CULTURAL CONNECTION LESSON 1-3

CULTURAL CONNECTION – LESSON 1

Lax Gyels and First Nations People

Lax Gyels is the Tshimshan meaning for freshwater mussels, it is also the name of Lakelse Lake located about 15 kilometers from the city of Terrace. Lakelse Lake is part of the territory that was used by the Kitselas people. For thousands of years this area was used for hunting, fishing, gathering food, and the great red cedar tree that was used to make canoes. The Kitselas people lived off the land. The vast ecosystems supplied the First Nations People with all that was needed to survive. The people used to hunt marten, beaver, bear, and deer. They would also fish for different types of salmon and gathered freshwater mussels as part of their diet. The area also had a rich supply of berries and other plants that were used for food and making household items. The red cedar trees that grew around this watershed were of great importance for carving canoes, making blanks for the long houses and important for the weaving clothing. There are many oral histories that tell the stories of how people lived and used the food provided by Lake Gyels. These stories are told by the Elders of the community and more information can be obtained from the Kitselas Band Office.

Activity One

Have students gather information on the wildlife such as marten, beaver, bear, and deer around Lakelse Lake. These provided food and clothing to First Nations people. Have students do research on one of the animals and how this animal provided to the existence of the First Nations people. Student's could then combine their information and create ecosystem diorama of the wildlife of Lakelse Lake. The same could be done for the aquatic life such as the mussels found at Lakelse Lake.

See the following site for information.

www.fws.gov/columbiariver/mwg/pdfdocs/Pacific_Northwest_Mussel_Guide.pdf

Activity Two

Have students gather information on the red cedar tree to learn about how this tree provided many things to the local First Nations. As part of this process students will learn about how First Nations used this tree to provide shelter and clothing without "cutting" the tree down. Students could also learn how First Nations used to "take down" cedar trees with out the use of a saw or axe. i.e. They chiseled a hole in the tree and start a charcoal fire to burn out the bottom and wait for the wind to blow tree to over. Sometimes the chiseled holes were made higher in the tree to test its strength. This was particularly the case if the tree was to be used for a totem pole.

Activity Three

Have students gather information on grease trails and how this affected trade among different villages. Also have student make the connection of the water ways and the use of the canoe for travel. Have students view an old map of the grease trail that connected the Lakelse watershed to other parts of BC. i.e. Grease trail from Kitimaat to Copper River, this trail was used by First Nations to trade, but later was used by Europeans to settle in this area. Refer to 'The People of Kitselas Canyon' by Rocque Berthiqume for further information. There is also a teacher guide with the trail. Multiple copies are available through the First Nations Resource Center.

Activity Four

Have students gather information on how First Nations People traveled and used the waterways and grease trails as their highways. Ask students to compare and contrast the pro's and con's of the old ways compared to travel today. Refer to the article in The Beaver, March 1953 'On the Trail of the Candle Fish' by Lyn Harrington (Copy in Coast Mountain College, archives) and also Kitselas Development Corp.

Trail 1

Trail 2

Activity Five

Share the oral histories of Lakelse Lake with the students (this information can be gathered from the Kitselas Band office). Incorporate these oral histories into Activities One, Two and Three and then take the students on a field trip to Lakelse Lake. Students could use prior knowledge to identify CMT's, local plant life, and wildlife and make the connection of the importance of Lakelse Furlong Park and First Nations people.

Activity Six

Once students have been on a field trip to Lakelse Lake they can then make the connection between the First Nations and Lakelse Lake. Have the students write their own Oral history of how their experiences connect them to the Lakelse watershed.

CULTURAL – LESSON 2

Lesson Plan: Lakelse Lake Photo Share (Activating personal connections through expository writing)
Curriculum Links: Social Studies/ Language Arts

Duration: 30 Minutes

Location: Classroom

Purpose:

The purpose of this activity is to activate students' personal connections to Lakelse Lake by providing them with the opportunity to share and reflect on family or personal photos.

Materials:

* Letter home to parents explaining the activity and requesting any photos the family may have of trips to Lakelse Lake, including photos that show the area surrounding the lake.
* Six clear cups, which will be used to collect the water and/or 'pollutants' which drain out as we pour the substances through the plant/soil.
* Historical photos of Lakelse Lake (visit Heritage Park for photos)
* Teacher's personal photos of their own trips to Lakelse Lake
* Photocopied maps of Lakelse Lake

Activity Description:

Students will produce an expository writing of memory they have of Lakelse Lake. Working in groups of four the students will share their photos with each other. They will indicate on a map of the lake where they were and what activities they did while they were there. They will also share with the group a memory from that day, that takes them right back to that time and the lake.

