (see Figure 2) were handed out to students to have at the front of their science notebooks and to show to their parents. The expectation was to have all participants follow these guidelines, as this unit involved participation not only from students but community as well.

Kwakwaka'wakw Teachings

Honor your family, whatever you do reflects on them and their teachings**.** **Respect** yourself, to respect others you must respect yourself first. **Obey** your Elders, to gain wisdom you have to listen. **Watch** what you say, once your words come out you can't take them back and they will always come full-circle back to you.
Speak the truth, if you lie you will be labeled as "Tłiḵwas" (liar) and no one will ever believe in you.
Do not take what is not yours, if you steal you will be branded as "Galu'tłlikw" (thief) and never trusted. **Share** and give of yourself to family and friends, this is what our culture is based on. **Cherish** the land, our Ancestors were blessed with it and it has sustained us from the beginning of time. **Have** gratitude; remember to give thanks especially to our Creator for everything that we have. **Friendship**, the best thing you can be to someone else is a friend.

Table 2. *Kwakwaka'wakw Teaching* used with permission by William Wasden.

Lesson 2 took place at U'mista Cultural center where students listened to William Wasden share the story about *The Mortuary Customs of the Kwakwaka'wakw*. Students gathered in the front space of U'mista where the potlatch collection is displayed. The storytelling took place in a room that was designed to look like a traditional Big House. William sat at the front and the students sat in a semi-circle in front of him (see Figure 3, Figure 4). The lesson started by William engaging the students in discussions that allowed him to gain an understanding of the students' prior knowledge. He asked: "Do you know what bentwood boxes are made from?" And, "Do you know how we used to bury our dead people" and "Do any of you know Bruce Alfred who makes cedar bentwood boxes?"

Figure 3. Students listening to William tell the story.

Figure 4. William telling the story about the Mortuary Customs of the Kwakwaka'wakw.

This question and answer period was a natural flow into the actual storytelling. Traditional and spiritual methods around death were explained while still presenting death as a natural cycle of life. As opportunities arose William discussed themes around the important concepts of respect. For instance, he gave the history of who taught Bruce Alfred (Douglas Cranmer) how to steam cedar bentwood boxes, and who taught Doug Cranmer (Mungo Martin) and so on. He explained the history and the long-line of teaching that comes with steaming bentwood boxes. He also asked the students to honor these teachings by being respectful. William then explained how a box is made from one piece of wood and asked "Does anyone know what kind of wood is used to make these boxes and the masks you see in this room?" A student replied by saying "cedar". William then talked about the many uses of cedar and gave details on cedar's structural makeup. He went on to explain how the flexibility and durability of cedar made it practical for creating many useful things (tool, baskets, totem poles and big houses) along the northwest coast.

The most amazing part about this presentation was that within this one story several other stories emerged. As the students talked about their own family crests (whale, sisiutl, raven, wolf

and sun) William shared the origins of these crests. He encouraged all of the students to research their family crests further because it gives us our sense of place and origin.

Figure 5. A whale crest on a bentwood box displayed at U'mista.

Figure 6. William showing a burial box displayed at U'mista.

William explained that the crests we see on these bentwood boxes tell the story of where we originate "so if you know the origins of your crest you will know where you come from". So not just any design was put on these boxes - they displayed ones lineage (see Figure 5). "So in 100 years when people see your bentwood box they will know who the box belongs to by simply looking at the designs displayed on the box".

William ended the lesson by reviewing the story he shared and the techniques used to bury our old people. The students noticed quickly that these boxes were half the size as a modern day coffin and wondered how people fit inside them (see Figure 6). William shared with them that there were both spiritual reasons and practical reasons for the size of the box. These boxes needed to fit up in the trees away from the animals, and in a place that could assist with the mummification process. Bodies were bent in specific places and then placed into the boxes carefully to ensure a safe journey to the spirit world.

After we all said “gilakas'la” (thank you) the students went to the basement of the old St. Michaels Residential School (carving shed) to observe a steam bentwood box presentation by Bruce Alfred (see Figure 7).

Figure 7. Bentwood box demonstration by Bruce Alfred

Figure 8. Completed Bentwood box by Bruce Alfred

Bruce covered each of the steps involved in bending cedar planks and asked the students if they understood the procedure and the principals behind steam-bending. He then gave a demonstration of the technique he has come to master over years of practice. He explained that in each of his four corners he put a slit in the wood called a kerf to measure where the bend would occur. “Why do you think I put the kerfs where they are?” he asked. A student replied “Because you want it to be even?” “You’re right, and also this part of the wood is thinner and therefore more bendable” Bruce explained that the wood must be soaked in water before it is steamed, otherwise the wood will crack when you are trying to bend it. “To soften the wood fiber there needs to be heat and moisture that is why I am using steam”. He mentioned that his demonstration was quick because when the steam is gone the wood fibers become hard again and this causes cracking.

Bruce ended by stating for several years he has been trying to find an apprentice because he wants to pass this art on to a younger Kwakwaka'wakw artist. However, it has been difficult because it takes commitment, practice and most of all patience for both the technical part of

things and also for mastering the art that goes onto the box. He showed samples of the various types of boxes he had created and described what they would have been used for (See Figure 9, Figure 10). Bruce described this art as a successful and fulfilling career because he has had the opportunity to do something he loves and he was guided by talented artists to pursue something that he was gifted in. The box he is holding was being presented to the lieutenant governor and he has won many prestigious awards because of his commitment to the art of steam-bending. He definitely sparked interest in the students when he mentioned that boxes, that are the same size as the students would be making, sell from $2500.00 to $7000.00 depending on the artist and the design.

Figure 9. Bruce Alfred's bentwood boxes.

Figure 10. Example of triangular shaped steam bending.

Once the students observed Bruce's demonstration our next class involved exploring the procedure of forming a steam bentwood box as outlined in Hilary Stewart's book titled *Cedar Tree of Life to the Northwest Coast Indians,* (1984). This book outlines the more traditional steps used by the northwest Indians and provides detailed illustrations that complemented Bruce Alfred's discussion.

The next step was for the students to begin art classes. This was the longest part of the unit, taking over eight weeks for the students to learn the basic components in Kwakwaka'wakw art. The first art class was taught by William Wasden where he introduced, and had the students

draw, the basic ovoid and inner-ovoid. Students were able to look through many of William's resource books to see how master artists put elements together to form a design. He also noted that many of the designs were symmetrical and showed balance. William reinforced that most designs used in Kwakwaka'wakw art relate somehow to nature and tell a story about where and how we originate.

The remaining art classes were with Andrea Cranmer where the students learned about the other elements of design - line, color and form. Each class began with a demonstration and a step by step approach on how to bring the elements together to form designs such as a hand, bear, wolf, and a whale. Students followed this procedure and copied each step that was demonstrated. Students were constantly reminded to take their time and to put positive thoughts into their art. After the student had practiced flat design for six weeks they learned painting techniques; how to hold the brush, how much paint to use and how to put the brush onto paper and wood. A few of the student became quite frustrated because there is a definite art to distributing the paint evenly to form clean lines. During this time Andrea also discussed with the students how in traditional times natural dyes were created from pigments in plants, tree bark, animals and even urine, and used in place of paint.

