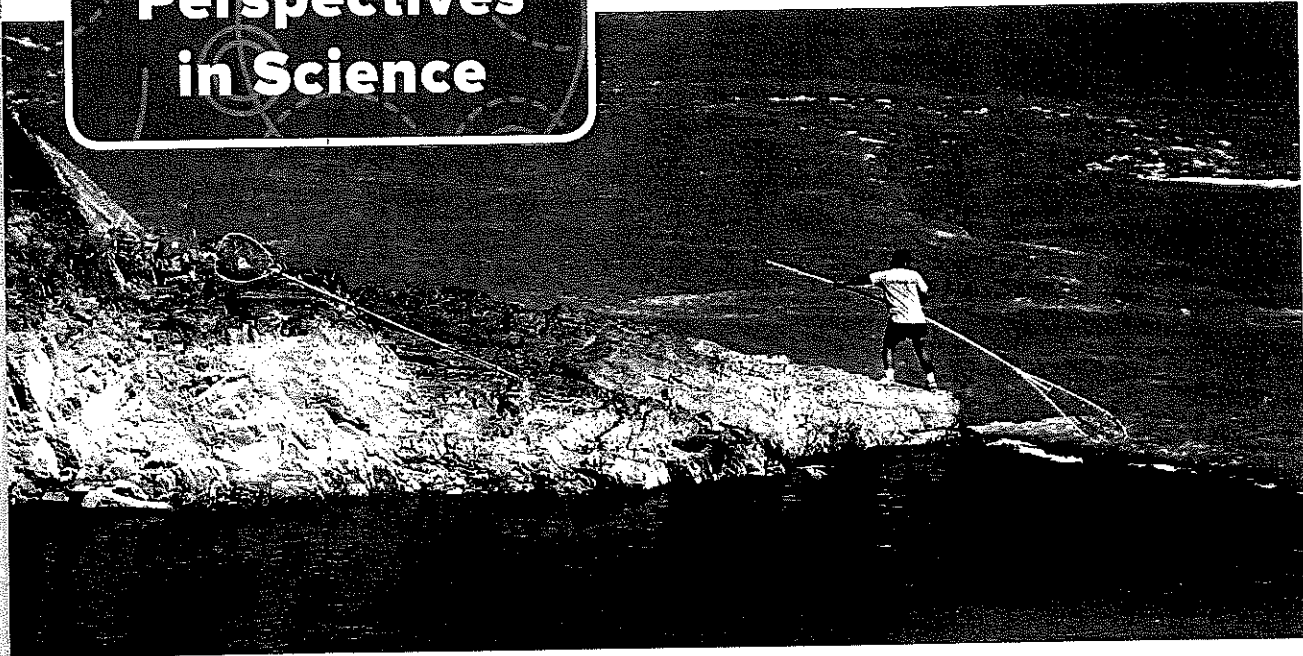


First Peoples Perspectives in Science



First Peoples have a profound connection with the local environment built on thousands of years of experience. Here a man fishes at the Fraser River where his ancestors have fished for generations.

Science is all about understanding the natural world. In this book you are going to have the opportunity to understand the world from different perspectives.

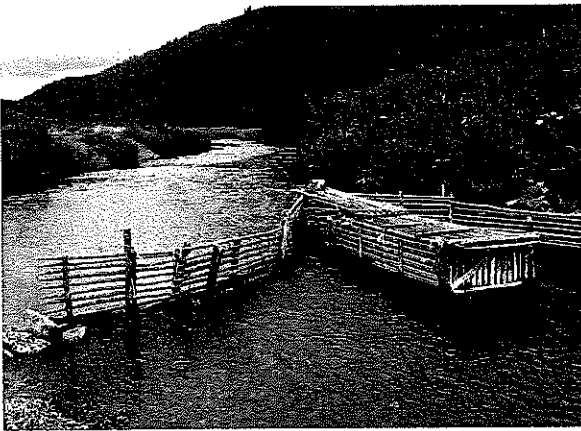
Like all knowledge, scientific knowledge is rooted in culture. What is often called Western science is based on ideas that developed mostly within the cities and aristocracies of Europe during the 1600s. Indigenous people around the globe understand the world in different ways. Their science is based on living close to the land for thousands of years.

