

## Indigenous Science in the Classroom

### A Note to Teachers

This resource serves as an extension of a previously created document entitled *Indigenous Knowledge and Science In Collaboration with STAO & FNMIEAO*. This initial document is a good start and as it provided support for getting started with terminology included common terms and cautions when utilized specific terms. The document included a brief passage on understanding colonialism and ways of knowing. Finally, ways to move forward with the knowledge gained through reading the document. The accompanying documents in the same package of work entitled *Indigenous Knowledge: Understandings & Considerations*. This accompanying document included explanation of the difference between appreciation and appropriation and how it applies to science. This second document will attempt to not repeat the previous work done but will attempt to deepen readers understanding of Indigenous Science, Indigenous ways of knowing, value systems, impact of colonialism on Indigenous Science. The final part of this document will be revisiting the guidelines and expanding on practical way to include indigenous concepts and learning opportunities while engaging with the science curriculum.

### What is Indigenous Science vs Indigenous Knowledge in Science?

Indigenous Science refers to the process in which Indigenous people have understood the world around them, this is a systemic method that focused heavily on observation and interconnectedness with the natural world. The major difference in these two topics is the Indigenous science is the process of understanding the world. This can be done through oral tradition, ceremonies and other indigenous ways of knowing. Indigenous concepts in Science would be discussing water from an indigenous perspective and including indigenous voices to tell their understanding.

### Indigenous ways of knowing and Traditional Knowledge.

There are many other ways of knowing that may not be touched upon in this document but there are eight broad areas that will be discussed to give some context for understanding Indigenous ways of knowing followed by an explanation of traditional knowledge. Indigenous ways of knowing are critical to understanding Indigenous science as it is the process and can be seen as Indigenous science. The first way of knowing discussed is **land**, Indigenous people have always learned from the land our mother earth. Indigenous people have many differing and complex understandings of the land and its resources. In some Haudenosaunee teachings we are told that we have enough sustenance to survive as long as the creator allowed us to be on earth and Turtle Island (North America). Indigenous people learn from all aspects of the land including the plant life, trees, rocks, animals and more.

The second way of knowing is **oral traditions and stories** as mentioned these inform our worldview and belief systems. They teach us about how to treat each other, the land, animals and all aspects of life. Our stories, when comparing to European frameworks would be the theories that scientist prove. These

stories keep traditions and traditional knowledge alive throughout generations and are critical to the survival of Indigenous Science.

The next way of knowing is **relationships**, through our stories we have the content and lessons we are supposed to learn but it is through our relationships with each other and the land that reaffirm and support the development of learning and ways of knowing. Relationships with elders and traditional knowledge keepers is the foundation of keeping indigenous ways of knowing and being alive. Developing a relationship and connectedness with the land will aid in the understanding of Indigenous Science concepts and ways of knowing. Similarly learning from **family** members is another way of knowing which is highly valued to Indigenous people. Trusting family members to pass on teachings and stories is important to the survival of Indigenous ways of knowing and Science because through family relationships the preservation of Indigenous Science and knowledge is maintained and supported. **Spirituality** and **Nationhood** stem from family and relationships which foster the learning and knowledge development of Indigenous Science. Spirituality takes into account relationships with the natural world as well as the creator. Exploring and developing an understanding of each individual's spirituality will support concepts that seem difficult to understand or that cannot be observed from the naked eye. Nationhood is important to understanding that each nation has a unique language, traditions, stories and understanding of the world. There may be similarities among sister nations or language families but each nation is distinct and may have different interpretations of stories and teachings. The final Indigenous way of knowing addressed in this text is **time**, it is believed that when things happened it's all at the right time. Time tells us what we are supposed to know when we are supposed to know it. If something is unclear or fully understood then it's not time yet. It honors the process of learning and ways of knowing.