Using their personal photos and recent discussion with their group as writing prompts, students will (individually) brainstorm ideas about the day the photo was taken, events that happened that day, and what reasons Lakelse Lake is important to them on a personal level. In writing their piece, students will focus on one particular event which emphasises their personal connection to the lake. Students should be encouraged to use all of their senses when describing their memory.

Suggested Complementary Activities:

Activity 1

Using laminated historical photographs of the Lakelse lake area students could examine the terrain surrounding the lake and then compare them to the terrain visible in their own more recent photographs. Working in groups of four with the laminated historical photos, the 2003 aerial photo of the Lakelse Lake watershed and their own personal photos, students would identify areas of human impact within the watershed indicated on the aerial photo. Students will then identify that particular area on the historical photograph, and draw the developments, whether it is logging, buildings, roads, etc onto the historical photo. Students would be required to consider the impact they are having on the land and to make allowances for them by researching environmental impacts on watersheds such developments have. This activity allows students to consider the implications of the development on the lake and in turn the implication development has on the students and their own relationship to the lake.

Activity 2

Students could also work in groups of four and choose one of the human developments that have occurred in the Lakelse Lake watershed. They could identify and discuss what the impact was of that particular development by completing a research project in which they discover the impacts certain human developments have on a watershed. The students would need to discover at least four areas of the environment that would be affected by their development and four ways the impact could be lessened or avoided altogether. The students would then present this information to the class in the form of a proposed development within the Lakelse Lake water shed. The presentation would be supported through the use of maps, aerial photos, photos taken by the students, drawings etc.

CULTURAL – LESSON 3

Lesson Plan: Respecting the Environment of Lakelse Lake

Duration: 1 hour

Location: Classroom

Purpose:

The lesson is a hands-on approach to understanding human impacts on Lakelse Lake. Students will be able to describe some of the problems that arise when many people depend on a limited resource (Lakelse Lake). Students will also be encouraged to consider taking social action to save this very important watershed.

Prerequisites & Skill Development:

Lakelse Lake provides recreation and resources for many people. The lake is considered a “hot spot” for summertime recreation for people in the Terrace area. Increasing numbers of people are using the lake and many people are choosing to make the lake their full-time residence this is having an impact on the water quality and environment of the lake.

Materials:

* Ball of string
* Masking tape
* Area and population of Lakelse Lake

Activity Description:

Lakelse Lake and the surrounding land provides recreation and resources for many people in the Terrace area. However, people can change the landscape. Each person that uses Lakelse Lake leaves behind evidence of their visit whether they know it or not. It is estimated that Lakelse Lake has two hundred thousand visitors to the lake each year. Brainstorm a list of what wastes people might leave behind. People create waste and add substances when they visit, many can be harmful and long lasting.

Map out Lakelse Lake on the floor using 9 m of string. Use masking tape to attach the string to the floor. The 9m string is proportionate to 27 km perimeter of the lake.

Students will stand side by side on the masking tape with their feet touching the person beside them in the most populated areas of the lake. Pass around the bag of pieces of paper, each student will take a piece of paper from the bag and throw it into the lake. It doesn't take much to pollute an environment, especially when people are concentrated together as they are at the lake. Have students notice how quickly the lake became polluted with the paper. What would happen to the lake if people didn't clean up after themselves? How would the lake water and land be affected?

Can you think of any solutions to limit the human impact in this environment?

Suggested Complementary Activities:

Create a poster to encourage people who visit the lake area to lighten their environmental footprint at Lakelse Lake. These could be placed around the school.

Promote a Lakelse Lake Day at the school.

AQUATIC LIFE – LESSON 1-6

AQUATIC LIFE LESSON 1

Lesson Plan: Water Pollution and Filtration

Curriculum Links: Science – Grades 4-7

Duration: 1 session

Location: Classroom

Purpose:

Students will begin to understand the role of plants and soil in filtering the water moving through the Lakelse Lake watershed. Through active investigation, students will explore and discover how materials, such as pollutants, can alter a healthy ecosystem. Students will see how materials can move through soil and enter a groundwater aquifer (a layer of permeable rock, sand, or gravel through which ground water flows, containing enough water to supply wells and springs) and will explore the dual role of soil and plants in this process.