Figure 11. Students creating their designs.

Figure 12. Students putting their designs on their bentwood boxes.

When the students had an adequate amount of practice painting on paper they then created a flat design that would later be transferred onto their bentwood boxes. Students were asked to research their family crests and to choose at least one design that represented their family origin. Due to time constraints and the size of the class the students were not able to steam bend their own boxes. However, they did value and appreciate the amount of work Bruce put into steam bending these boxes for the class. This was evident when various students became afraid to make a mistake and damage the boxes that were created for them. It took a bit of time for some to finally put their paint onto the boxes.

When the students completed painting their bentwood boxes they were very proud of their work. One student said "I am going to give this to my mom for Mothers Day and Fathers Day" another student showed their mom the wolf design that they had created and said "see this shows that we are from Kingcome Inlet". At the same time the grade 6/7 students were ending a self-esteem series (*Enjoy Being You*) that was coordinated by Andrea Cranmer. Many of the themes that the students discussed in the self-esteem series were similar to the topics that were being discussed in my grade 6/7 science unit of study. Things like: knowing where you originate, being respectful, community, values, culture, mayaxala, etc… So the two themes naturally came together. The grade 6/7 students showcased their completed bentwood boxes along the runway of the fashion show that ended the *Enjoy Being You* series (see Figure 13). Local businesses (U'mista, Culture Shock, James Speck and local artists) and community also became involved by lending pieces of clothing that displayed elements of design (see Figure 14). Students modeled these alongside their own completed works of art.

Figure 13. Students' bentwood box display along the runway.

Figure 14. Student models showing elements of design.

What made this event successful was that the whole day was about the students and the community. There were parents, local hairdressers, sisters, aunties and many other people who helped get the students ready for this special event (see Figure 15, Figure 16).

Figure 15. A local hairdresser donating her time.

Figure 16. A big sister helping her younger sister put on make-up.

It was a great way to bring the community into the school and have them witness what the students were learning from our local knowledge. It was extremely evident that on this day the students were proud to be Kwakwaka'wakw (see Figure 17, Figure 18, Figure 19).

Figure 17. Traditional wear.

Figure 18, Contemporary wear.

Figure 19. Evening wear.

This was definitely an exciting conclusion to the bentwood box assignment and to the *Enjoy Being You* self-esteem series.

Several weeks' later students were fortunate to see a demonstration on the steps involved in splitting cedar planks (see Figure 20, Figure 21). David Garrick saved a piece of wood that was left from a fallen cedar tree during a wind storm. Though a more modern method was used, the goal was to demonstrate how easily cedar could be split and to have the students practice splitting a cedar plank (see Figure 22). The roughness of the end product showed the amount of work that would have gone into preparing the wood to the point where it would have been ready for steam-bending. These planks were similar to the ones that were traditionally used (see Figure 21).

Figure 20. Splitting cedar planks.

Figure 21. Example of a cedar plank.

Figure 22. Students practice.

Even though the students were able to see the plank splitting demonstration I still covered a lesson discussing the more traditional steps involved in splitting cedar planks by using Hillary Stewarts book *Cedar Tree of Life to the Northwest Coast Indians* (1984). To complement this lesson we also visited the Ecological Park in Alert Bay where there stands a living culturally modified tree (CMT). The scar left on the tree showed that the tree had been planked decades before. It was explained to students that these CMT's are used today to confirm our presence in our traditional territories over hundreds and even thousands of years. By simply counting the growth rings, following the harvest we can infer the exact date that the Kwakwaka'wakw occupied specific areas. Following our discussion students had to list the six steps involved in splitting cedar planks. Below is an example of one of the worksheets that a student completed following this lesson:

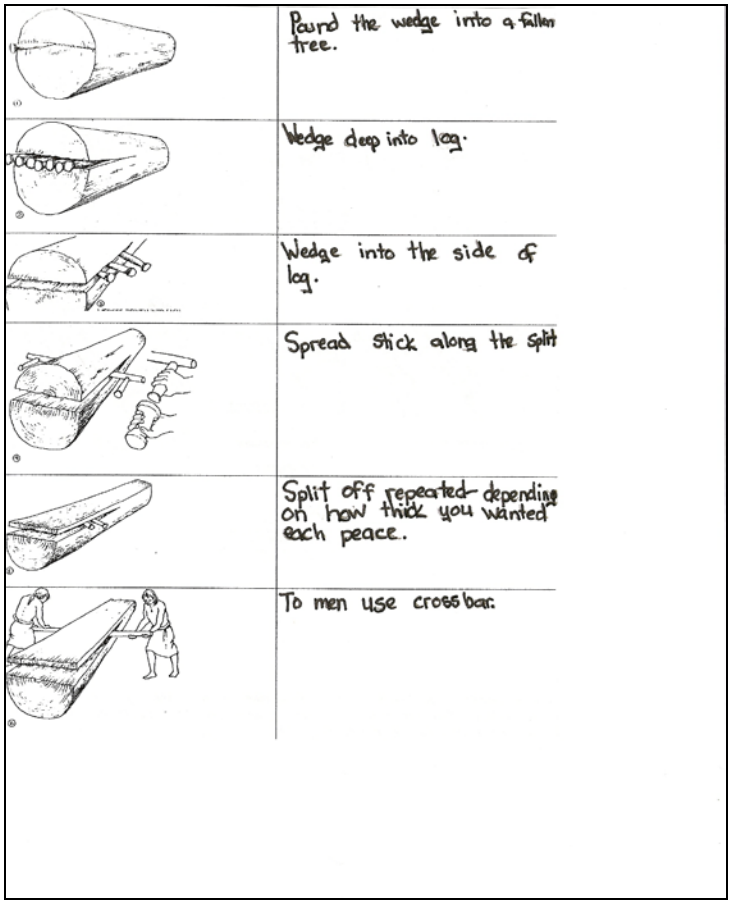

Figure 23. Students' worksheet on *Steps to Forming a Bentwood Box*.

The second story in my unit of study was *Raven Steals the Light*. This story was selected for many reasons. First, it is a story that is told up and down the northwest coast and there are several oral and written versions that can be adapted. Second, it links to the *Mortuary Customs of the Kwakwaka'wakw* because raven stores the sun in bentwood boxes. Thirdly, the message in *Raven Steals the Light* relates largely to greed and in nature we are seeing the devastating effects of this greed. Lastly, the sun is the source of energy for green plants which is the main focus of Part 2 of *Combining Kwakwaka'wakw Story with Experience.*

I started unit 2 of my lessons by handing each student a copy of the story *Raven Steals the Light*. I asked the students to predict what the story was going to be about by looking at the

title. Of course the students' main reply was that the story was about a raven stealing the light. However, I challenged the students to think more critically and to think about what the raven and the sun symbolize to the Kwakwaka'wakw people. Up to now the students had listened to several stories relating to the significance, and the origin of the sun and the raven. As I read the students followed along and highlighted the areas that related to my question. Following the story we discussed themes that relate to the concept of greed. There was consensus that both the raven was greedy and the chief was greedy for trying to keep the sun to them self. We discussed how the sun was required for life on earth, and to keep the sun stored in a box symbolized death. Though this story required a lot of guiding the students were able to make connections to their previous teachings and identified the importance of the sun as the source of life.

