FOUR DIRECTIONS LEARNING ACTIVITIES

Elder	**Stephen Augustine**
Nation	**Mi'maq**
Lesson Plan Grade Level	**Senior (Grades 10-12)**
Time Required	**2 - 3 hours**
Subject Strand Links	• Biology • Chemistry • Earth and Space Science • Philosophy
Key Concepts	• Mi'kmaq Creation Story
Student Summary	The origin of life has perplexed people for centuries. "Where did we come from?" is a question that continues to be debated by scientists and theologists alike. Scientific views try to *explain the processes* contained within life and life's changes over time, i.e. graduated and punctuated *evolution*, natural selection, mutations, *cellular respiration*, and *photosynthesis*. When it comes to trying to explain any sort of creative process, science can not support its ideas validly and can only serve to describe the moments that occur after the creative process has begun. Science has many empty spaces where biological processes are not clearly understood at all: these gaps in the knowledge are considered mysteries. Many of these scientific mysteries involve creation processes e.g. the beginning of the universe, cellular division and fertilization. In many First Nations cultures, the name for the Creator can be translated into meaning "the Mystery" or "the Great Mystery." According to the *Mi'kmaq Creation Story*, the first actions of creation are a mystery. Once life is established, it is sustained by several cellular processes. One of the most important cellular processes comes from the green plants. They are the only life forms that manufacture their own food and in doing so, they create a by-product that is necessary for our atmosphere and survival. This process is called **photosynthesis** and begins when light strikes the plant's leaves. Cells in the plant's leaves contain chlorophyll which interacts with sunlight to split the water in the plant into its basic components. Carbon dioxide enters the leaf through holes and combines with the stored energy in the cells through a chemical reaction to produce a simple sugar. The sugar is then transported through tubes in the leaf to the roots, stems and fruits of the plants. Some of the sugar is used immediately by the plant for energy; some is stored as starch; and some is built into a more complex substance, like plant tissue or cellulose. Fortunately for us, plants often produce more food than they need, which they store in stems, roots, seeds or fruit. We can obtain this energy directly by eating the plant itself or its products, like carrots, rice or potatoes. Photosynthesis is the first step in the food chain which

connects all living things. Every creature on earth depends to some degree on green plants.

The oxygen that is released by the process of photosynthesis is an essential exchange for all living things which is why forests, for instance, have been called the "lungs of the earth" because animals inhale oxygen and exhale carbon dioxide in the process of breathing, and plants take in carbon dioxide and give off oxygen in the process of photosynthesis (KTCA Twin Cities Public Television). This 'give and take' is what creates a **symbiotic** relationship between plants and animals and/or humans. To understand symbiotic relationships more clearly, view the *Sacred Balance* video/DVD series. See how trees, river systems, salmon, black bears of British Columbia work together through complex systems of behaviour and chemical decomposition to sustain a healthy rain forest.

Cellular respiration is an almost universal process by which *organisms* utilize the sugars in their food to produce enough energy to perform all the necessary actions of living creatures. Cellular respiration is carried out by every cell in both plants and animals and is essential for daily living. It does not occur at any set time and, at the same point in time. Neighboring cells may be involved in different stages of cellular respiration.

The Mi'kmaq Creation Story

The Mi'kmaq Creation Story describes how life began for all things. This process occurred in seven stages or levels of creation and is described as follows:

Level 1: The sky represents the Giver of Life, Gisoolg, who creates everything. Creation is a mystery that contains everything and is within everything. It is regarded with awe and reflected in all aspects of life, seen and unseen.

Level 2: The Sun creates life and gives us our Shadows. The shadows reflect the identities, characteristics and spirits of ancestors. The Shadows are the joining of earth, matter, and the blood of human life. The Sun connects the spirit world to the physical world and is represented by the centre direction.