Prerequisites and Skill Development:

A basic understanding of plants and their role in our world would be beneficial, but not necessary. Understanding of the water cycle would also be beneficial. Students will learn that whatever goes into our ground has the potential for reappearing in our water systems – including that which we drink or play/bathe in – and this can also have detrimental effect on living organisms which depend upon the local water. This activity is designed as a whole group observation and discussion exercise, however, by adding more materials smaller groups could also explore what happens when various pollutants are drained through the soil.

Materials:

* Six potted plants in pots with drainage holes (These plants need to be moderately dry, as if they had not been watered for a couple days: Plants with saturated soil will not absorb water, and very dry plants will absorb it all – we want some of our water to drain through the holes in the bottom of the pot)
* Six clear cups, which will be used to collect the water and/or 'pollutants' which drain out as we pour the substances through the plant/soil.
* Tap water

* Unsweetened powdered drink mix, preferably grape or cherry for colour
* Vegetable oil
* Vinegar
* Two different household cleaners (one should be liquid and the other powder – Comet/Ajax or Dish/Laundry detergent)
* Graph for students to record data (see below)

Activity Description:

Several days before the experiment/demonstration, set up the potted plants and slowly pour clean water through the pot to check the percolation rate. Loosen or tighten the soil so that the percolation rate is fast enough to prevent long waiting periods, but slow enough not to carry very much soil through the pot – we want some 'pollutants/water' to travel through the pot, but not so quickly that it washes out a bunch of soil or so slow that nothing comes out!

It would be useful to explain that soils and plant can remove some of the foreign material that end up dissolved in our lakes and rivers as the water moves down through soil, but that most materials will adhere to the soil which may then be broken down and used as food by the plants.

Prepare a graph/table for students to record the findings from the demonstration. This should include six rows (1 for each plant) and six columns (1 for each 'pollutant').

For the demonstration, hold a potted plant over the top of one clear cup and slowly pour clean water through one of the pots. With students, watch it percolate through the bottom of the pot into the cup. The water should look as clean as what was poured, although there may be some soil that washes through too (likely because the water was poured too quickly or the soil was too loose in the pot). If there is soil in the cup/water ask the students what they think this might mean for water quality in a lake or river. Then, choose a second plant and repeat the procedure but instead of straight water, mix a little powdered drink mix into the water before pouring it through the plant. See if the water percolating through retains the colour. For the third plant try adding some vinegar to the water and have students observe the effects and repeat this process using vegetable oil/water (they won't mix completely). Does the vegetable oil percolate through or is caught up by the plant roots? Then use the final two plants to try the two different household cleaners and water mixtures. Is the cleanser retained in the soil? Does the soap percolate through the soil? Then, to finish it all off, using the "contaminated" plants, pour some clean water at the same rate through each one (simulating a rain shower). Is more of the "pollutant" rinsed away from the soil by the clean water?

Possible questions for students to explore:

In what ways can plants and soil benefit our drinking water quality? We saw plants and soil remove some types of impurities from water. How might the plants remove larger quantities? Can plants and soil remove any type of impurity from water? How might these pollutants affect other organisms in the soil-plant system? Additionally, what is the role of rainwater moving through contaminated soil?

Suggested Complementary Activities:

Students could continue watering these plants with the 'contaminated water' to see what happens over a longer period of time, perhaps a week or two, and record the observations. What might the long term effects be if contaminants continue to be introduced into the water system?

Visit the lake and have students look at lake water samples and note landscape alterations that may be increasing the sediment in the lake. See 'Scavenger Hunt' activity for further suggestions.

AQUATIC LIFE – LESSON 2

Lesson Plan: Roger the Salmon – A Comic Strip

Curriculum Links: Science/Socials

Duration: 1 lesson

Location: Classroom

Purpose:

This activity is meant to draw attention toward the connections between human activity and its impact on returning fish stocks at Lakelse Lake. Numerous reports are currently showing declining returns of spawning salmon and a possible cause of this is lakeshore development. Using a cartoon format, students will be able to visually detail the possible effects of human activity on that of the returning salmon population in the Lakelse watershed.

Prerequisites and Skill Development:

An understanding of the habits and life cycle of a salmon is beneficial. Students will extend this and develop an understanding of the possible connection between water quality, human impacts, and the survival of the species. In addition, this connection will be displayed in a creative, written and illustrated format. The students should be made aware of some of the major concerns of the Watershed Society and community members, such as water quality, elodea growth, heavy nitrogen and phosphorus counts, shoreline erosion etcetera which can all be found on the above cited website. See www.lakelsewatershedsociety.com/custom4_1.html and http://www.davidsuzuki.org/Publications/an_upstream_battle.asp for further background details.