The next lesson was a pre-trip lesson for Hanson Island. I had students look at a map that illustrated Alert Bay in relation to Hanson Island, and predict how long it would take to get to Hanson Island on a seine boat. Most students guessed between 1-4 hours. I then introduced the students to the key wildlife species map of Hanson Island to discuss the concepts of food energy flow. I used a drawing of an orca as an example to illustrate that the materials that the orca needs to maintain its body is matter and that the orca itself is made up of matter. I then asked the students to identify the wildlife species shown on the map. I explained that these wild animals spend most of their time searching for food and that they use this food to gain energy. So to gain energy the animal must expend energy. I presented an example on the black board to explain that plants use carbon dioxide from the air and sunlight, along with water in the soil, to make food for themselves (photosynthesis) and that some of these animals rely on these plants for food. I used a handout to explain how food energy flowed, and asked the students to make a

food energy flow chart and a simplified ecological pyramid representative of Hanson Island (see Figure 24, Figure 25).

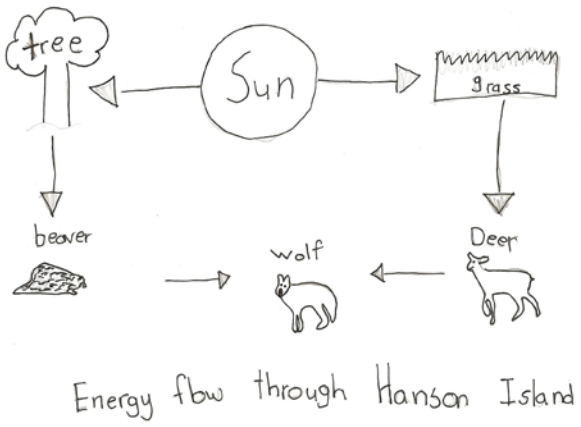

Figure 24. Students' example of food energy flow.

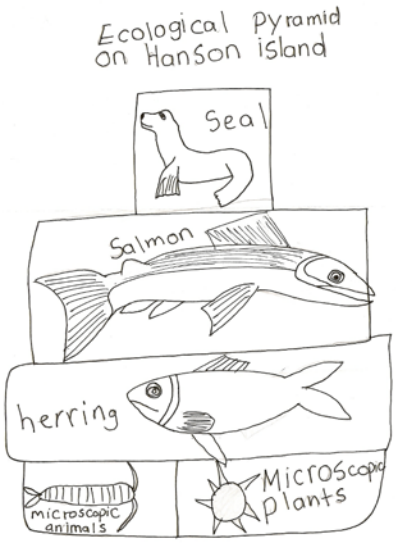

Figure 25. Students' example of Ecological Pyramid.

This lesson linked nicely to chapter 2 of the textbook *BC Science Probe 7* (Chapman, 2005) where students learned about energy flows and matter cycles in ecosystems. Chapter 2 ensures that students understand the importance of the role of the Sun and green plants as energy producers in ecosystems. By using diagrams from both my unit and the science probe unit, I was able to bring the themes of *Raven Steals the Light* and themes presented in chapter 2 of Science *Probe 7* together.

The last part of this unit revolved around our Hanson Island trip. Hanson Island is a one hour seine boat ride down the Johnston Straits. Steve Beans is the skipper of the boat (Ocean Predator) that took us to Hanson Island and also a respected elder and chief in the Kwakwaka'wakw community. Anyone who continues to fish commercially knows Steve. As we travelled down the straits Steve, in his own quiet way, shared stories about the land and his

lifelong experiences of being on the water. Once we arrived to the bay outside of Hanson Island we then transferred to land by punt (see Figure 25, Figure 26).

Figure 26. students on a punt going to Hanson Island.

Figure 27. Teachers on a punt going to Hanson Island.

David Garrick (Walrus) was at the base of the trail to Earth Embassy to greet us with open arms. David, who is a research scientist, has single handedly saved Hanson Island from environmental and cultural destruction. Students learn that over the past few decades David has prevented the island from being logged through his extensive research of the nearly 3000 culturally modified trees he has identified- he estimates that there are more than 12, 000 CMT's on Hanson Island. This island is sacred and the minute you step off the boat you can feel that there is something special about this place. The island is the home to David and an organization he formed called Earth Embassy.

The first thing we did when we arrived on Hanson Island was to get in a big circle and hold hands while our cultural teacher gave a prayer of thanks. David has a quiet personality but one thing that stuck with me, after we finished our prayer and headed up the trail for our hour hike, was that he told the students to "listen to the trees and the birds and you will hear a story" I found it fitting that he would mention story and I almost wished that I could have captured the

moment in some way to prove that we were on the right track. On the other hand it would have ruined the moment - everything was as it should be.

As we traveled up the trail to Earth Embassy (The living classrooms of Hanson Island) David and Don Svanvik identified the culturally modified trees (CMT's) and explained their physical characteristics. These are the trees that were harvested for traditional purposes. When we arrived at the Embassy the students rested for half an hour and then went right into a tour of David's medicinal garden. Students were reminded by the teachers "What we take in we take out – please take your garbage with you unless it can go into the compost".

Figure 28. Labels in David's garden.

Figure 29. David giving a tour of his garden.

David explained each plant in detail and asked the students to identify the names by looking at the labels he had created on small pieces of cedar located in each plant box (see Figure 27). These labels listed the scientific names of the plants as well as the English names, some even had the Kwak'wala (language that the Kwakwaka'wakw speak) names. Dawn Cranmer, who studies the traditional uses of plants, also shared her knowledge with the students. She talked about how important balsam bark was used to make a salve that was rubbed on aching muscles or joint pains. She also explained how cows' parsnip was a powerful agent for eliminating fleas and bugs. Then she spoke on how salal berry was mixed with twinberry fruits

to make natural dyes for wools and some baskets. (see Figure 29). All the students were given a plastic zip-loc bag so that they could take samples for a medicinal drink they would make later.

Figure 30. Dawn explaining traditional uses of balsam bark.

Figure 31. Students collecting plants in their zip-loc bags.

The students were fascinated to say the least, especially when they were told that most of the soil in the garden was made from decayed leaves and seaweed. David gathered all of the leaves in a round bin that he weaved with the branches of salal berry bushes (see Figure 32). The seaweed decomposed in a plastic container and was mixed with other compost materials, such as the leaves and left over food (see Figure 31). Because there is not a lot of soil on the island David explained that he had to come up with his own soil mixture and uses what is available to him on the island. These photos show an example of the soil he had just created for the newest section of his garden (see Figure 31).

Figure 32. Seaweed decomposing

Figure 33. Bin weaved from salal berry branches.