First Peoples scientific knowledge is based on the knowledge and experience gained from the local environment. Therefore, their knowledge is as diverse as the First Peoples themselves. However, most First Peoples share a world view that is based on a reciprocal and respectful relationship with the natural world.

The aim of First Peoples science is to live in balance with the rest of the world. The scientific perspective of First Peoples reflects an understanding that survival depends on an equal relationship with the rest of the universe.

Traditional Ecological Knowledge (TEK)

One of the most important aspects of First Peoples science is Traditional Ecological Knowledge or TEK. This is detailed local knowledge that First Peoples have gained through their relationships with the particular landscape where they live. It takes in the world view of the people. This includes relationships with their local ecosystems and the plants and animals that live there, as well as with spiritual dimensions.



The fish weir is an example of a sustainable fishing technique used for thousands of years to fish selectively for salmon returning to their spawning rivers.

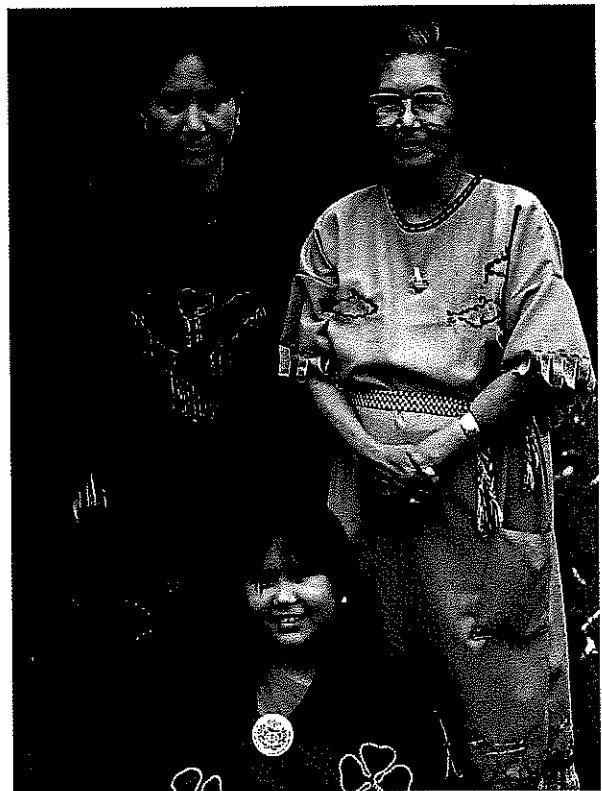
The traditional knowledge of First Peoples includes understanding the lives and behaviours of plants and animals. It also includes skills and practices that people have used and developed over thousands of years to use these resources in sustainable ways. TEK embeds beliefs about the natural world and the role people play in that world. It emphasizes living in a way that respects the natural world.

Traditional Ecological Knowledge has been accumulated over many thousands of years as people interacted with the land. It is still being accumulated. TEK is learned as a result of direct contact with the local environment through observation, experience, events, and interactions. The knowledge has been passed down from generation to generation, from time immemorial.

One way that knowledge and skills are passed down is through direct experience. From a young age, children participate in the cultural activities of their ancestors. This can include helping to harvest resources from the land and participating in ceremonies and celebrations.

Another way that TEK is transmitted is through story. In the past, First Peoples lived in oral societies. Storytelling was a crucial way of passing on information, values, and beliefs. Traditional stories told today still hold the ancient teachings that speak about humans' relationships with the natural world. They often emphasize the need for respect by telling stories about people or creatures who did not show respect.

The vehicle for passing on TEK is, of course, the language of the First Peoples who hold the knowledge. There are more than 30 different languages spoken by the First Peoples of B.C. Each has its own way of speaking about the natural world through its words and phrases, grammar, and local place names.



Traditional knowledge is passed on from one generation to the next through experience and story. A reciprocal relationship with the land ensures survival for future generations.

Today, First Peoples sometimes share their Traditional Ecological Knowledge with scientists working in fields such as wildlife and environmental sciences. Their specific knowledge of animal behaviours and their relationships with the local ecosystem is a storehouse of data that is invaluable to the work of scientists.

