

Churchill Learning Center
La Ronge, Saskatchewan

Biology 20 - Lentic and Lotic Ecosystems

A Thematic Unit Plan

for the

Askiy Nih (On The Land) Project
a Northern Lights School Division #113 pilot project

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Unit Overview - Askiy - Nih Thematic Unit Plan - prepared by Gordon Lobe

Project Title: Northern Saskatchewan Freshwater Ecosystems – Fish populations
 Theme / Unit title: Biology 20 -Lentic / Lotic Ecosystem Fish Populations
 Teacher: Gail Gardiner email: skweew@hotmail.com

School: Churchill Composite High School - La Ronge Learning Center

Foundational Objectives:

- 1) Biology 20 Unit 1- Nature of Biology
- 2) Biology 20 Unit 2- Ecological Organization
- 3) Biology 20 Unit 3 – Diversity of Life
- 4) Aboriginal Language K-12
- 5) ELA - Writing
- 6) ELA – Listening

- 7) Social Studies 7- Unit 1- Location
- 8) ELA – Speaking
- 9) Wildlife Management 10, 20, 30
- 10) Forestry 20, 30
- 11) Food Studies 10, 30
- 12) Native Studies 10, 30

Common Essential Learnings
 COM = Communication
 NUM = Numeracy
 CCT = Critical and Creative Thinking
 TL = Technological Literacy
 PSVS = Personal and Social Values and Skills
 IL = Independent Learning

Learning Objective	Instructional Activity	Methodology	Aboriginal Language/Values	Elder's Role	Resource Material	Resource people	Assessment / Evaluation	Time allotment
SWBAT - identify main water uses in Northern Saskatchewan - focus on different local practices for fishing. - write about their thoughts and views on fishing. - grasp the different uses of water systems. (COM, PSVS) F.O. # 1, 2, 4, 5, 6, 10	1) Freshwater uses - Teacher led brainstorming and discussion – 'Water uses in Northern Saskatchewan' Elder storytelling Written assignment – snaring and Commercial fishing in Northern Saskatchewan 2) What's around Us - Introduction to maps Written assignment – 'Scale, elevation, signs & symbols'	Interactive Direct Independent study	Relevant fishing, water ecology and Geographical terms in the Aboriginal Language	Storytelling Pronunciation of Aboriginal Language words	Books, posters, video (see resource list)	Elder Commercial fisherman Traditional fisherman	Anecdotal notes Brainstorm assignment Written assignment	2 class periods (120 minutes)
SWBAT: - identify specific water systems surrounding community. - distinguish in geographical terms the surrounding water systems(English, Aboriginal Language). - list all surrounding local water systems. - work co-operatively in groups. - identify information that is available on maps. (COM, IL) F.O. # 1, 2, 4, 5, 7, 10	3) Ecosystem components Note taking – Biotic & Abiotic organisms. Discovery & observation of Biotic & Abiotic organisms in pictures Written assignment – biotic & Abiotic components found in the pictures.	Interactive Direct Independent study	Relevant Aboriginal Language terms for plants, animals water air, rocks etc.	Pronunciation of Aboriginal Language words	Maps, handouts, posters & Dictionary (see Resource list)	Conservation officer	Positive student feedback Teacher graded written assignment	1 class period (60minutes)
SWBAT: - identify abiotic and biotic components of a given ecosystem. - list components of a given ecosystem. (COM) F.O. # 2, 4, 5, 9, 10						Conservation Officer Elders Community resource people	Recall questions Written assignment	1 class period (60 minutes)