Level 3: The third level of Creation is on the surface of **Mother Earth**. In the Mi'kmaq language, several words are directly related to the word for "Earth." For example, the word for the skin of a drum and the word for the Mi'kmaq people are related to each other and to the Mi'kmaq word for Mother Earth. The beat of a drum is the heartbeat of Mother Earth. The surface skin of Mother Earth gives rise to life, including people, and this is reflected in the word *Oosgitjinoo* which means "the person who has

	peeled himself off the surface of the Earth and is standing erect." *Oosgitjinoo* is a word used to refer to the Mi'kmaq people. Level 4: The first man, **Glooscap**, is created from a bolt of lightning. The bolt hits the Earth and his body is created on the Earth's surface. He is lying with his head in the direction of the rising sun and his feet are facing the setting sun. His arms are outstretched to the north and south. When the lightning meets with the elements of the Earth that make up Glooscap's body, a life force is created. When lightning hits a second time, Glooscap develops fingers and toes, and seven sacred parts to his head (two eyes, two ears, two nosrils and a mouth) appear. At the third bolt of lightning, Glooscap is freed from the surface of the Earth to walk and move about. Glooscap gives thanks to Mother Earth and Grandfather Sun for his creation, and pays his respects to the **South**, the **West**, the **North** and the **East** directions. Once returning to the east where he was created, Glooscap is visited by an eagle that tells him he will soon be joined by his family to help him understand his place in this world. The eagle drops a feather, which Glooskap catches. This feather gives him strength and serves as a symbol of connection between his people and the Giver of Life, Grandfather Sun and Mother Earth. Level 5: Glooscap meets his **Grandmother,** who is born from a rock. She teaches him to respect her wisdom and knowledge about the stars, the wind, the seasons and the tides, the characteristics and the behaviour of the plants and animals, and how to make food, clothing and shelter. For their *sustenance*, Glooscap takes the life of a **marten**, asking *permission* of the animal first, and giving thanks to the Giver of Life, Grandfather Sun and Mother Earth afterwards. Then, using the seven sparks from the bolts of lightning that created Glooscap, and seven pieces of dry wood, cousin **Whirlwind** is invited to create the Great Spirit **Fire**. Grandmother and Glooscap then feast to celebrate Grandmother's arrival into the world. Level 6: Glooscap meets a young man who says he is Glooscap's nephew, a creation of Whirlwind, who passed through the ocean in the direction of the rising sun, causing foam to form and blow ashore. This foam has rolled in sand and picked up rocks and wood and feathers, eventually resting on sweet grass. With the help of the Giver of Life, Grandfather Sun and Mother Earth, the **nephew** was created. The nephew offers vision to the future and comes as a gift of the ancestors. Nephew is also a responsibility for Glooscap to guide, since the young turn to the old for direction in life. And just as Glooscap took the life of the marten for survival, the nephew calls upon the fish to give up their lives. Glooscap gives thanks, apologizing for taking the shadows of the fish and for taking elements of Mother

	Earth for their own survival. Again they feast, and continue to learn from Grandmother. Level 7: Glooscap's **mother** appears, coming first as a <u>leaf</u> on a tree that falls to the ground and collects dew. The Giver of Life, Grandfather Sun and Mother Earth have made Glooscap's mother from this dew to bring gifts to her children. These gifts include the colours of the world, understanding and love, so that her children will know how to share and care for one another. Glooscap has his nephew gather food for a feast to celebrate the creation of Glooscap's mother. Glooscap provides leadership, respecting the teachings of the elders, the vision and strength of the young people, the gifts of the ancestors, and the teachings on how to rely on each other and to respect and care for one another. In this way, they live a good life.
Learner Objectives	Knowledge/Understanding: • To understand the origin of energy flow through living systems on planet earth through photosynthesis and cellular respiration • To understand that the carbon cycle is Nature's recycling system • To demonstrate how structures and functions of cells, tissues, organs, and body systems relate to each other • To gain insight into the food chain, starting with plants and followed by animals, as made possible through photosynthesis • To understand symbiotic relationships • To understand creation from a traditional Mi'kmaq perspective Inquiry/Values: • To reflect on the relationship between human needs and the physical environment. • To recognize the opportunities and limitations presented by geographical contexts • To appreciate the environmental processes on which humans rely for their continued existence • To identify the roles that oxygen and carbon dioxide play in sustaining our ecosystem • To develop insight as to the symbiotic relationship between natural elements, plants and humans Skills/Applications : • To apply basic science process skills (observing, classifying, measuring, communicating, predicting, and inferring) • To formulate operational definitions of the vocabulary terms • To develop proficiency in listening, speaking, writing, questioning and negotiating
Strategy	1. Have students stand with their backs to a wall. Ask them to lean against the wall as they slowly slide down the wall until their legs are 45 degree angles at the knees. See how long they can hold this position. Who lasted the longest? What did this it feel like to