The tour ended with the students engaging in a brief presentation with Dawn Cranmer about the medicinal uses of plants. She shared several teaching that have been handed down to her and showed samples of medicines she had prepared for specific purposes. She said that "devils club is an extremely powerful medicine that some people have used to help treat cancer, it is mainly used to purify your body and give you energy." She then encouraged the students to assist her in making an energy drink with devil's club and the plants they gathered before we had to head back down the trail.

Figure 34. Plants students collected for an energy drink.

Figure 35. Student saying cheers to an excellent day.

Originally, we had planned to harvest cedar bark on the way back down the trail but the trees were not ready. Students learned from Don Svanvik and Harry Alfred that the best time of

the year to harvest cedar bark usually falls sometime between mid-June and early July. Don explained to the students that "If you are not sure if a tree is ready, you can make a trial cut at the base of the tree…if the bark is ready it will peel easily from the tree." In the past few years the weather has been changing so he wasn't sure if the trees were going to be ready for this trip. We agreed it would be best to harvest cedar bark at a later time and hiked back to the boat.

Before we left Hanson Island we gathered together to say gilakas'la (thank you) to the many people and experiences that made the day memorable. We were fortunate on this trip to have a wealth of local knowledge and traditional knowledge.

Though Hanson Island was to be the end of my unit of study the students were adamant about harvesting cedar bark. Fortunately, in mid-June the grade 6/7 class was invited by the Gwani Hatchery to witness 10,000 sockeye being released at Woss Lake. The main goal of this day was to witness the release of the salmon and to take part in a spiritual ceremony where William Wasden led us all in a traditional song that gave thanks to the salmon. Coincidently, the area in which we released the salmon was an ideal location for harvesting cedar and medicinal plants. The day unfolded perfectly because students were able to split up into two groups and harvest the cedar bark that we were not able to get on Hanson Island (see Figure 35, Figure 36) and learn the process of gathering medicinal plants (see Figure 37). The students learned the proper techniques and prayers for gathering cedar bark and medicines. It was an awesome day!

Figure 36. Cedar harvesting.

Figure 37. Cleaning cedar bark.

Figure 38. Medicinal uses of devils club.

The day after we arrived back from Woss Lake Dawn Cranmer came to the school to make traditional medicines with the grade 6/7 students. She covered step by step the methods involved in making a balsam rub that the students could use for muscle joint pain. The cedar bark harvesting and making the traditional medicine was a nice completion to my unit of study. Two other enrichment activities following the Woss Lake trip involved identifying animals that live in our traditional territories and plant pressing. The students identified the animal's English name, scientific name, Kwak'wala name, and their traditional uses. The second activity was a brief introduction to plant pressing where the students learned how to use a plant press. They later glued the plants to paper and identified the plants' English name, science name and Kwak'wala name.

I can honestly say that the students understood the concept of taking only what you need and giving thanks for the things that the creator has given us. More importantly, the students were able to be in our traditionally territories and see the richness and beauty of our natural resources. These trips and my unit of study definitely required a lot of planning and local knowledge. There were many teaching that take place, some that I may not have even witnessed.

Part 2 – Evaluation

This science unit of study was built on what was already in the community – community knowledge, skills, and cultural practices. Lessons focused on Kwakwaka'wakw identity and gaining the self-confidence that comes along with knowing who you are and where you originate. It was imperative for students to work with community to reach their goals and to celebrate their accomplishments. Traditionally this is how evaluation took place, and this is why the success rate in this unit was much higher than it tends to be in the standard science program. Several traditional methods of evaluation and several modern methods of evaluation took place throughout this unit of study. These include the following:

- Students identified several definitions of Traditional Ecological Knowledge (TEK) on an internet search and by listening to local knowledge.
- Students traced on a map, provided by the 'Namgis communications officer, the route the seine boat would travel from Alert Bay to Hanson Island.
- Students identified the different types and uses of cedar bentwood boxes - like those used for burial, holding treasures, preparing foods, using in a canoe and contemporary.
- Students drew a basic ovoid and put elements (u-shape, s-shape, and ovoid) together to make a design.

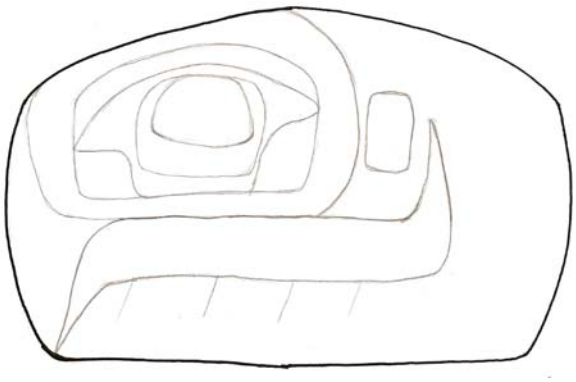

Figure 39. Students work samples of line drawings.

Figure 40. Students' works samples on elements of design.

- Students used basic elements of line, color, and form to draw a design on their bentwood boxes.
- Students researched their family crest and drew their family crest.
- Students observed and completed the steps involved in making a cedar bentwood box.

Figure 41. Completed bentwood boxes with designs.

Figure 42. Fashion show "Enjoy Being You"

- Student participated in a community event – fashion show that ended the "Enjoy Being You series and completion of the bentwood boxes.
- Students gained knowledge on the techniques of painting on paper and wood.

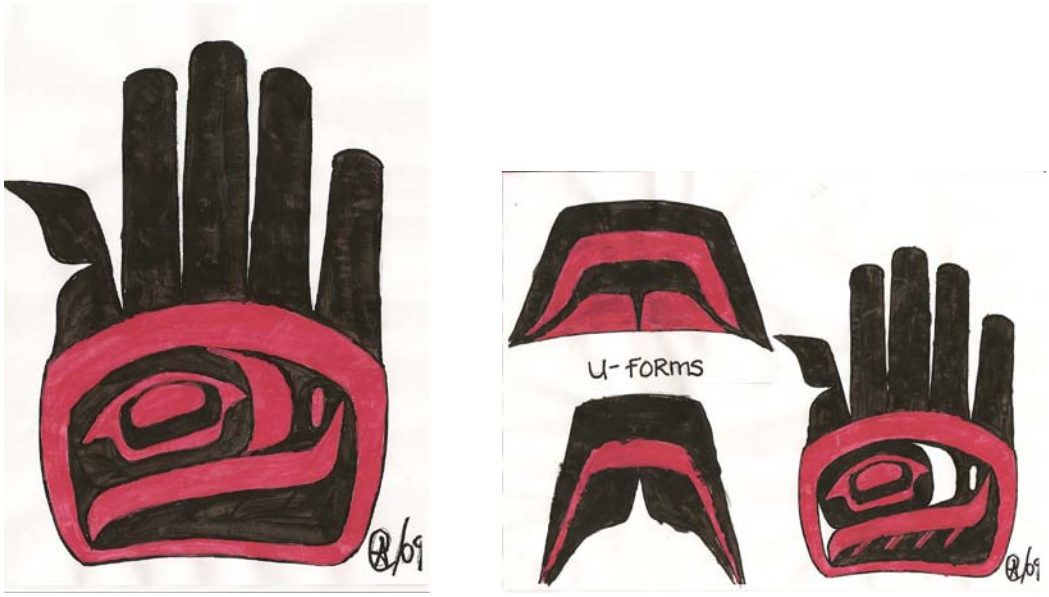

Figure 43. Work samples of students painting.