Materials:

* 11 x 17 paper with sections for the cartoon strip
* Markers, pencil crayons
* Imagination and Creativity!

Activity Description:

Students can create a cartoon which details the adventures of Roger, the spawning salmon, on his return to his native spawning grounds at Williams Creek via Lakelse Lake. However, along the way he encounters several problems which he must overcome – if he can! Will Roger ever make it home and find his familiar family and spawning grounds? Some of the problems (which will reflect current concerns in the watershed) might be poor water quality due to human development along the lake shorelines, high nitrogen and phosphorous levels and low oxygen levels, or

perhaps beavers, who have been forced away from their usual lands in the south (perhaps due to flooding caused by watershed logging activities) and have moved into the Williams Creek area and started erecting a damn which impedes Rogers progress. Perhaps the water quality is so poor or the elodea is so thick that Roger can't find his way or a new massive home being built has required that the shoreline be drastically extended and this throws Roger off course! The possibilities are endless.

Also see www.bclss.org/docs/Lakelse%20Lake_Final.pdf and www.env.gov.bc.ca/bcparks/explore/parkpgs/lakels_wtlnd/nat_cul.html for further information and maps relating to on the watershed

Suggested Complementary Activities:

This can be extended into a Readers Theatre with perhaps, the whole class creating the script together. This can also be used as a springboard into puppet plays with small groups designing their own scripts and productions or an awareness campaign whereby your students can create posters and oral presentations to promote awareness of the watershed concerns as they relate to habitat preservation and health.

AQUATIC LIFE – LESSON 3

Lesson Plan: Migration and Life Cycle of the Salmon

Curriculum Links: Grades 4-7 Science

Duration: One Hour

Location: Classroom

Purpose:

The purpose of the lesson is to provide students with the background knowledge on the species of salmon before studying the environmental issues. The specific environmental issue in the following lessons is how human development has and is affecting the distribution of sockeye salmon in the rivers flowing from and into Lakelse Lake. Within the lessons, students will use their critical thinking skills to try and solve a local environmental problem.

Materials:

* A map that depicts Lakelse Lake and the tributary rivers/streams that flow to and from. See Lakelse Lake link for sketch map.
* Teachers will also need to find pictures or create a power point presentation of the salmon cycle depicting the different stages in salmon development. A good website to look at if a teacher needs more information about salmon and their life cycle is…
http://www.clean.ns.ca/library/IdleFree/IdleFree_Grade4Lessons.pdf and/or the book – Luutigm Hoon: Honouring the Salmon – Teacher's Resource Guide. Available at the Northwest Community College in Terrace, BC
* An excellent lesson plan on pacific salmon is available at…
http://www.nationalgeographic.com/xpeditions/lessons/09/gk2/migrationsalmon.html

Activity Description:

A good hook would be to bring a salmon related item such as candied salmon or sushi with salmon eggs. Ask students to tell you what they know about salmon and brainstorm a web. Once prior knowledge is activated, start lesson off by showing pictures or a power point of the salmon cycle.

Then explain to the students that salmon live in both salt water and fresh water. To help students understand this better, a visual aid of Lakelse Lake and the rivers that flow from it and into the ocean is essential. See Lakelse Lake link for sketch map. Students will learn about the migration of salmon between salt and fresh water, they will also learn that salmon return to the same rivers and streams that they were born in to spawn, and they will learn what happens to male and female salmon after they spawn.

To end the lesson, students will role play the different stages in the life cycle of the salmon. Students will be put in groups and assigned to act out and describe one stage in the life cycle of the salmon. Cue cards will be given out to students with information about their salmon stage. Along one side of a wall in the classroom teachers could design a stream of water that eventually leads out to the ocean (outside the classroom). The pictures of the different stages will be posted along the wall in our 'salmon stream'.

An example of the salmon role-playing would be if a student were to receive a cue card that said 'spawning'. He or she would then read out to the other students what the spawning stage entailed and then act it out. Because fish in the spawning stage have to swim against the current, the student would act out how hard this might be. Fish also return to the same place they were born, so a dab of smelly fish oil on the 'gravel' in the 'stream' in the classroom and have the student swim up the current and return to exact spawning area by sense of smell. There is a great link with salmon activities including salmon puppet shows, salmon debates, and fin rummy games.
http://www.fs.fed.us/outdoors/naturewatch/implementation/Curricula/Salmon-Curriculum.PDF

Suggested Complementary Activities:

1. Complete a lesson on the life cycle of cedar trees or on the earth's seasons and compare it to the life cycle of the salmon. The Adventures of Txamsm – Teacher's Resource Book – Available at the Northwest Community College in Terrace, BC.

