

STEM Lesson Plan

Lesson Title: How did we even survive in the Arctic
Lesson # 3
Date: Nov 11th, 2020
Name: Liam Edey
Subject: Biology
Grade(s): 7

Rationale:

The reason why living things are the way they are today is often completely overlooked as well as the past of the Inuit people in Northern Canada. The Inuit people's survival was intertwined with adapting to their harsh environment and because of their ingenuity they survived to this day. These are things students should know about and understand because of the life lesson of adapting in life, the topic is part of Canada's Indigenous People's history, and provides a deeper look into why things are the way they are in present day. One of this lessons goals is to explain to students that our influence over the environment is powerful but nature itself can change without our influence and even force us to change with it. This leads to adaptation and thus natural selection.

Core Competencies:

Communication	Thinking	Personal & Social
<ul style="list-style-type: none"> Fostering communication through small group discussions and full class discussions Opening the class up multiple times for conversation creates multiple opportunities are available for new flow of information and support 	<ul style="list-style-type: none"> Promoting the use of critical thinking skills by working in groups to come up with ideas cooperatively Premade questions give students a direction of thought Using and strengthening interpreting skills and observing how others can have much different interpretations Promoting self-reflection to critically assess validity of student's own answers 	<ul style="list-style-type: none"> Students will always be working together in groups and working in or sharing roles, stimulating social skills and interaction Students must coordinate themselves and delegate roles, take turns, and respect group members

Big Ideas (Understand)

Evolution by natural selection provides an explanation for the diversity and survival of living things.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
<ul style="list-style-type: none"> Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information Use scientific understandings to identify relationships and draw conclusions Transfer and apply learning to new situations Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate Express and reflect on a variety of experiences and perspectives of place 	<ul style="list-style-type: none"> Organisms have evolved over time Survival needs Natural selection

Instructional Objectives & Assessment

Instructional Objectives	Assessment
<p>SWBAT:</p> <ul style="list-style-type: none"> • Understand and answer questions regarding natural selection and if living things do not adapt to their environment then they will not survive • Apply the idea of bodily adaptation of animals to mental adaptation of the Inuit peoples in the same climate • Work together positively in groups and take turns with, or assign, the role of answer sharing/writing to the class • Critically think about how to survive in a harsh climate (whether thinking about animal or human) and think of solutions to the problems presented by said climate 	<p>Formal:</p> <ul style="list-style-type: none"> • Marking of worksheet 1 and worksheet 2. Worksheet 1 contains the answers groups came up with before group discussion and teacher answers and Worksheet 2 contains additions/comments to the validity of their first set of answers. This is to assess how/if students learned over the course of the lesson and see if students demonstrated critical thinking of their own answers and self-reflection/assessment <p>Informal:</p> <ul style="list-style-type: none"> • Walking around during group working gauging how well, respectful and inclusive students are when working together • Visiting each group during group working to gauge if students are understanding the material (steering students in the right direction if needed)

Prerequisite Concepts and Skills:

None

Indigenous Connections/ First Peoples Principles of Learning:

Use of the First Peoples Principle of Learning “*Learning involves patience and time*” through thorough explanation to the students of how natural selection happens over the course of numerous years, and how the Inuit peoples underwent trial and error for a long time but because of their perseverance they were able to learn from and improve upon their mistakes to survive in a place where a vast majority of the world could not.

Partial use of the First Peoples Principle of Learning “*Learning is embedded in memory, history, and story*” through explanation to the students of the lesson imbedded in natural selection and the adaptability of the Inuit peoples to live in such a harsh environment. That lesson being that the best way to survive in life is to adapt to our surrounding and learn from it in order to become smarter and better people.

Use of the Encyclopedia of American Indian Contributions to the World by Keoke and Porterfield (2001) to find examples of, and the history behind, many of the inventions created by the Inuit peoples.

<https://mexikaresistance.files.wordpress.com/2013/09/american-indian-contributions-to-the-world.pdf>

Examples of inventions found in the book to include in the lesson:

Traversal of land

- Dogsleds
- Snowshoes
- Snow-goggles

Hunting

- Seal calls
- Laminated bows
- Bow drill/ice fishing

Home

- Earth lodges
- Igloos

(Each of these examples should not simply be listed when performing the lesson but explained how and why they were made, and how they improved survival)

I believe I infused an indigenous worldview/perspective into my lesson plan by elaborating on and stating two of the First Peoples Principle of Learning (as mentioned above), and teaching about the struggles the Inuit tribes of Canada faced and fought through to survive. I had no difficulties making an FNMI infused lesson plan other than the fact I had no prior knowledge of the Inuit peoples. This was mainly due to the perfect resource for my chosen science Big Idea being provided on the rubric page for this assignment. The book and the concept of natural selection went hand in hand because most of the book was a list of inventions that FMNI peoples had adapted to their environment, thus they continued to survive in a similar way to how animals had to change thinking and body to survive. It would have been easier if I had prior education on Inuit tribes, but the curriculum taught to me growing up never touched on the subject. If I had chosen a different Big Idea I am sure this assignment would have much more difficult. I do wonder why in the past I was not taught more about FMNI related lessons (especially in science and history) as they are, from what I have read, perfect examples of human perseverance and simple scientific ingenuity.