Learning Objective	Instructional Activity	Methodology	Aboriginal Language/Values	Elder's Role	Resource Material	Resource people	Assessment / Evaluation	Time allotment
<p>SWBAT:</p> <ul style="list-style-type: none"> - understand their local freshwater ecosystem. - differentiate between lentic (still) and lotic (flowing) waters. - identify biotic and abiotic organisms in lentic and lotic waters. - practice Aboriginal Language pronunciation of freshwater ecosystem terms. (COM, IL) <p>F.O. # 2, 4, 6, 8, 9</p>	<p>4) Our Ecosystem - Teacher led discussion to review terms</p> <p>Introduction of new terms 'lentic & lotic)</p> <p>Student practice using Aboriginal Language words for the terms learned so far</p>	<p>Interactive</p> <p>Direct</p> <p>Independent study</p>	<p>Reinforce Aboriginal Language words for English terms learned so far</p>	<p>Pronunciation of Aboriginal Language words</p>	<p>Maps, handouts, posters, books (see Resource list)</p>	<p>Teacher</p>	<p>Student response</p> <p>Written assignment</p>	<p>1 class period (60 minutes)</p>
<p>SWBAT:</p> <ul style="list-style-type: none"> - understand how fish are placed in a classification system. - use key to identify fish species. - identify fish by local name and scientific name. - use Aboriginal Language to pronounce names of fish - discover certain characteristics of fish. (COM, IL) <p>F.O. # 3, 4, 8, 9</p>	<p>5) Classification of Fish</p> <p>Note taking - classification systems</p> <p>Concept formation - seeking information</p> <p>Teacher led reflective discussion</p>	<p>Interactive</p> <p>Direct</p> <p>Independent study</p>	<p>Aboriginal Language words for fish names and body parts</p>	<p>Pronunciation of Aboriginal Language words</p>	<p>Maps, posters, dictionary, field books (see Resource list)</p>	<p>Teacher</p> <p>Elder</p>	<p>Recall questions</p> <p>Teacher-graded independent study sheet</p>	<p>1 class period (60 minutes)</p>
<p>SWBAT:</p> <ul style="list-style-type: none"> - use terminology relevant to commercial fishing - to use proper skills in fish collection. - identify fish species collected. - identify body parts during fish dissection. - prepare fish for food consumption. (IL) <p>F.O. # 2, 4, 8, 9, 11</p>	<p>6) Commercial Fishing - Teacher led discussion about fishing equipment, terminology & fishing methods</p> <p>Demonstration - winter fishing at a fish camp</p> <p>Dissecting fish in the lab</p> <p>Filleting and skinning the fish</p>	<p>Direct</p> <p>Experiential</p> <p>Independent</p>	<p>Fishing equipment terminology</p>		<p>Posters, dictionary, field guides, text books</p>	<p>Community resource person</p> <p>Elder</p> <p>Commercial fisherman</p>	<p>Participation rubric</p> <p>Teacher-graded lab sheets</p>	<p>2 weeks</p>
<p>SWBAT:</p> <ul style="list-style-type: none"> - Identify the early spring for the Longnose sucker. - Recognize likely spawning areas. - Differentiate between local aboriginal fish collection and Saskatchewan Government regulated practices. (COM, CCT, PSVS, IL) <p>F.O. 2, 4, 5, 6, 9, 11, 12</p>	<p>7) Early Spring Fishing - Day 1 - Focus</p> <p>Students reflect on traditional fishing practices locally, Gov't Fishing Regulations & Treaty / Métis Rights</p> <p>Day 1 - Focus</p> <p>Collecting the fish</p> <p>Field trip to spawning grounds to collect fish for smoking</p> <p>Day 3 - Smoking the fish</p> <p>Elder demonstrates / explains how to smoke fish</p> <p>Day 4 Luncheon/Supper</p>	<p>Direct,</p> <p>Interactive,</p> <p>Experiential</p>	<p>Learning and using Aboriginal Language terms used in Fish and Food Preparation.</p>	<p>Elder is involved in preparing the fish, setting up the smokehouse and preparing the meal.</p>	<p>Cree Dictionary</p> <p>Resource material from Local Authorities describing fish species</p>	<p>Elder/resource person (Abraham Gardiner) to describe and demonstrate how to clean, prepare & smoke fish.</p>	<p>Students assigned to write a description of the traditional collection process, and comment on the reason for regulations that limit traditional practices.</p> <p>Students assigned to research and describe the longnose sucker as compared to other varieties of sucker found in northern waters.</p>	<p>4 days</p>

Introduction

Freshwater systems (lakes, wetlands, rivers and streams) have been critical to the establishment of civilizations throughout human history. From ancient times, civilizations have been established based on their proximity to water (Lingis 2001). In Northern Saskatchewan a large portion of the landscape is covered by fresh water, here water and the creatures living in it have historically been an important part of life.

In this thematic unit, it is our intention to teach about 'Ecological Organization' and the 'Diversity of Life' from the scientific perspective by exploring the Aboriginal connection to the aquatic resources of the local northern area. This unit of study is planned for the Biology 20 class at the Churchill Learning Centre in Lac La Ronge, but it could be adapted for any class from K-12. Some of the practical methods of fish collection noted in this thematic unit may vary from community to community in Northern Saskatchewan as will the terminology, especially when the Aboriginal Language is used.