- Students participated in a question and answer period following the storytelling presentation at U'mista.

- Students identified edible plants and participated in process of plant pressing.

Figure 44. Samples of students pressed plants.

- Students identified animals (their science name, English name, habitat and traditional uses) that live in the Kwakwaka'wakw territory.

English Name: Killer Whale

Kwakwala Name: max̄ "inux̄

Science Name: Orcinus Orca

Habitat:
Killer Whales live in the Atlantic, Pacific, Indian and Arctic Ocean.

Physical Characteristics:
A killer Whale has a sleek, streamlined body. It's physical characteristics are adapted for life in an aquatic environment.

Diet:
Fishs, squids, seals, sealions, walruses, birds, sea turtles, penguins, cetaceans, polar bears, reptiles, and even a moose they all have been found in the stomach contents of killers whales.

Traditional Use:
Killer Whales are highly respected creatures within kwakwaka'wakw culture.

Figure 45. Students' worksheet on animals and their habitat.

- Students observed the properties of wood: expansion and polymers.
- Students identified trees common to Kwakwaka'wakw territory.
- Students participated in preparing medicinal tea.

- Students participated in making traditional medicine.
- Students identified Kwakwaka'wakw uses of the cedar tree.
- Students identified a living CMT tree, from a non CMT tree.
- Students counted the growth rings on a CMT and inferred the exact date that the Kwakwaka'wakw occupied specific areas.
- Students identified and observed the use of simple machines: wedge, lever, maul and crossbar.

Figure 46. Simple machines used to plank cedar.

Figure 47. Students and their pieces of cedar planks.

- Students planked their own piece of cedar from a fallen tree.
- Student created food energy flow charts using organisms indigenous to Kwakwaka'wakw territory.

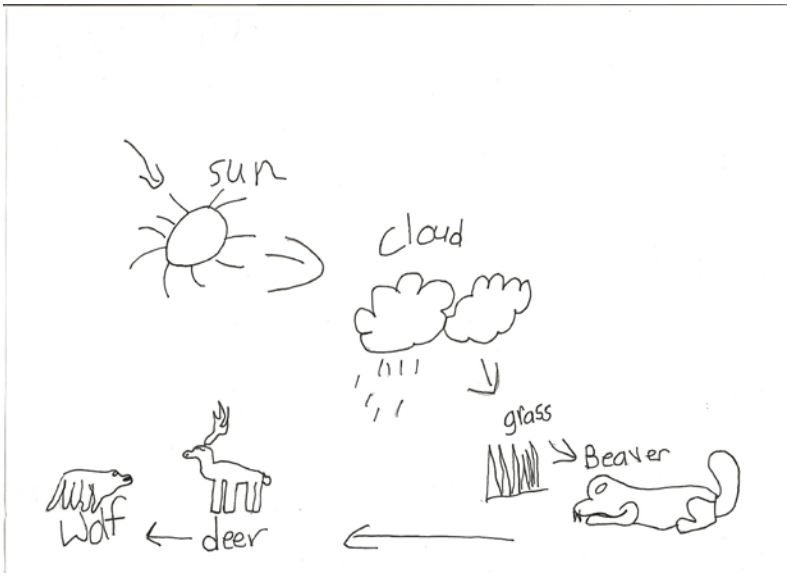

Figure 48. Students work samples of food energy flow on Hanson Island.

- Student created basic ecological pyramid of Hanson Island.

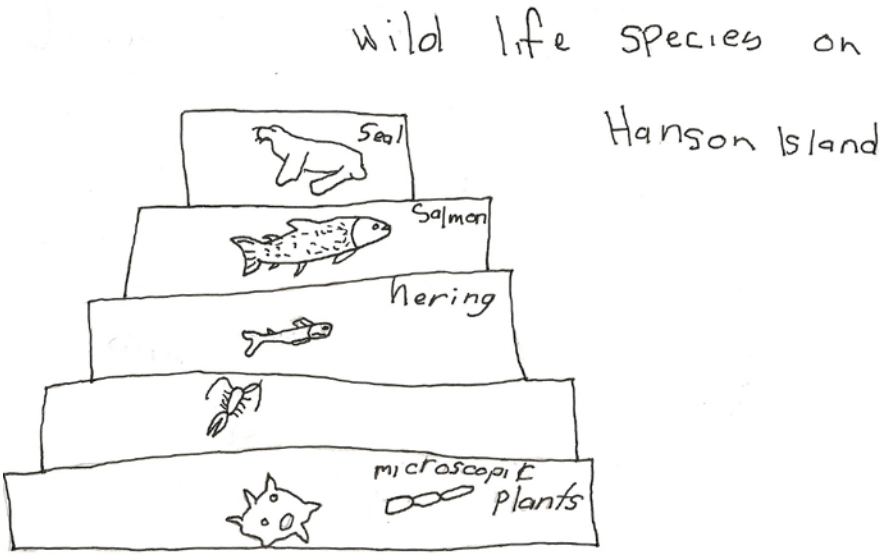

Figure 49. Ecological pyramid on Hanson Island

- Students took part in prayer circles at Hanson Island and at Woss Lake before harvesting cedar bark from a cedar tree.
- Students cleaned their camping site on Hanson Island to make sure they left no garbage behind.

- Students recognized parts of a tree and their function: bark, cadmium, phloem.
- Students studied the process of photosynthesis.
- Students studied the process of recycling and decomposition.
- Students listened to presentations asked questions and expressed opinions on clear cut logging, resource extraction, habitat loss, conservation, and sustainability on Hanson Island and Woss Lake.

This science unit of study incorporated the science processes of observation, communication, classification, questioning, measurement, recording, making inferences and interpreting information. The main part of this unit dealt with observation. Students' teachings focused on the ability to listen, observe and experience the Traditional Ecological Knowledge and Wisdom (TEKW) of the Kwakwaka'wakw. Following many of the presentations students were expected to communicate the processes involved. For example, when the students observed the steps to splitting a cedar plank they communicated their understanding by completing a worksheet following the presentation. In most cases communication occurred orally as students listened to several stories and had opportunities to ask questions and show their understanding by answering and asking questions. Students also developed their skill in observing, comparing and classifying when they identified plants on Hanson Island and the animals that live in the Kwakwaka'wakw territory. They learned about the classification of the different types of stories, songs, art and dances that are used for specific Kwakwaka'wakw traditions. When students made medicinal teas and medicines, harvested cedar bark, and observed steam bentwood boxes there were specific measurements to keep in mind. These teachings were mastered over years of practice and listening to the wisdom of the people who held these skills. Inferences were made throughout the unit as many of the students had explanations of why their end products did not

turn out the same as their peers. For example, one student commented that “My strip of cedar bark strip is longer than the other students because I made a wider cut at the base of the tree”. Though all of the students heard the same stories their perception of the stories were different, so the students took from the stories the teachings that were meant for them at that time.