It is necessary to remember, however, that Traditional Ecological Knowledge is the intellectual property of the people who hold it. Some of this knowledge is considered sacred and is usually not shared with outsiders. Other knowledge, such as changes in animal behaviour and properties of medicinal plants, may be shared, with the goal of contributing to wider scientific knowledge.

Recognizing First Peoples Perspectives

Much of this book deals with the natural world from the perspective of Western science. However, there are also places where you can think about the world from a First Peoples perspective of science. To do this, it is important to understand some of the foundations of First Peoples science.

We can think of these foundations by considering four related themes or ideas: interconnectedness, transformation, renewal, and connection with place.

From a First Peoples perspective everything in the universe is connected. Humans and the rest of the world are interdependent.



Interconnectedness

From a First Peoples perspective, humans are not separate from or outside the rest of nature. We are one part of the universe. This view is expressed by the idea of interconnectedness. Everything is connected; everything is related.

The idea that everything is connected goes further. Because everything is connected, everything is also interdependent. Humans depend on the rest of the natural world for our existence and our survival.

If people understand that everything is connected and interdependent, that understanding has a big impact on their relationships with the natural world. It means knowing that any action people take will affect the land and living things in some way.

Transformation

Another idea understood by First Peoples science is that everything is in motion. Change is normal and to be expected. Change brings about transformation—moving from one form or state to another.

Transformation is part of interconnectedness. For example, when we eat plants and animals, our bodies transform the food. The plants and animals become part of us.

First Peoples have always understood the power of transformation. Many origin and creation stories talk about a time when the world was transformed. At the core of most First Peoples cultures is a Trickster character like Coyote or Raven. The Trickster



Fire transforms matter and energy into new forms. For many First Peoples, fire is one of the four formative elements, along with air, water, and earth.

sometimes causes chaos but ultimately brings about order to the world. This usually involves some kind of transformation.

Change and transformation also bring about creativity. The universe itself is a creative force, and First Peoples perspectives view human existence as a creative activity.

Renewal

Change often is cyclical—it moves in patterns that repeat themselves over and over again. Think of the seasons. Life changes over the year from young growth in the spring, ripening and maturing in the summer and autumn, and decay and sleep through the winter. But spring comes again, and life is renewed.

Renewal is the third big idea held in First Peoples perspectives on science. Renewal is key to maintaining the conditions people need to exist on the planet. But First Peoples knowledge understands that for nature to renew itself, ecosystems must be sustained. People have to act in a sustainable way to ensure the planet renews itself.



A new shoot renews the plant known as Devil's Club. For First Peoples, this plant offers powerful medicine, to be used only by people with specialized knowledge.

First Peoples honour the importance of renewal through important ceremonies. For example, many communities have ceremonies in the spring to mark the first berries, the first bitterroot, or the first salmon. These may be family or community events that recognize the renewal of the gifts that the natural world provides. They may include words or songs that give thanks to the plants or animals for giving up their lives to nourish humans.

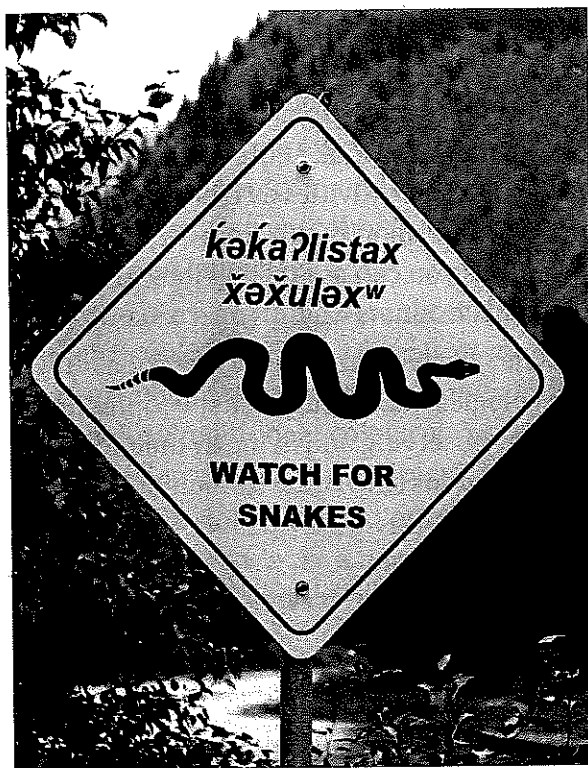
Connections with Place

This brings us back to the relationship with the land. When we say land, we mean all of nature, or the universe. But First Peoples knowledge usually comes from the local territories where they live. Traditional Ecological Knowledge is scientific knowledge resulting from generations of observing and experiencing the landscape where people live.