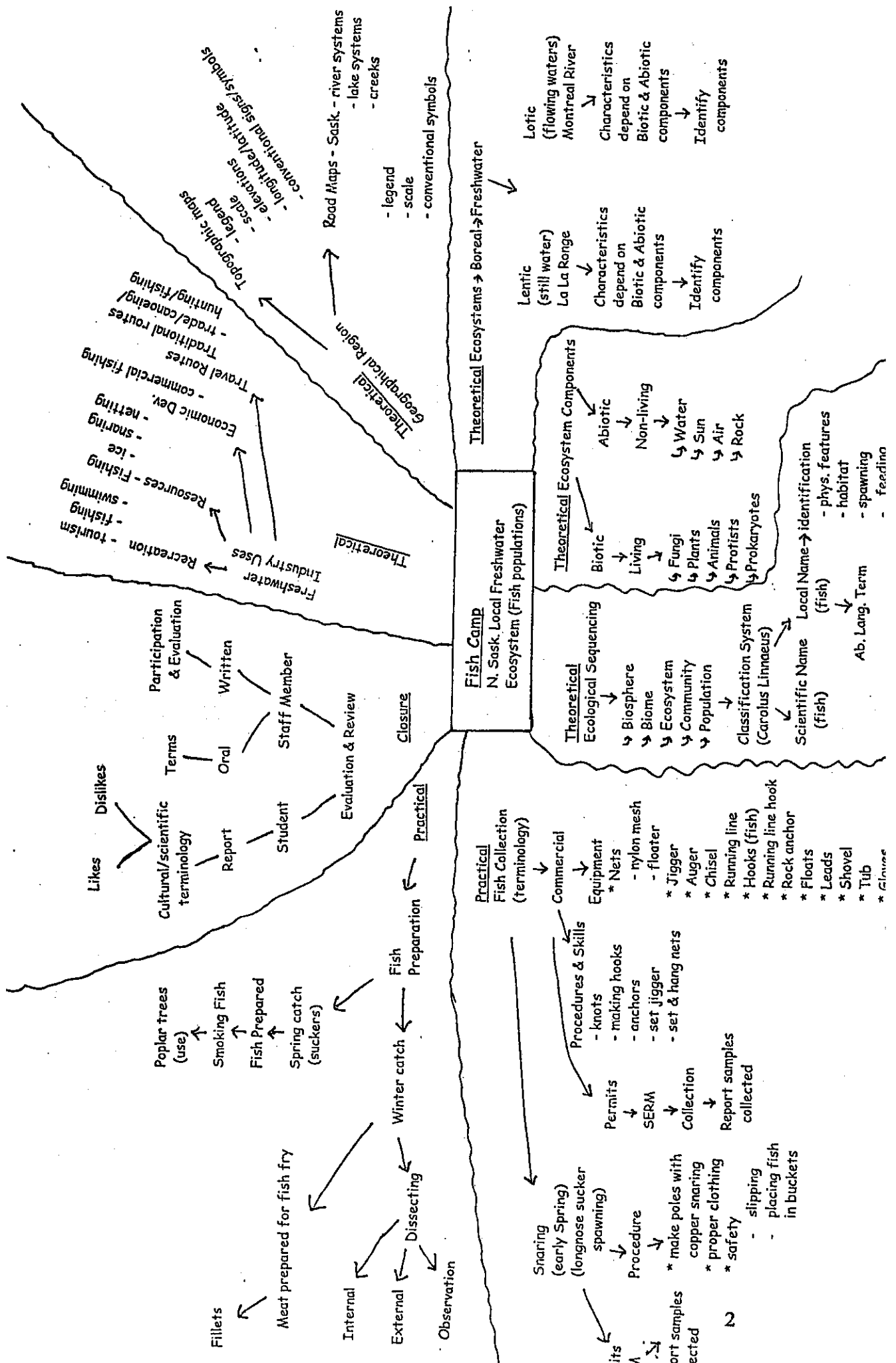
Scientific Perspective

A study of fish allows students to gain knowledge in many ecological principles. With local fish as a focus, students in this unit can explore the following terms and concepts:

- Lentic ecosystems - Lentic (still water) communities can vary greatly in appearance, anything from a small temporary puddle to a large lake is capable of supporting life to some extent. The type of life which is supported will depend greatly on the *biotic* and *abiotic* components of the freshwater ecosystem.
- Lotic ecosystems – Running water freshwater communities are also known as lotic communities, lotic meaning running water. Lotic communities are formed by water being introduced to the freshwater body from rainfall, ground surface water or underground water.
- Abiotic factors – Essentially non-living components that effect the living organisms of the freshwater community
- Biotic factors - Having to do with living things. Something that is caused by, or produced by living things. Having to do with the biological aspects of an environment (as opposed to geological, etc. aspects).
- Classification (taxonomy) - The theories and techniques of naming, describing, and classifying organisms. The taxonomic hierarchy is, from top to bottom: kingdom, phylum (for animals) or division (for plants and fungi), class, order, family, genus, species

Aboriginal Perspective

For most aboriginal people, fish were an important food resource - a resource that aboriginal people successfully used and managed. Aboriginal people developed a variety of methods to harvest the fish species available to them. This harvest demonstrated a knowledge of many of the above scientific concepts.



Activity #1

Lesson Author: Gail Gardiner

Activity Name: Freshwater Uses

Time Duration:

- 2 class periods (120 minutes)

Learning Objectives: SWBAT

- Identify main water uses in Northern Saskatchewan.
- Focus on different local practices for fishing.
- Write about their thoughts and views on fishing.
- Understand the different uses of water systems.

Common Essential Learnings:

- COM, PSVS

Classroom Set-up:

- Before lesson have classroom set-up with materials that are focused on fishing and water ecosystems. Posters that include such things as fish, water, tributaries and lakes. Topographical and road maps can be displayed on bulletin boards.

Activity:

- Focus, Brainstorm Have students focus on the displays in the classroom. This focus can take a few brief moments. Once students have been allowed enough time teacher should direct them in brainstorm activity. Teacher can remain at board and write focus questions for brainstorm. "What is water used for in Northern Saskatchewan?" Students can begin to generate answers as teacher writes these on the board. Teacher can set limit for activity. (Possibly 5 minutes)
- Categorize – Teacher directed categories will be written on board, have student take out a piece of loose-leaf paper and begin to categorize. Students may overlap brainstorming topics, this is acceptable. Students should be advised to attach this list later to upcoming written assignment that is due the following day. *Categories that may be used are recreation, resources, economic development, and travel routes.* Teacher can set limit for activity. (Possibly 5 minutes)
- Discussion Teacher directed discussion can now begin. Ask students to focus on the water systems that surround the local community. Teacher directed question, "Throughout the year our local water systems are used in many different ways. We use them for food, travel and recreational uses. Tomorrow morning on MBC radio a warning is stated that a water borne virus has infected the waters. It is advised that people should not use the water it could

potentially harm people, animals and an environment. "What effects would it have on your local community?" Teacher can set limit for discussion, it should not exceed 20 minutes as time will be needed for next two activities

- Storytelling – Students are to be advised beforehand of elder's presence. Elder may be present during class period or brought in when storytelling is to begin. Remind students that respect and listening skills are to be applied when elder is present. Elder can be given topic of storytelling beforehand, so that he/she can prepare what they are telling. Suitable topics are: traditional fishing methods such as snaring, and netting; commercial fishing, using water systems routes for daily subsistence activities, living on the water systems. The focus of the story telling would be to allow students to grasp the different uses of water systems.
- Written Assignment- This assignment can be given as homework if storytelling has taken up the rest of the period. The topic for the written assignment is knowledge of snaring and commercial fishing. Students may have no experience but may have some terminology based on class discussions and elder's information. Requirements of assignment are for student to write a paragraph for each topic on snaring and commercial fishing. Evaluation should be based on understanding of information presented and previous knowledge student has acquired.

Methodology:

- Interactive, direct and independent study.

Aboriginal Language Activities:

- Teacher may acquire materials from the Aboriginal Language Programmer to introduce relevant Aboriginal Language terms for fishing terms and northern water ecology and geographical terms.