### **Knowledge and Value Systems**

There are many differences between European and Indigenous knowledge systems and some similarities that will be discussed in this section of the text. The main difference is where the value is placed. In European knowledge systems the emphasis and value is on the product and/or results of said project or experiment. Whereas, in Indigenous worldview the process, time dedicated to achieving results is valued just as if not more important than product and/or results. There is currently a shift in western education that is aiming to find balance between the process of learning and collecting data and the product or results. It's important to remember although the emphasis maybe different the overall benefits for understanding and learning are as important in both knowledge systems. When referring to knowledge systems and the differences are explained in the first section through the ways of knowing. When we compare the way knowledge is attained through a western/European knowledge system it is likely through books, news, journal articles, other scientists whereas for Indigenous knowledge systems knowledge is attained through stories, relationships, time, land and so on.

### **Impact of Colonialism on Indigenous Science**

As you may or may not be aware, the legacy of residential schools as well as colonialism has been detrimental to the wellbeing of Indigenous people on Turtle Island. Specifically in relation to Indigenous Science and Indigenous ways of knowing we have seen a decline in the amount of traditional knowledge keepers which are critical to the succession of Indigenous ways of knowing and therefore Indigenous Science. However, recently children and youth have been able to be exposed to their traditions and culture without the shame that has been present for many years through colonialism. It is hopefully that many traditions and ceremonies will be retained for future generations to come however, there are some communities that were not so lucky and their indigenous languages and traditions have become extinct through Canadian legislature such as the Indian Act which outlawed ceremonial practices for many years. This piece of legislature continues to be in existence and has impeded the growth and understanding of Indigenous science and ways of knowing. There are many challenges and barriers that Indigenous people have faced in order to retain these critical pieces of knowledge and ways of knowing which is why it's so important to engage meaningfully with local community elders and traditional knowledge keepers to ensure included Indigenous science and ways of know are done with respect, integrity and appropriately.

### **Why should I included Indigenous Science and Indigenous knowledge in my classroom?**

As an educator, there will likely be many diverse students in your classroom with diverse learning needs and understandings of the world by incorporating Indigenous knowledge into the classroom through the appropriate mechanisms and supports you will allow students of all backgrounds to a unique and beautiful way of learning and knowing the world. For non-Indigenous students it opens their minds to another way of learning and understanding the world which may resonate with them or may not. By providing authentic Indigenous voices into your classroom or school you are working towards uncovering the true history of Canada which many Canadian children to this day are still denied. Additionally, for Indigenous students in your classrooms you are demonstrating that you understand their unique cultural background and are honoring it an appropriate way. Simply put, including Indigenous Science and Indigenous knowledge in the classroom is good for all and necessary for some. Meaning that all students will benefit from having an open mind even though some might not be ready or willing to understand that is fine as long as respect is maintained. However, the students that really need to learn in another way or on the land this can be critical to their academic success and understanding of the world as it places value and understanding on the unique perspective Indigenous people have.

### **How can I include Indigenous Science and Indigenous knowledge in my classroom?**

After reading this, you may be thinking, I totally understand why it's important but how do I do it? Well, it's a process so take your time and only do what you feel comfortable with. Students can tell if something is force or rushed without proper planning and understanding. The best way to start is to

read the Guidelines provided in the previous document mentioned above entitled *Indigenous Knowledge: Understandings & Considerations*. There are also learning explorations that have been previously presenting as starting points as well there have been more created within this document to support your journey. The key point that should be taken from any guidelines are that Indigenous people are simply still people. Ensure you are humanizing the people you are working with and do your best to not make a spectacle of Indigenous people. Remember to ask permission for any Indigenous knowledge you bring into the classroom as well as consult with your Indigenous Education Lead (every school board is mandated to have one) they will be the helpful to get your started on your journey. If you are a non-Indigenous teacher working to incorporate Indigenous knowledge and Science in the classroom make every effort to stay away from ceremonial teachings and sacred traditional knowledge and stick to the facts that are prove and commonly known. An example of this is that science now provided evidence that discusses the health benefits of smudging which is a practice that many Indigenous people have done prior to scientific evidence explaining that. There are many more examples that demonstrate Western or European science is just now catching up with Indigenous science and Indigenous ways of knowing and we should do our best to honor that.

#### **References:**

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