Universal Design for Learning (UDL):

Having students come up to the board to write answers supports tactile learners and gets students moving in the classroom

Electing a representative allows students who are not comfortable or do not want to answer in front of everyone an option

Pairing higher level students with less proficient students will provide the more advanced students more of a challenge and a learning experience (high ceiling) while the less proficient students receive more support and less responsibility (low floor)

Pairing students with different groups than previous lessons allows further exploration into meeting new people and identifying who they work better with

Having a virtual version of the premade worksheets and powerpoint so students who only use, or prefer to keep everything online have that option

Writing answers on the board will support visual learners and allow students to better follow and keep track of what was said

Having a projected powerpoint with pictures/videos supports visual learners

Differentiate Instruction (DI):

This Lesson plan is almost completely group oriented which can be very anxiety inducing for some students or simply struggle when working with others. The lesson is designed in a way that if a student asked to work alone then that would be completely fine.

If students were not able to make it to school (sick, fear of Covid19, injury, etc.) all the resources can be provided so said students will still be able to complete the lesson.

Materials and Resources

Projector

Whiteboard and markers (or chalkboard and chalk)

Prepared worksheet handouts (**Worksheet 1 and 2** as previously mentioned)

Prepared Powerpoint of what it is like in the Arctic circle portion of Canada, description of what animals live there, information about the Inuit peoples that lived there, Inventions of the Inuit peoples and how they helped the Inuit tribes survive, and a description of a few examples highly adapted animals around the world,

Online links to lecture and worksheets

Lesson Activities:

Teacher activities	Student Activities	Time
<p>Introduction Teachers will:</p> <ul style="list-style-type: none"> • Open up the classroom for discussion and ask students a series of questions, writing down answers on the board. A powerpoint will be projected on the wall sharing teacher answers and providing examples and elaborations. <ul style="list-style-type: none"> - what are the harshest environments in the world to live in? (tundra, desert, high in mountains) - how did animals we know of get there? (The teacher could answer this question with “The truth is many of those animals were there for hundreds of years but just weren’t what we see them as today”) - does anyone know why animals change (The teacher could answer with “they had to adapt to a changing environment to become more efficient”) • After addressing student answers and sharing actual answers, show pictures of animals (such as giraffes) who occupy a specific niche because of their extreme adaptation and pictures of animals hundreds (or thousands) of years ago compared to the same animals in present day • Explain to students that these animals changed over time because of natural selection • Explain natural selection and show helpful images and/or videos • Explain that the previous lessons taught us about how much of an influence humans have over the environment but nature itself can change without our influence and even force us to change with it. This leads to adaptation and thus natural selection 	<p>Students will:</p> <ul style="list-style-type: none"> • Participate in teacher led discussion by sharing answer orally • Watch and listen to teacher led powerpoint lecture slides about natural selection and adaptation 	<p>20 min</p>
<p>Body: (Teacher will project questions at hand on board and show applicable images during group work time)</p> <p>Part 1</p> <ul style="list-style-type: none"> • Organize students into predetermined groups of 2 or 3 and hand out prepared question worksheet 1. First page should contain questions such as: <i>What are some adaptations that you think would be needed for animals to survive there?</i> <i>What are some animals that you know of that wouldn’t survive there and why?</i> <i>What are some animals that you know live in this climate and why do you think they are so good at living there?</i> <i>Do any people live there? Do you think they have lived there for long?</i> • Explain how today we will be specifically looking at the portions of Canada in the arctic circle (Provide reference to the conditions of that area such as temperature year-round, winds, ice, snow, kinds and prevalence of flora and fauna, etc.) • Allow for groups to work together and try to answer worksheet questions 	<ul style="list-style-type: none"> • Get themselves situated with their group members and gather together somewhere in the classroom • Work in a group to answer the posed 	