Elders Role:

- Storytelling about fishing in Northern Saskatchewan and the Aboriginal Language pronunciation for relevant terms. Elder may or may not be present at beginning of lesson, advise elder of possible Aboriginal Language terms that could be reinforced during storytelling.

Resource Material:

- Road Maps of Northern Saskatchewan
- Topographical maps of selected local area (S.E.R.M.)
- Video
- Flora and Fauna posters
- Fish Posters. (N.L.S.D)

Resource People:

- Elder – Mary Cook
- Local Commercial Fisherman (Alex McKenzie, Otto Fietz)
- Local Traditional Fisherman (snaring, netting)

Assessment/Evaluation:

- Direct teacher comments.
- Students hand in categorized brainstorm.
(4 categories (2 marks each) = 8 total)
- Written assignment submitted by student. Must have a full paragraph for each topic.
(2 paragraphs (3.5 marks each) = 7)
- Total Marks this assignment is 15

Activity # 2**Lesson Author:** Gail Gardiner**Activity Name:** What's Around Us?**Time Duration:**

- 1 class period (60 minutes)

Learning Objectives: SWBAT

- Identify specific water systems surrounding community.
- Geographical terms in English and the Aboriginal Language used to describe the surrounding water systems.
- List all surrounding local water systems.
- Work co-operatively in groups.
- Identify information that is available on maps.

Common Essential Learnings:

- COM, IL

Classroom Set-up

- Topographical maps, road maps and atlases should be made readily available. Previous classroom setup should stay intact for entire unit and other materials may be added as unit progresses.

Activity:

- Observation -- maps and atlases for each student are made available. Students, each with a partner will be directed to look for legend, scale, elevations, conventional signs and symbols and names of water systems on the maps.
- Note-taking -- Teacher will write definitions and examples on board for the following terms. (legend, scale, elevations, conventional signs and symbols, geographical terms for certain water systems) Students can copy them into their binders under selected subject heading.
- Written Assignment -- Students each with a partner are assigned to complete the handout (see attached "Mapping Skills Worksheet")

Methodology:

- Interactive, Direct and Independent study.

Aboriginal Language Activities:

- Teacher may acquire materials from the Aboriginal Language Programmer to introduce relevant Aboriginal Language terms for fishing, water systems and geographical terms.

Resource Material:

- Road Maps of Northern Saskatchewan

- Topographical maps of selected local area (S.E.R.M.)
- Handout – teacher made
- Fish Posters (N.L.S.D) Flashcards on Northern Fish
- Dictionary of Geological Terms – 3rd Edition

Resource People:

- Conservation officers or any person knowledgeable of topographical maps can be used to generate more knowledge of topographic maps.

Assessment/Evaluation:

- Positive feedback during cooperative group activity.
Students along with partner must hand in written assignment sheet.
(1 mark can be given according to the total number of answers being sought out by teacher directed questions)

Mapping Skills Worksheet:

Mapping Skills

Name: _____

What is the elevation for Lac La Ronge?

What is the scale of the map?

Name 10 conventional signs and symbols that are on the map?

List the lakes that surround Lac La Ronge.

Activity # 3**Lesson Author:** Gail Gardiner**Activity Name:** Ecosystem Components**Time Duration:**

- 1 class period (60 minutes)

Learning Objectives: SWBAT

- Identify abiotic and biotic components of a given ecosystem.
- List components of a given ecosystem.

Common Essential Learnings:

- COM

Classroom Set-up

- Topographical maps, road maps and atlases should be made readily available. Previous classroom setup should stay intact for entire unit and other materials may be added as unit progresses.

Activity

- Note-taking – Students should write down notes for the terms: Biotic and Abiotic. The teacher can direct students to specific examples for classification.

Biotic (Living)	Abiotic (Non-living)
Fungi	Water
Plants	Air
Animals	Sun/Heat
Protists	Rock/Minerals
Prokaryotes	

After students have finished taking notes, the teacher will hand out scenic pictures from nature magazines. When selecting pictures teacher should look for biotic and abiotic components that provide examples for student discovery and observation.

- Written Assignment - Have students observe pictures. When they are done they can list components that were present. Students are to use specific classifications as presented in the table above. They may not know proper names but students can use previous knowledge as to address the components.

Methodology:

- Interactive, Direct and Independent study.

Aboriginal Language Activities:

- Teacher may acquire materials from the Aboriginal Language Programmer to introduce relevant Aboriginal Language terms for plants, animals, water, air, rocks, etc.

Resource Material:

- Road Maps of Northern Saskatchewan
- Topographical maps of selected local area (S.E.R.M.)
- Handout – teacher made
- Fish Posters (N.L.S.D)
- Cree Dictionary – Cree Vocabulary Resource Booklet “Th” Dialect (N.L.S.D)
- Scenic pictures from nature magazines.
- Biology – 4th edition
- Ecology and Field Biology – 5th edition

Resource People:

- Conservation Officers, Elders and local community members can be used for identification of biotic and abiotic components. This may be necessary to enhance lesson.

Assessment/Evaluation:

- Recall concepts through teacher directed questions and immediate teacher feedback.
- Students will hand in written assignment attached to picture. Student must identify 5 each of abiotic and biotic components
 - (2 concepts * 5 examples each = 10 marks)

Biotic and Abiotic Environment

Use the pictures and identify the living and non-living components in the selected environment. Place them into the table below under the proper heading.