For most First Peoples, their connections with place are a part of their identity. This goes to the heart of the idea of interconnectedness and interdependence. In every way imaginable, First Peoples feel they are an extension of the land. This is why First Peoples science aims to live in harmony with the rest of the natural world. It is crucial for all survival.

Bridging First Peoples Knowledge and Western Science

First Peoples perspectives on science, then, provide a holistic (all-inclusive) view of science. It seeks to understand how all things are connected and dependent on each other. Western science often emphasizes the study of details, looking at certain aspects of the natural world as if they are separate from it. Sometimes it is helpful to look at the world



This dual-language sign warns of rattlesnakes in English and Nsyilxcen, the Okanagan language.

in such detail. Neither view is better or worse than the other. We can benefit from both.

One way in which First Peoples scientific knowledge usually differs from Western science is the inclusion of spirituality. Because of their holistic view, because everything is connected, First Peoples include the spiritual side of life as part of their knowledge of the universe. It is important to note the difference between spirituality and religion. When we speak of First Peoples spiritual connections with the natural world, this is something quite different from the concepts of religious beliefs.

Spirit is that part of life that can't be observed and measured scientifically. It can be thought of as energy, or as the life force. One way to understand this is through different perspectives on animate

and inanimate entities. Western science separates everything in the universe as animate or inanimate. Cougars and blueberries are animate: they are living. Rocks and stars are classified as inanimate. However, First Peoples perspectives see everything as animate, as alive. Rocks and stars have their own spirit or life force.

Western science does not usually include the spiritual side of life in its knowledge system. But there are interesting parallels with First Peoples perspectives. Consider the big bang theory of the universe. All matter is believed to have been created in the mysterious moments of the big bang. Immense forces created the stars. Almost all the elements that we know of in the universe were created and transformed in the heart of the stars. The stars exploded, sending particles of these elements through space. We are made from those particles. We are, in fact, star dust.



Petroglyph in Gitga'at territory. No one knows the meaning of these rock carvings, but they likely had something to do with the spiritual world. There are dozens of carvings along this beach in the Great Bear Rainforest, which is covered twice a day by the tides.