Today in the more recently developed science curriculum there is mention of First Nations and Traditional Ecological Knowledge (TEK), but the evaluation standards remain the same. In my unit of study I did my best to follow what I felt was a more traditional method of assessment. In most situations I was not the expert so I left it up to the experts to guide the students and set the standards. The teachers modeled what was expected from the students and they either “got it” or they didn’t, and it reflected in their finished products. By doing this there became more lessons within the lessons that I had planned. Those who had difficulty grasping concepts were given more guidance and those who “got it” were given more responsibility. For example, some students walked away with one bundle of cedar bark while others walked away with four.

Observation and interaction seemed to be the most powerful evaluation tool used in this unit of study. I spent most of my time watching students’ complete tasks or getting help to complete tasks. There is not one student in this unit of study who did not complete several tasks. Some may have needed more guidance and support, but all of the students finished or took part in what was asked of them. So the completed bentwood boxes; the split cedar planks; the completed drawings and charts; the jars of medicine and bundles of cedar; the respect they showed the elders, plants, animals and the land; all combined to show me that the students understood the Traditional Ecological Knowledge and Wisdom of the people, they understood and practiced mayaxala, and they understood what it means to be Kwakwaka'wakw.

Chapter 5 Summary and Implications

Purpose

Each tribe within the Kwakwaka'wakw (Kwak'wala speaking people) has unique stories that link to their communities' ways of knowing and culture. This project examined selected traditional stories, songs, prayers and teachings of the Kwakwaka'wakw people for the purpose of developing science units of study that are relevant to the people of these tribes. The curriculum developed was meant to be a sample science unit, where the content would have to be modified to fit the unique culture of the community in which it was being taught. The goal was to acknowledge and strengthen the First Nations science education experience, while simultaneously engaging students in the Western science education experience.

Through the collaboration of elders and cultural teachers this science unit of study was developed using two stories – *The Mortuary Customs of the Kwakwaka'wakw* and *Our Beliefs around Death* and *Raven Steals the Sun*. These stories were selected because they were deemed relevant to the students' lives and science concepts and processes could be easily drawn out of them. The curriculum was pilot tested with 18 grade 6/7 students who attend the 'Namgis First Nation band operated school (T'lisalagil'akw school) with participants who are all part of the Kwakwaka'wakw nation.

Overview of Curriculum Experience

Community involvement was vital to the development of this science unit of study. The first step was to interview individuals, who are well respected and contribute to the cultural teachings that take place in the community, about traditional story. Interviewees were more than willing to share their knowledge when they were told that the goal was to get their young people motivated about science education. The collective knowledge gathered from these interviews

was developed into a science curriculum with a focus on the themes that were drawn out from the story and the themes that were naturally occurring in the community. So it made sense to develop lessons and have students participate in teachings that suited this time of the year (spring).

The students were introduced to the unit by developing a clear understanding of the definition *Traditional Ecological Knowledge* (TEK), and by defining the term *Kwakwaka'wakw Teachings* (as developed by William Wasden). This lesson informed students that they would be involved in cross-cultural science curriculum that would link them back to their cultural roots, their traditional territories and the animal and plant world. Students learned that traditional Kwakwaka'wakw stories are more than just myths or legends. These stories represent "Kwakwaka'wakw truths." It was explained that there are thousands of stories that confirm Kwakwaka'wakw presence in their traditional territories and these stories teach what it means to live in community and with each other – this is Kwakwaka'wakw science. Students were exposed to both Kwakwaka'wakw ways of knowing and Western Modern Science (WMS) by being immersed in the natural world, and understanding the essential relationship that has been maintained with nature since the beginning of time. All of the lessons developed for this unit of study explored how the Kwakwaka'wakw made their living in the natural world. Students experienced and explored the exact territories that their ancestors walked. They were exposed to the beauty of the territories and the stories that were imbedded in nature. There were stories about the trees, the mountains, the lakes, the rivers, the rocks, the birds, and fish. Stories appeared everywhere, and the students became involved in a process of creating their own stories. For example, students culturally modified trees by harvesting cedar and in hundreds of years from now these trees would tell the story of their presence.

Implications for Science Education in Native Communities

It is important that community be involved in choosing the material for the school science program. This way a student is able to make personal connections, and the content is more relevant to the student's learning. For example, the bentwood box that was shown to the students at the U'mista cultural center was found in the community of Alert Bay (Kwakwaka'wakw territory). This sparked interest in the students because the box was found in a tree in an area that they were all familiar with. Cajete (1999a) states that "significant learning is directly related to the degree of personal relevance the student perceives in the educational material being presented" (p. 88). So to take a seine boat to Hanson Island with a respected elder in the community and uncles and aunties who teach about Kwakwaka'wakw ways of knowing is more likely to motivate students to want to learn about traditional science.

Having community involved in developing the content of the science program also benefits the school atmosphere. There is much strength to build upon within First Nations community and community members wants to be involved in the education of their children. There was a tremendous amount of knowledge with the few people selected to assist with the development of this curriculum and they provided names of other community members who had special talents and gifts that they felt would benefit this curriculum. Students were happy to have their family members involved and family members were happy to be involved.

Teaching students about their sense of place and their traditional territories builds valuable skills and confidence. Sense of place refers to "an experientially based intimacy with the natural world processes, community, and history of one's place" (Sanger, 1997, p.4). It makes sense that First Nations students learn about the processes of Western Modern Science (WMS) by exploring and experiencing the world around them. They are able to maintain and

build upon who they are as Aboriginal people while learning both Traditional Knowledge and Western Knowledge. It could only benefit any educational experience to know and understand the story of where you originate. Wendell Berry, America's best known bioregionalist, says, "If you don't know where you are, you don't know who you are" (*Discovering Sense of Place*).

Challenge of teaching two Worldviews

To successfully incorporate TEK into the science curriculum I believe teachers need to be aware of, and respectful to the local peoples and their traditional territories. So including the First Nations community is what brings strength to these science units of study. The knowledge that the community brings is what makes the science of TEK, and the students are learning science without sometimes even being aware of it. Looking at similarities and differences can also be vital. For example, when we discuss the animal kingdom we can compare the Western Modern Science version to the First Nations version. This opens discussion for valuable teachings in both areas, which should be the goal of science education today. However, for the most part, telling the students they are learning "Native Science" I believe will only widen the barrier between First Nations ways of knowing and Western Modern Science. What makes TEK work for First Nations students is that it just "is" - it is a part of everyday life and has been since the beginning of time.