Biotic (Living)	Abiotic (Non-living)

Activity # 4**Lesson Author:** Gail Gardiner**Activity Name:** Our Ecosystem**Time Duration:**

- 1 class period (60 minutes)

Learning Objectives: SWBAT

- Understand their local freshwater ecosystem.
- Differentiate between lentic (still) and lotic (flowing) waters.
- Identify biotic and abiotic organisms in lentic and lotic waters.
- Practice the Aboriginal Language pronunciation of freshwater ecosystem terms.

Common Essential Learnings:

- COM, IL

Classroom Set-up:

- Previous classroom setup should stay intact for entire unit. Other materials that may be added for this lesson are numerous posters on surrounding rocks and sand near water ecosystems, the sun, and air.

Activity:

Discussion – Teacher may use previous knowledge for further elaboration to introduce new concepts. Previous knowledge may include broad terms such as lakes, rivers, creeks, living components, non-living components, etc. Teacher can acquire this knowledge through directed questions.

- What are some geographical terms for water systems?
- What are the living and non-living components that surround a freshwater ecosystem?
- The movement of water will contribute to the type of ecosystem it is. What two types of waters are present in our local areas?

After questions take information and begin to give specific classifications for standing and flowing waters; living and non-living components.

Transfer discussion to note-taking.

Note-taking – Students will be allowed time to take notes off board.

Terms teacher can write on board are as follows: lotic, lentic (biotic and abiotic components in each ecosystem).

Written Assignment – Students will give 3 examples of each term that is written on board. This assignment is to be completed before end of class period.

Closure Activity – Teacher selects freshwater terms and student must pronounce them in the Aboriginal Language. If student does not feel confident teacher may help student with pronunciation.

Teacher may also want to review other scientific terms.

Methodology:

- Interactive, Direct and Independent study.

Aboriginal Language Activities:

- Reinforce previous Aboriginal Language terms for water systems and other geographical terms.

Resource Material:

- Road Maps of Northern Saskatchewan
- Topographical maps of selected local area (S.E.R.M.)
- Biotic and abiotic posters.
- Fish Posters (N.L.S.D) – Flashcards on Northern Fish
- Cree Dictionary – Cree Vocabulary Resource Booklet “Th” Dialect
- Ecology and Field Biology – 5th edition
- Biology – 4th edition

Resource People:

- Teacher

Assessment/Evaluation:

- Positive feedback during discussion.
- Written assignment will be handed in to teacher.
 - (2 concepts * 6 examples(1 mark each) = marks)

Lentic and Lotic Ecosystems

Fill in the blanks with abiotic and biotic components for each water ecosystem.

Lentic (still water)	Lotic (flowing water)
Abiotic Components List 3 for the ecosystem	Abiotic Components List 3 for the ecosystem
1	1
2	2
3	3
Biotic Components List 3 for the ecosystem	Biotic Components List 3 for the ecosystem
1	1
2	2
3	3

Activity # 5**Lesson Author:** Gail Gardiner**Activity Name:** Classification of Fish**Time Duration:**

- 1 class period (60 minutes)

Learning Objectives: SWBAT

- Understand how fish are placed in a classification system.
- Use key to identify fish species.
- Identify fish by local name and scientific name.
- Pronounce fish names according to Aboriginal Language terminology
- Discover certain characteristics of fish.

Common Essential Learnings:

- COM, IL

Classroom Set-up:

- Before lesson have classroom set-up with materials that are focused on fishing and water ecosystems. Posters could include such things as fish, water, tributaries and lakes. Topographical and road maps can be hung on bulletin boards. Teacher should collect and display pictures of local fish so that students may use for visual representation. If possible computer room may be used for research on specific fish.

Activity:

- Note-taking – Present *Carolus Linnaeus* classification system to students. Students may wonder what this classification has to do with fish. Tell students that classification systems allow for people to differentiate fish by their physical characteristics.
 - Concept Formation – Students will look over Fish species booklets (S.E.R.M), biology books, fish guides. They will attain information on fish characteristics, scientific name and local fish names.
 - Reflective Discussion/ Closure Teacher-lead reflective discussion.
 - Items to be discussed:
 - Scientific versus Local Fish Names
 - Fish body parts and characteristics. (Student's
 - Vocabulary - versus Book Vocabulary)
 - Independent Study – Fish Terminology
- For this activity, students use teacher presented material to search, read and learn the following term and concepts. This means that

you learn topics independently. Look through books from front to back. Look at introduction, table of contents, maps and appendices for this information. Write notes on the following topics using the template attached to the lesson. (see 'Fish Species, p.16)

Methodology:

- Interactive, Direct and Independent study.

Aboriginal Language Activities:

- Teacher may acquire materials from the Aboriginal Language Programmer to introduce relevant Aboriginal Language terms for fish and their body parts. Teacher may or may not know the language they may feel comfortable to teach the vocabulary, but this information may be taught by the Aboriginal Language Programmer or have an elder involved during this lesson to introduce the terms.

Elder's Role:

- An elder may be present to help with pronunciation of fish terms, if the Aboriginal Language Programmer is not available.

Resource Material:

- Road Maps of Northern Saskatchewan
- Topographical maps of selected local area (S.E.R.M.)
- Flora and Fauna posters
- Fish Posters (N.L.S.D) – Flashcards on Northern Fish
- Cree Dictionary – Cree Vocabulary Resource Booklet “Th” Dialect
- Fish Species of Saskatchewan (S.E.R.M.) - Booklet
- National Audubon Society - Field Guide to Fishes
- Thompson's Guide to Freshwater Fishes

Resource People:

- Elder may be involved for pronunciation of Fish Terms.

Assessment/Evaluation:

- Recall concepts through teacher directed questions and immediate teacher feedback.
- Take in independent study sheet, each topic area is worth 5 marks each for a total of 15 marks total.