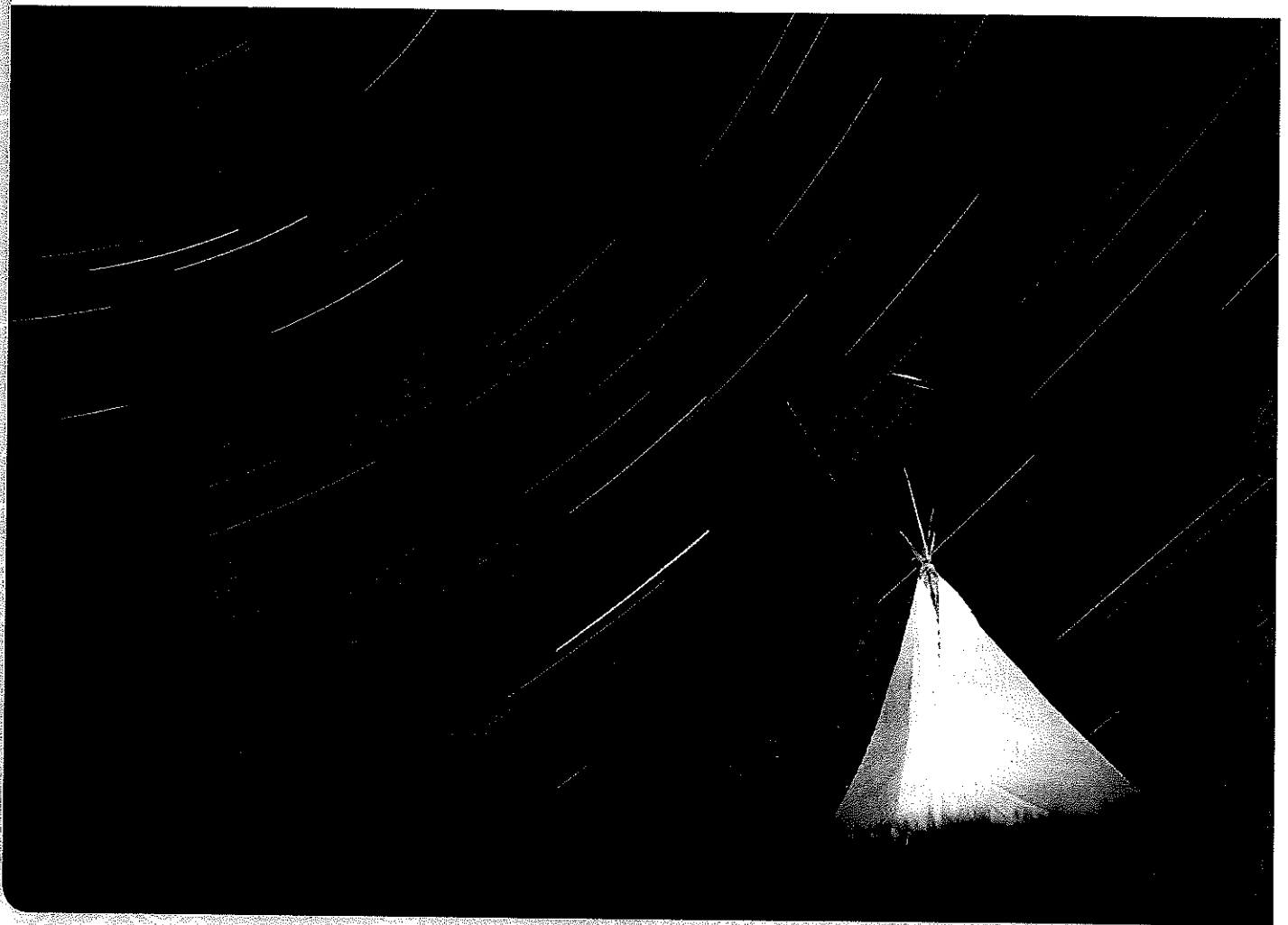
Another parallel between First Peoples science and Western science may be found in our dreams. For many First Peoples, dreams are an important part of understanding life. Some hunters dream about the animals they are going to hunt the next day. In the same way, many major scientific discoveries have been made through dreaming. For example, Niels Bohr's insights into the structure of atoms and Frederick Banting's discovery of insulin came about, in part, through dreams.

Looking at Science 9 from a First Peoples Perspective

As you study the lessons in this course, find opportunities to look at the information, concepts, and activities as First Peoples might understand them. Here are some questions you can ask to help look at the concepts in a new way:

- What can we learn from Traditional Ecological Knowledge? First Peoples have been observing and living in their local ecosystems since time immemorial.

Star trails over the Cariboo Mountains. According to Star Chief Robert Cardinal, Cree Blackfoot astrophysicist: "The light, the energy and matter are about five per cent of what the universe is made of. We have no clue what the rest is. When you know that a huge part of the universe is not understood, there's plenty of room there for spirit."



The knowledge and skills they have attained can help bring a new or additional insight to the work of Western scientists.

- How can we connect with the local First Peoples community to understand these ideas better? Can we connect with local stories and language?
- Can we learn anything new about the topic by thinking from a female or male perspective? Often women and men hold different Traditional Ecological Knowledge about certain topics.
- What is the story? Can you put the facts together to make a narrative about a topic? Does this help bring new understandings, or help you remember some ideas?
- How does this topic fit into the big picture? How can we view it holistically? Does that help us understand the problems or issues differently?
- How is this topic connected to other topics or ideas? How is it interconnected and interdependent?

- Is there evidence of transformation in this topic? Does understanding how motion and change are involved give us new ways to understand a problem?
- What is the role of renewal? Is there a question of sustainability that needs to be understood?
- How does the topic connect with you and your sense of place?