Recommendations for teachers

Based on observations throughout this science unit of study, I have come up with the following recommendations for teachers when delivering cross-cultural science curriculum:

1. It is essential to collaborate with respected elders and respected cultural teachers in the community.

2. It is important to collaborate with individuals who hold a Western Science background.
3. Elders or elders' teachings should be a part of the students' experiences.
4. Take advantage of the local knowledge in the community (elders, storytellers, people educated in traditional science and western science, cultural teachers and family members)
5. Have a list of reliable and respected resources in the community (resource people, books, and transportation)
6. Be organized, but also be flexible with your schedule – unexpected learning opportunities will arise.
7. Bring students out into nature so they are able to discover the beauty and knowledge of how their people sustained a way of life.
8. Welcome the stories that arise when visiting traditional territories (most of these areas have stories that are connected to them).
9. Allow time for traditional practices (prayers, stories, and protocol).
10. Include traditional practices in the evaluation process by allowing elders and cultural teachers to have input while students' are completing tasks or have completed a task.

There are many things to consider when planning a cross-cultural education experience. Of course it will depend on the community you are in and the resources and limitations within that community. It will also depend on the willingness of the teacher. The processes and concepts of Traditional Ecological Knowledge (TEK) should be given time and effort if it is meant to be meaningful. Traditional science should not be treated as a small add on to the

science curriculum, but as an idea that can be woven throughout the science curriculum. In the simplest terms we need to build students' self-confidence and this comes with knowing who they are and where they come from. By incorporating TEK into the science curriculum the science program becomes a natural part of the students' lives and we get back the motivation that has been lost with First Nations students. Science will naturally occur as our children begin to respect and care for the environment, and themselves.

Most science teachers might ask what this science curriculum looks like. Four such science attributes were identified by Ogawa (1989):

> First, students reflect on their own understanding of the physical and biological world. Second, students come to know the Aboriginal commonsense understanding held by their community. Third, the students may encounter ways of knowing of another culture, including other Aboriginal peoples. Fourth, students are introduced to the norms, beliefs, values and conventions of Western science – the culture of Western science. Negotiating among these four sciences in school science is known as "multi-science education" (p. 247).

Future Research Implications

Today there are many First Nations communities within B.C. who are going through the treaty process. The 'Namgis are now at their final stages of negotiations. What this means for Aboriginal communities is that they will have control over their own governing system and their own natural resources. The worry among many is: "Are we ready?" and "Do we have the people in place to take on these responsibilities?" It is alarming that there is a low percentage of First Nations represented in the sciences in secondary school and post secondary education. Many future jobs require science backgrounds, as they have to do with sustaining and managing our own natural resources. Economic factors also come into play as First Nations begin to build partnerships with major corporations. Today many First Nations scramble to fill job placements

in these companies because they simply do not have the trained people to fill these positions. Getting young people interested in the sciences now (TEK and Western science) gives us a better chance to fulfill our dreams and aspirations in the future.

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Appendix 1

The Mortuary Customs of the Kwakwaka'wakw and our Beliefs around Death

The wooden burial box containing the corpse is placed either in one of a group of small huts called grave houses, or in a canoe, in a dry and inaccessible cave or overhang, or high up in a spruce tree. Exposed to the air, the corpses slowly mummify. The grave houses and trees used for this purpose are always near the deceased's village. They are often on small and unused islands surrounded by water. **This is due to the belief that the spirit of the departed cannot return to their village and "bother" the people.**

The burial box is placed so that the head of the corpse is facing toward the west. One whose death is expected is carried out of the house and kept in a temporary hut of boards and mats, so that the rest of the household may not be exposed to the spirit of death and its consequences of causing more death within the same family.

The burial box was made from red cedar and is steam bent in the corners and sewn together with cedar withes and sealed with wooden pegs. These boxes are usually around three and a half feet long, two feet wide, and three deep. For someone that is expected to die, the burial box was made in advance by a man who has lost a wife by death; at the same time the cedar-bark rope for binding the coffin is prepared by a woman who is a widow. When death occurs unexpectedly, a new storage chest serves the purpose of a coffin. **The burial boxes were well bound and great lengths of cedar rope were twisted and braided to form the lashing used to secure the box.**

If death happened during the night, the news is confined to the members of the family until the first break of dawn. When the lamentations began first thing in the morning, the villagers instantly knew that death was amongst them and quickly rose; for it would be inviting death to sleep in daylight with a corpse in the village. At any time other than night, preparations for burial began immediately. If death happened late in the afternoon and death rituals could not be completed before darkness, proceedings had to wait until the next day. **This is following the belief that if death rituals are practiced at night; it is inviting death to return and possibly take others.**
As soon as wailing was heard, a number of a'apxila "caretakers" whose services had been previously engaged by the family, assembled at the house in which the body lay. These were unmarried people of the same sex as the deceased. Their numbers could vary from two to eight. The a'apxila bathed the body and blackened the corpse's face with charcoal. Then they covered its head with a small blanket that was fastened with wooden pins. They wrapped the body in a new robe and adorn it with the best of the deceased's finery. **Kwakwaka'wakw believe that the deceased journey into a next life and all that was valuable to them in this lifetime is needed in the next.**

Fully clothed and wrapped in the robe, the body is lifted by the a'apxila and with three preliminary motions and is placed in the burial box on the small of its back. **Robes could be an ancient pre-contact yellow cedar bark cloak with sea otter fur collar trim or fur. In later**

times, the button blanket made out of Hudson Bay blankets plain or decorated would be used.

The knees are drawn up to the chin and the hands to the breast below the shoulders. Some of the deceased's more valuable personal possessions are placed in the chest and in the burial box. **Often their "treasures" or prize possessions were also placed near or around the burial site. This could be dance masks and other cultural property that symbolized social rank and status, e.g. Copper.**

If there was time to make a special box, the body was fit in it without the head being pressed down. Normally, the head was pushed down and forward until the spine cracks and the head hangs forward on the breast. The burial box lid was then adjusted and the corner was laced down with cedar withes. Coffins were often painted with family crests and ancestral figures.

At a funeral, everything is carried forward with great haste. While the body is being prepared, all the people gather outside the house of the deceased. The burial box stands outside the house and the process of putting the body into it goes on in front of the people. The relatives of the deceased weep and wail.

After the coffin is laced shut, the a'apxila inverted it and cracked the bottom, in order that the spirit may have an exit to the next world. Then they place two boards across the gunwales of a canoe and place the burial box on top. All men get into their canoes and accompany the a'apxila to lend assistance, but the women never go.

If the coffin was to be hung in a tree, two men in a small canoe went in advance and selected a tree. Prior, they have thinned the branches with an adze. Finally, the burial box was secured to the tree. After finishing their work, the two men descend. They carefully cut off every branch close to the trunk, to protect the body from animals or robbery by thieves or uncivilized people. **Noble families usually from direct decent of first ancestors (ancient lineages) owned burial caves or overhangs that were personal property and privilege only to those families. There are often red ochre paintings nearby to mark these sites and may display family crests or deeds of the departed, e.g. Canoes or coppers.**

If the deceased was a high chief, everybody then moved a distance from the tree and sat down, while song makers composed memorial songs celebrating the life and deeds of their dead chief. After learning the mourning songs, all embarked in their canoes and returned to their village. They sang the new songs according themselves to proper custom, acting like invited guests from another tribe singing their mourning songs to comfort the bereaved family.