Fish Species

List the common names and the scientific classification of the freshwater fish species are found in our local area?

-
-
-
-
-

List the common names and the scientific classification of the freshwater fish species that are found in Saskatchewan?

-
-
-
-
-

/5

Why are fish classified in this manner?

-
-
-
-
-

/5

Fish Characteristics and body parts

- What are the characteristics of freshwater fish ?

- _____
- _____
- _____
- _____
- _____
- Describe their Habitats
- _____
- _____
- _____
- _____
- _____

Draw a Fish and Label the Body Parts (internal and external)

15

Activity #6**Lesson Author: Gail Gardiner****Activity Name: Commercial Fishing (Winter Collection - Feb./March)****Time Duration:**

- 2 weeks

Learning Objectives: SWBAT

- Use proper terminology that will apply to commercial fishing.
- To use proper skills in fish collection.
- Identify fish species collected.
- Identify body parts during fish dissection.
- Prepare fish for food consumption.

Common Essential Learnings:

- (IL)

Classroom Set-up /Equipment/ Safety Precautions:

- Note: Educational fish collection permit will have to be obtained from S.E.R.M. Teacher can approach S.E.R.M office 3 weeks in advance.
- Classroom can be used to show fishing equipment used. A commercial fisherman can be contacted one or two weeks before hand contact commercial fisherman to prepare equipment for the class to see. Fisherman may not be comfortable in classroom setting and may be more comfortable at own private property for presentation.
- Teacher made poster with terminology can be posted on classroom bulletin board. Pictures may be added from magazines or hand drawn. Terminology that should appear on poster are: *Gil nets, jigger, auger, chisel, running line, floats, lead weights, anchor, tubs, gloves, running line hook, fish grappers, shovel.* (This terminology may change depending on fisherman's equipment. They may use different equipment or have different names for equipment. Teacher can talk to fisherman regarding method of net setting and go through method with students. Contact with fisherman a week - 2 weeks beforehand is more realistic. It prepares teacher, student and fisherman.)

Activity:

Week 1 - Day 1

- *Presentation, Discussion* – Discuss with students if they've had opportunities to use the equipment before, go over fishing equipment and terminology that is in the room. Discuss the uses for each piece of equipment. Some students may have been involved in commercial fishing before, ask them to describe their

fishing method and ask them to use the proper fishing equipment terminology as it applies to their fishing experience.

The teacher then presents method of fishing as previously described by local fisherman/resource. (Remind student that each fisherman may have their own techniques and what is being presented is the way of our resource people (Otto Fietz & Alex McKenzie). See the steps they will demonstrate below:

- A hole is cut into the ice where the net will be set.
- A jigger which is worked along the under side of the ice by pulling the running line.
- When the jigger has reached 100 yards the jigger is pulled out.
- The end of the running line should be attached to the net.
- Running line is then pulled and net set.
- According to recommendation net should be checked 24 hours later.
- When net is pulled the day after, some people are to be pulling the net and others can be removing the fish from net.

Day 2-5

- Demonstration – Students are taken out to local fisherman’s camp. Fish camp will take place for 3-4 days. Fish should be kept frozen until fish camp is over. Fish can then be prepared for cooking the week after fish camp. Depending on number of fish caught and types of fish, students and teacher may decide which will be used for dissecting and which will be used for consumption.

Week 2 - Day 1

- *Lab Work* – Fish Dissection, once fish have been dissected have students clean the insides properly. Students may take this fish home or they can be given back to local fisherman for their use. (Burbot fish were used in this lab)

Day 2 – Filleting and skinning – Post the “Directions for Filleting and Skinning” (see attached).

Students proceed to fillet the fish. The teacher precede this activity with a lecture on safety with sharp knives and provides close supervision during the activity.

Methodology:

- Direct, Experiential and Independent

Aboriginal Language Activities:

- Fishing Equipment terminology,

Resource Material:

- Fish Posters (N.L.S.D) – Flashcards on Northern Fish
- Cree Dictionary – Cree Vocabulary Resource Booklet “Th” Dialect
- Activity Guide for Inanimate Activity Package on Colors & Camping Equipment

- Fish Camp- All Fishing equipment that should be used net, jigger, auger, chisel, running line, catch hooks, rock anchors, floats, leads, shovel, tub, gloves
- Fish Dissection- Lab assignment, preserved fish, scalpel or razor blade, probe, disposable rubber gloves, cardboard boxes, newspaper, garbage bags.

Resource People:

- Elder/Fisherman familiar with Aboriginal Language terms
- Otto Fietz
- Alex McKenzie

Assessment/Evaluation:

- Participation for fish camp can be placed on rubrics.
 - Fish Lab/Dissection – Students will hand in lab sheets to be -marked for information being sought after. 10 marks

Directions for Filleting and Skinning

Place dressed fish on cutting board, with head to the right (left, if you are left-handed) and the back towards you. With a sharp knife, cut through skin and flesh behind the head to the backbone. Turn the knife to a flat position and cut with a sawing motion towards the tail, running the knife flat against the backbone. Turn the fish over and repeat the procedure to remove the other fillet.

To remove rib cage bones, lay fillet skin-side down with side containing bones to the left (right, if you are left-handed). Cut away ribs by exerting a slight upward pressure of the knife against underside of bones, taking care to remove as little flesh as possible.

Trim away the pelvic fin.

To remove skin, lay fillet in diagonal position holding tail end between thumb and forefinger of one hand. Cut down and under flesh, approximately 1 cm (1/2 in) from end of tail. Remove skin by cutting with a sawing motion, keeping blade flat while gripping the tail end of the skin securely.