<ul style="list-style-type: none"> • Visit groups periodically to check their understanding and group cohesion (steering them in the right direction if needed) • Ask for 1 volunteer from each group to write their answers up on the board or put a check next to an answer from a different group had as well. • Address each of the answers and explain to the class the validity of answers. • Present some teacher answers with corresponding images to the class • When addressing the last question tell the students that people in fact do still live there and the first people to inhabit this area were the Inuit tribes, and that they had to adapt to survive, just like the animals there. 	<p>questions and fill in their worksheets</p> <ul style="list-style-type: none"> • Elect a representative to write group answers on the whiteboard 	
<p>Part 2</p> <ul style="list-style-type: none"> • Present a very brief history about the Inuit peoples (make sure to include how long they have lived there for) • Explain that just like the animals they had to adapt as best they could, but they overcame issues by thinking smarter rather than growing thicker hair and changing it to white. • Instruct students to flip worksheet 1 over and try to answer the second set of questions. Second half of the worksheet should have questions such as: <i>Try and think of ways that the Inuit peoples could have solved the following problems and why that solution works. Try to keep in mind that they couldn't make elaborate metal tools:</i> <i>How to stay warm?</i> <i>If their main source of food was fish but there is a thick layer of ice then how do you get fish?</i> <i>How to traverse a massive amount of snow?</i> • Allow for groups to work together and try to answer worksheet questions • Visit groups periodically to check their understanding and group cohesion (steering them in the right direction if needed) • Ask for 1 volunteer from each group to write their answers up on the board or put a check next to an answer from a different group had as well. • Address each of the answers and explain to the class the validity of answers. • Present some teacher answers with corresponding images to the class about things they did actually do and why those inventions were so effective • Be positive about the diverse set of answers students have come up with and try to relate their answers to the teachers as much as possible. 	<ul style="list-style-type: none"> • Watch and listen to powerpoint of teacher's answers <ul style="list-style-type: none"> • Watch and listen to powerpoint about the Inuit peoples of northern Canada <ul style="list-style-type: none"> • Work in a group to answer the posed questions and fill in their worksheets • Elect the same or different representative to write group answers on the whiteboard • Watch and listen to powerpoint of the teacher answers 	50 min
<p>Closure:</p> <ul style="list-style-type: none"> • Hand out worksheet 2 which contains the same questions as worksheet 1 but prompts students to comment on their answers validity and make improvements to answers if applicable 		

<ul style="list-style-type: none"> • Stress that no one would have been able to live there unless they figured out how to survive and adapt to their environment like the Inuit tribes did • Stress that life is possible anywhere as long as the living things have been given enough time to adapt their bodies and/or minds • Explain how some of these tribes were so clever in their designs of things like igloos that the Europeans, who were considered a much more advanced people at the time, did not believe they could have figured it out without the help of an advanced civilization such as themselves. • Allow students to work on worksheet 2 and offer assistance • Open up the class to discuss any questions or comments students may have about the lesson • Have each student hand in their worksheets 	<ul style="list-style-type: none"> • Work on worksheet 2 by critically thinking about what was taught in the lesson in order to improve on ideas and provide self-assessment comments on the validity of their previous answers • Participate in group discussion about any questions or comments students may have about the lesson • Hand in worksheets 	20 min
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Organizational Strategies:

Representatives to reduce amount of time and chaos
 Predetermine groups to save time with deciding groups
 Premade worksheets instead of notes will help students organize answers and save time
 Teacher checking for problems with group dynamics to stop problems from happening and making sure groups are working well and being inclusive

Proactive, Positive Classroom Learning Environment Strategies:

Electing representatives for each group will reduce amount of time needed for writing answers on board by having less people coming up to the board all at once. This also reduces amount of chaos present (more orderly and structured).
 Premade worksheets instead of notebook copying to save time and keep things clear for students
 Groups are premade in a way that groups higher level students with less proficient students to assist the less proficient students and give the more advanced students more of a challenge.

Extensions:

An extension modelled towards the Inuit Peoples portion of the lesson:
 Students will be provided the pdf of The Encyclopedia of American Indian Contributions to the World by Keoke and Porterfield (2001) to students so they can look more into the history of the Inuit peoples (or other indigenous peoples), their survival in different climates, and what other inventions not talked about in the lesson were used. (This can be an optional or non-optional activity).
 If this extension is non-optional then students will be tasked with answering questions such as “what are 3 more things invented by the Inuit tribes that you believe to have improved their survival and why/how do you think your 3 choices were so great?” and “what are 3 things invented by the Inuit peoples that did not involve hunting or travelling and what impact do you think the inventions had on their lives?” (an example answer is jackstraws (pick-up-sticks game) improving mental wellbeing and providing a way to have fun and stay positive).

An extension modelled towards the natural selection of animals in a given climate:
 Giving students a different climate (such as grasslands or arid desert) in which to do the same activity as the lesson at home. Students can then give these worksheets if they so choose and have the teacher comment on (or even mark) their answers.
 Worksheets can be provided physically or virtually.

Reflections (if necessary, continue on separate sheet):