Adapted from:
Edward Curtis's
"The North American Indian" Volume 10 - Kwakiutl.

Additional bolded information from William Wasden Jr.

Appendix 2
Raven Steals the Sun

(This legend is famous on the Pacific Northwest Coast and many First Nations have their own version of this story. It belongs to the tribes who tell it).

At the creation of the world, there was no light. The sun and the moon were kept in treasure boxes by a greedy Chief. This Chief who owned them would not share them with anyone.

One day, Raven, whose name was K̓wik̓wax̱a̱ʼwi "Great Inventor" (Kwak̓wala name), heard about the Chief and his treasures. He heard how bright and warm the sun was. He wanted to have it. So Raven thought about how he could steal it for himself. Raven discovered where the Chief lived and decided to fly there.

Raven rested in the trees near the house of the greedy Chief. For many days he watched the Chief and his family. He wanted to learn all he could about them. He saw that the Chief's daughter left the house every morning to fetch water from the nearby river. Raven then made a plan to use the daughter to get into the house.

Raven thought that if he transformed with his magical power, he could trick the Chief's daughter into bringing him into the house. He thought that transformed into a small pine tree needle he could get into her drinking water. She would swallow him when she drank the water. He sang his sacred song and changed into a pine tree needle and dropped from the tree. He landed right in front of her as she scooped up the water into her water bucket. Raven made it into her bucket. However, each time she took a sip, she would blow him aside and would not drink him.

When his first attempt did not work, Raven came up with a new plan. He thought that if he transformed into a large, juicy salmonberry, she would notice him. So he sang his sacred song and transformed into a huge red salmonberry. He grew in a bush above the watering place of the Chief's daughter. He hoped that she would notice him. He planned for her to see him when she leaned over the water. She would see him in the reflection.

So the daughter came down to her watering spot and just as Raven had planned, she saw him in the reflection and wanted to pick him. He was the biggest and juiciest of all the berries. She decided to pick him. She took the large berry and ate it. She did not know that it was Raven in another form. With his trickery and magic, he transformed inside her to become a baby.

Raven grew quickly inside of the daughter and within four days, she gave birth to a boy. The greedy Chief was very confused. He wondered who the father was of his new grandson. When he questioned his daughter, she told him that she did not know and only believed it to be good luck.

Raven grew very fast and could talk as soon as he was born. Although the greedy Chief did not know who the father of his grandson was, he loved him greatly. He always packed the child and told him that he was precious. Raven knew that his new grandfather cherished him and would do anything for him. So Raven thought about how he would get the treasure box that held the sun. Raven always played on the floor near the fire. He could see the boxes hanging from the roof

beams of the house. He started to throw a tantrum and screamed for attention. His grandfather picked him up and could not calm him down.

Finally after rocking the child for a long time, the grandfather asked him, “What do you want?” Raven replied, “Grandfather, please make me a fish trap to catch salmon”. The grandfather who would do anything for his grandson made the trap. Very soon Raven got bored with the fish trap. He forgot about it.

Raven then began crying again and his grandfather packed him and tried to settle him. After he couldn’t calm him down he asked his grandson, “What is the matter?” Raven told him, “I want a bow and arrow to play with”. So his grandfather made him a yew wood bow and four arrows. This calmed Raven down. Again, Raven became bored with the bow and arrows and set them aside.

It was not long before Raven was allowed to go down by the river and play by himself. Again, he started to cry and when his grandfather tried to calm him, he only stopped when he was asked what he wanted. This time he told his grandfather that he wanted a yew wood paddle to play with in the water. His grandfather carved him a paddle as he had wished for. He went down to the water and played for only a short time when he went home crying and wanting to go out on the water.

Raven’s grandfather told him that it was too dangerous out on the water. He said Raven should not go out there. So Raven threw a tantrum and cried harder than before. Raven’s mother begged her father to make him a small canoe. She said to build it of sea lion skins wrapped around a wooden frame. Her father told her that he would make the canoe. So Raven was happy and went a short way on the water with his canoe. His grandfather told him not to go out too far. He promised he would obey. Raven stayed close to the shore and his grandfather was very pleased with him.

Later that day, Raven came home crying loudly. His grandfather asked him, “What is the matter with you, don’t you like your canoe?” Raven replied, “I want to play with the treasure box that hangs from the roof beams”. His grandfather told him very sternly, “No one is to touch that treasure box and do not ask again!” Raven’s mother heard the words of her father and added, “You are a very spoiled boy. You are not like the other children and you want everything! You cannot touch that box!”

So Raven threw the biggest tantrum he had ever thrown and cried and cried and would not stop. Finally, Raven’s grandfather took pity on him and told his daughter to lower the treasure box. He told her to open the lid just a little for Raven to see. He also said that the sun was very bright. The box should be opened carefully only a small bit. When Raven saw the beams of the sun shining out he started to cry. He begged to play with the box. So his grandfather allowed him to play with the box only if he promised not to open it. Raven promised and played with the box all afternoon without opening it.

The next day, Raven asked his grandfather if he could take the box in his canoe. He promised his grandfather he would not open the box. His grandfather trusted him because he did not open it

the day before. So he allowed Raven to take it out in his canoe. Raven paddled all day and did not open the box. His grandfather kept a close watch. He was very happy when Raven kept his promise. That evening Raven paddled home bringing the box back to his grandfather.

The next day, Raven asked again to take the treasure box out on the canoe. His grandfather said, “Not today, you had it all day yesterday and it should stay up in the beams”. Raven cried and screamed and almost fainted from holding his breath too long. Finally, his grandfather gave in. He allowed Raven to take down the box. He loved his grandson so much and would do anything to make him happy. Raven calmed down and asked to take the treasure box out on the canoe one more time. He promised he would never ask again. He promised that he would always obey his grandfather. So his grandfather told him he could take it one more time and no more.

Raven ran down to the beach and put the box in the bow of the canoe. He told his grandfather not to worry that he would take good care of the treasure box that held the sun. Raven paddled away and went out to the sea. His mother watched him and yelled that he was going too far. He yelled back and told her not to worry and that he wasn’t that far away. When he was quite a distance away, he opened the box just a little bit. Out from the box flowed some bright rays of light. His mother called to her father and said, “Look Father, look at the disobedient tricks my child is playing!”

Raven’s grandfather yelled at him to close the lid and paddle back to shore. He pretended not to hear and opened the lid some more. He was really proud of himself that he had stolen the sun and had it all to himself. He yelled back to his mother and grandfather and said, “You thought you would have the sun for yourselves and be the only ones to have daylight! Now look who has the sun, it is me, for I am the great Raven!” He opened the lid a little more and at that moment a wave came and rolled the canoe. Raven fell back in the canoe and the lid fell off the box. The sun came rising up and quickly floated into the sky. It was too hot for Raven to grab. There was nothing he could do. He had lost the sun and daylight was released to the world.

As told by William Wasden Jr.