Rinse skinned fillets, drain and pat dry with paper towels

Activity #7**Lesson Author:** Gail Gardiner**Activity Name:** Early Spring Fishing for Longnose Sucker**Time Duration:**

- 4 days

Learning Objectives: SWBAT:

- Identify the early spring as the spawning season for the Longnose sucker.
- Recognize likely spawning areas.
- Differentiate between local aboriginal fish collection and Saskatchewan Government regulated practices.

Common Essential Learnings:

- COM, CCT, PSVS, IL

Classroom Set-up / Preparation:

- Advise the local authorities (SERM) that you wish to collect fish (probably during the second week of May).
- Request a dip net license from the local authorities.
- Advise the administration and fill out the necessary Field Trip Request Form as per policy.
- Request resource material from local authorities.

Activity:

- Day one – Focus
 - Students will be asked to think about traditional practices of fish collection in the local region.
 - The teacher provides local background as necessary and the importance of the Montreal River to the aboriginal community for spring fishing here.
 - Review government fishing regulations regarding dip nets and fishing rods.
 - Discussion about the legality of fishing practices:
 - o Treaty, Non-Treaty and Metis rights
 - o Conservation versus Consumption for family
 - o Cree traditional practices
 - Northern society, land based food source
 - Teacher presentation on Aboriginal Rights and treaty Rights.
 - Field trip – students taken to spawning grounds to observe the techniques of local people in fishing the sucker.

- Students instructed to make mental notes so that they can record their activities upon their return to class.
- Day 2 – Collecting the Fish
 - Students are reminded that they must clean all the fish they catch.
 - Students should have rubber boots and dip nets with them as well as a light lunch.
 - Suckers prefer shallow water flowing over the coarse gravel.
 - Students are reminded of the safety rules:
 - o Beware of slippery rocks, do not try to walk on them
 - o Stay together as a group, leave as a group
 - The elder demonstrates and explains how to de-bone a fish in preparation for the smoker.
 - The teacher provides filleting knives with appropriate instruction regarding safety.
 - Students prepare the fish they collected for smoking the next day.
 - Fish are kept cool until the next day.
 - Students collect and split wood for the smoker (white poplar is best), coniferous wood should not be used because it creates black smoke that leaves a bitter taste in the fish.
- Day 3 – Smoking the fish
 - A smoke shack provided by the Elder may be used, or the school may wish to acquire its own.
 - Fish are placed in the smoke shack.
 - Elder explains the process for smoking fish and monitors the process, stoking the fire as needed.
 - Students observe and interact with the Elder throughout the process.
 - After the fish is smoked (probably near the end of the day), it is placed in the fridge to await next day's meal.
- Day 4 – Luncheon / Supper
 - Elder and/or resource person prepares the smoked sucker by frying some (fry at least 5 minutes) and baking some (bake at least 10 minutes)
 - Students observe, question and interact with the Elder during the process.
 - The fish is served with bannock, potatoes and canned vegetables.

Methodology:

- Direct, Interactive, Experiential

Aboriginal Language Activities:

- Learning and using fish and food preparation terms in the Aboriginal Language.

Elder's Role:

- Preparing the fish, setting up the smoke house and preparing the meal

Resource Material:

- Cree Dictionary
- Resource material from SERM describing fish species
- See 'Sample Lesson – Freshwater Fish Reproduction' (page 25 attached)

Resource People:

- Elder / resource person (Abraham Gardiner) to describe and demonstrate how to clean, prepare and smoke fish.

Assessment / Evaluation:

- Classroom activities:
 - Students assigned to write a description of the traditional collection process and comment on the reason for regulations that limit traditional practices.
 - Students assigned to research and describe the Longnose Sucker as compared to other varieties found in northern waters.

Sample Lesson – Freshwater Fish Reproduction :

Manitoba Fisheries – www.gov.mb.ca/conservation/sustain/9.html

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Senior I

The following information is based on Senior I to Senior II Science: Manitoba Curriculum Framework of Outcomes which itself is based on the Pan-Canadian's Common Framework of Science Learning Outcomes (K - 12). Each outcome includes a brief description of the outcome, teacher background information and suggestions for instruction. Also, where appropriate, worksheets and activities have been included.

To download these activities and/or worksheets (A=Activity... W=Worksheet... E=Example...), click on the corresponding colour button(s) for each learning outcome. The exercise(s) will be saved to your computer as an adobe PDF file(s). To view these files, you will require a copy of adobe acrobat reader to be installed on your computer. To download a free copy of the reader, [click here](#).



Outcome S1-I-08:

Investigate and explain adaptations of plant and animal species which enhance reproductive success

Teacher Background Information ...

Fish species have evolved and developed a number of reproductive methods that allow them to reproduce successfully under a variety of conditions. Reproductive strategies include the number of eggs laid and placement of eggs or young in the right place at the right time, in response to physiological or environmental cues.

In general, fish mature quickly and produce thousands to millions of eggs annually.

Fish reproduce using the most primitive form of sexual reproduction- **external fertilization**.

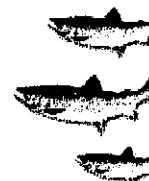
Sexual Reproduction - Internal versus External Fertilization

Fertilization is the fusion of an egg and sperm cell to form a **zygote**. The most primitive form of sexual reproduction is **external fertilization**. It is used by simpler animals such as frogs and fish. In external fertilization, the eggs are fertilized outside the bodies of the parents. These animals must return to the water to reproduce. Usually the eggs or roe are released into the water by the female animal. Then the male releases sperm or milt into the same area. Sometimes a crude nest is constructed, but more often than not the eggs are just released onto the gravel.