	hold oneself in this position? 2. Discuss what happens to the muscles in the legs when they are strained like they were. The cells cannot produce the oxygen they need so chemical processes take place in the body's metabolism which we feel as pain. This scientific exercise demonstrates cellular respiration, which is how the cells in the body breathe and rejuvenate. Energy is transferred to the cells through oxygen which explains why we need oxygen for our survival. 3. Now compare cellular respiration to photosynthesis. Discover what happens if you change the patterns of a plant's light source. Pick a shrub, tree or houseplant that you can use for an experiment. Using the cardboard or aluminum foil, cut out some geometrical shapes like a circle, square or triangle. Make sure your shapes are big enough to make a patch that will cover nearly half of the plant leaf. 4. Paperclip each shape on a different leaf. If you use a house plant, place it near a south, west or east window where it will get plenty of sunlight. Make notes about the weather each day and add them to your observations. 5. After four days, remove the shapes from the leaves and observe each of the leaves that had a shape covering it. Compare the areas on the leaf that were covered with the shape to other parts of the leaf. What has happened to the leaves? Describe the effects that the lack of sunshine has on leaves. What has or hasn't happened in the different parts of the leaf? What is the best environment for a house plant? Why? Where have you seen effects like these in nature? Where would you expect to find fewer plants outside because of a lack of sunlight? 6. Discuss the transfer of energy in cellular respiration compared to that of photosynthesis. What are the active agents to precipitate these processes? What happens to cells when they lack oxygen? What happens to plants denied light? This explains why we need sunlight for our survival. 7. Now having scientifically demonstrated the transfer of energy through respiration and light to sustain life, introduce broad theological perspectives on the creation of life itself as explained by a traditional Mi'kmaq elder, Stephen Augustine. 8. View www.fourdirectionteachings.com together as a class to: a) Read "Mi'kmaq Creation

Story" (PDF) and b) Listen to Stephen's teaching, "The First Level of Creation," "The Second Level of Creation, "The Third Level of Creation," "The Fourth Level of Creation," "The Fifth Level of Creation," "The Sixth Level of Creation," and "The Seventh Level of Creation."

9. In groups review the seven levels of creation as told by Stephen Augustine. Discuss the process by which energy is transferred to Glooscap, charging him with life. How do the bolts of lightning compare to photosynthesis? How does the wind generated by Whirlwind relate to the concept of cellular respiration?

10. In groups relate the reaction of elements in cellular respiration as understood by scientists to the moment of creation when lightning struck Glooscap. Identify the chemical processes by which energy was transferred in this story. How does this coming to life relate to cellular respiration?

11. Wrap up with a reading of the Student Summary above and a selection of discussion topics and/or optional exercises below.

Discussion Topics:

- Explain the relevance of the Mi'kmaq creation story to the Mi'kmaq people in terms of understanding our ecosystem. How is their understanding of our ecosystem impacted by the knowledge gained from this story? To what extent is the relationship between Glooscap and the sea, sweet grass, and the wind a symbiotic one (mutually advantageous)?
- Understanding global interdependence begins with an understanding of global dependence. Discuss the modification of Earth's surface to meet human needs and how when successful, the relationship between people and the physical environment is adaptive whereas when the modifications are excessive the relationship is maladaptive.
- Identify the themes in the Mi'kmaq Creation Story.
- How is this traditional teaching in fact relevant and not incompatible with scientific perspectives of energy and energy transference?

Optional Exercises:

- Research creation stories from other cultures and religions. Present findings through visuals such as photographs, drawings, maps and diagrams. Identify those elements similar between

	the stories. What conclusions do you have about man's understanding of creation? • Research the meaning of the terms in the vocabulary • Reflect in a journal how everyone is like Glooscap. Identify the commonalities in terms of relationships, needs and wants. Compare these to our responsibilities. How do you reconcile your responsibilities with your needs and wants? • Present the circle of life theme from the Mi'kmaq Creation Story non-verbally. Incorporate movement, song, dance, artistry, sculpture, video, photography, etc. to convey the creation of life and the interconnectivity of all living beings.
Vocabulary	• Organism • Evolution • Cellular • Respiration • Photosynthesis
Materials Required	• Cardboard • Aluminum foil • Paperclips
Evaluation	1. Give an oral presentation 2. Take a written short-answer form of test

Diagram for MI'KMAQ Curriculum