Spawning lake trout are a good example. Unlike other trout that construct "redds" (spawning beds or nests), these fish spawn in fall or early winter over rubble or gravel, usually at night. Several males fan a section of lake bottom clean of fine silt. One to three males court a single female, nudging her body to cause the release of her eggs. Collectively the males release milt over the eggs which falls to the swept lake bottom. Because of low water temperatures, the unattended eggs usually take 4 to 6 months to hatch over the winter.

The eggs are on their own from this point on. The embryos, which hatch from them, must fend for themselves right from the moment they hatch. Young fish who meet their parents will very likely be eaten by them! In fact less than one in a hundred fish eggs grow to adulthood. This is why two northern pike must produce one or two thousand eggs just to replace themselves.

Higher, more evolved animals such as snakes, dinosaurs, birds, and a few mammals



<http://www.gov.mb.ca/natres/sustain/index.html>.

Fisheries and Ocean Canada:

http://www.dfo-mpo.gc.ca/zone/under-sous_e.htm.

Saskatchewan Interactive Fisheries:

<http://interactive.usask.ca/ski/fisheries/fish/index.html>.

University of Minnesota ... Natural History of Minnesota Fishes:

http://www.gen.umn.edu/faculty_staff/hatch/fishes/natural_history.html.

Minnesota Department of Natural Resources:

<http://www.dnr.state.mn.us/fish/index.html>.

The Content Well:

http://www.thecontentwell.com/Fish_Game/index.html.

Wisconsin Department of Natural Resources- EEK! Environmental Education for Kids:

<http://www.dnr.state.wi.us/org/caer/ce/eeek/critter/fish/index.htm>

Aquatext: The Free Online Aquaculture Dictionary:

<http://www.aquatext.com/dicframe.htm>



Outcome S-1-13:

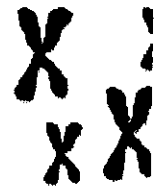
Describe the relationships among DNA, chromosomes, genes and the expression of traits.

Teacher Background Information ...

Nearly all living organisms contain their basic genetic material in DNA or deoxyribonucleic acid (some viruses utilize RNA or ribonucleic acid). This DNA contains the blueprint or set of instructions that allows the organism to reproduce as well as manufacture the countless proteins it needs to carry on its life processes. In higher organisms the DNA is wound with protein to make chromosomes and a segment of DNA is referred to as a gene.

DNA is made up of nucleotides which are chemical structures of the 5C sugar deoxyribose, a phosphate (P) group and a nitrogen containing base. In a nucleotide the sugar (S) and the phosphate group are always present, but the third component (the nitrogen base) can vary in four different forms. They are: cytosine (C) → [Click Here](#) , thymine (T) → [Click Here](#) , adenine (A) → [Click Here](#) and guanine (G) → [Click Here](#) .

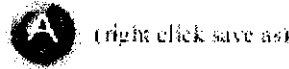
Below are examples of a cytosine and adenine nucleotide:



chromosomes into a map. The cells from which the chromosomes are taken are blocked during the metaphase stage of mitosis (in mitosis the chromosomes have all made copies of themselves) and the condensed chromosomes are stained with a dye. The chromosomes are then arranged in their similar pairs, usually from longest to shortest, using the centromeres as a reference point (the centromere is the structure that holds replicated chromosomes together). This arranged map is called a **karyotype**.

Suggestions for Instruction ...

Making a Model of DNA



This activity has answer keys provided for teachers and will introduce students to the structure of DNA. They will manipulate the basic building blocks (nucleotides) of DNA to get a sense of how the nucleotides fit together.

Materials:

Activity sheets, Scissors, Glue and Coloured Pencils

Procedure:

Cut out all the individual structures from the worksheet and colour adenine red, thymine green, guanine blue, cytosine yellow, phosphate brown and deoxyribose sugar purple.

Using the small squares, circles and stars as guides on each of the structures line up the bases, phosphates and sugars.

Glue the appropriate parts together to form nucleotides. Now construct the right side of your DNA molecule by putting together in sequence a cytosine, thymine, guanine and adenine nucleotide.

Complete the left side of the DNA ladder by adding complementary nucleotides or nucleotides that fit. Your finished model should resemble a ladder.

*** Note to teacher:** DNA replicates or makes a copy of itself by coming undone in the middle and new complementary nucleotides come in to bond opposite the unconnected single strands. Two new identical DNA molecules or segments will result from the original one.

To show replication of your model, separate the left side from the right side on your desk, leaving a space of about 15 to 20 cm.

Using the remaining nucleotides, add to the left side of the model to build a new DNA molecule. Do the same with the separated right side.

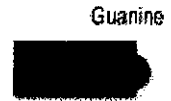
Tape or glue the nucleotides together to form two complete identical DNA ladders or molecules.



Adenine



Thymine



Guanine



Cytosine

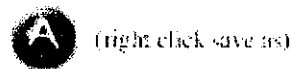


Phosphate



Deoxyribose

Chromosome Mapping



This activity will allow students to prepare and understand a chromosome map or karyotype. Answer keys are provided for teachers.

Materials:

Chromosome Mapping Activity sheet, Scissors, Tape and/or Glue.

References

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- see also website below

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Websites

www.gov.mb.ca/conservation/sustain/9.html

- check here for more sample lesson plans from Manitoba Fisheries.

<http://www.geotech.org/survey/geotech/dictiona.html>

- check the dictionary of geological terms

<http://www.accessexcellence.org>

- check the sample 'Lotic Environment Lesson Plans' for some neat tests and experiments with natural environments right inside the classroom.

<http://www.howe.k12.ok.us>

- check here for a neat lesson on 'Communities & Ecosystems'
- good illustrations