2. English Language Arts: Students could be taught a reading strategy such as inferring or visualizing while reading the book The Salmon or Txamsem and the Salmon Woman. Students could also write a legend or folklore in their literacy class about the characters found in the books listed above. Both books are available at the Northwest Community College in Terrace, BC.

3. Art Class: Students could design a First Nations button blanket or a salmon crest with either ceramics or with paint. Tsimshian Crests and Designs – Available at the Northwest Community College in Terrace, BC.

AQUATIC LIFE – LESSON 4

Lesson Plan: Migration and Salmon Spawning

Curriculum Links: Grades 4-7 Science

Duration: 45 minutes

Location: Classroom

Purpose:

The purpose of the lesson is for students to become familiar with maps, understand salmon migration consisting of Lakelse Watershed, the Skeena River, and the Pacific Ocean, and to learn what is needed in a stream for salmon production to happen.

Materials:

* map of Lakelse Watershed depicting where Lakelse River flows into the Skeena River and out to the ocean – See website http://www.fishwizard.com/
* a picture of a clean gravel spawning ground versus one filled with sedimentation and a picture of an ideal stream. See pictures below
* An excellent lesson plan on pacific salmon is available at…
http://www.nationalgeographic.com/xpeditions/lessons/09/gk2/migrationsalmon.html

http://www-heb.pac.dfo-mpo.gc.ca/water_quality/fish_and_pollution/glossary_e.htm

A coastal cutthroat juvenile assessment in the Lakelse Watershed

Fish
http://wlapwww.gov.bc.ca/ske/fish/

Activity Description:

Begin by showing students the map of the Lakelse Lake Watershed joined with the Skeena River and the Pacific Ocean – see link http://www.fishwizard.com/

The teacher will show students the 13 tributary rivers/streams that are in the Watershed and indicate which ones are salmon bearing. Salmon bearing streams/rivers include Ena, Andalas, Clearwater, Scully/Schulbuckhand, Hatchery/Granite, Furlong, Blackwater, Williams, and Sockeye. The following website has a nice summary of the tributary rivers/streams.
http://www.skeenafisheries.ca/publication_Conserving%20Lakelse%20Fish%20and%20their%20Habitat.pdf

Students need to not only understand the life cycle of the salmon, but they need to understand that salmon who spawn in Lakelse River travel down their own river, then down the Skeena River finally hitting the ocean. A good way for the students to get a clear understanding of this would be to let them go up to the front of the class and trace with their finger the salmon's route of migration back and fourth.

Students should also understand what a stream needs for salmon production to occur. This information will help students make better observations when they go on their field trip to one of the salmon bearing streams. The Department of Fisheries and Oceans has a good website that explains different qualities streams need, such as what kind of trees cover along streams is needed, description of gravel spawning beds, and water quality of streams. http://www-heb.pac.dfo-mpo.gc.ca/water_quality/fish_and_pollution/fish_hab_e.htm

Students also need to know about what might be impacting the streams such sewage disposal systems along the lake and streams. See link for more information. http://www.bclss.org/docs/Lakelse%20Managment%20Plan%202003.pdf

Suggested Complementary Activities:

1. Complete a lesson on the life cycle of cedar trees or on the earth's seasons and compare it to the life cycle of the salmon. The Adventures of Txamsm – Teacher's Resource Book – Available at the Northwest Community College in Terrace, BC.

2. English Language Arts: Students could be taught a reading strategy such as inferring or visualizing while reading the book The Salmon or Txamsem and the Salmon Woman. Students could also write a legend or folklore in their literacy class about the characters found in the books listed above. Both books are available at the Northwest Community College in Terrace, BC.

3. Art Class: Students could design a First Nations button blanket or a salmon crest with either ceramics or with paint. Tsimshian Crests and Designs – Available at the Northwest Community College in Terrace, BC.

AQUATIC LIFE – LESSON 5

Lesson Plan: Stream and Creeks

Activity Title: Measuring Streams and Creeks in the Lakelse Watershed

Curriculum Links: Grades 4-7 Science and Math

Duration: Whole afternoon

Location: In class and at a stream or creek

Purpose:

The purpose of the lesson is to look at environmental impacts on streams and creeks with associated with human development and how this impact might decrease salmon production.

Prerequisites & Skill Development:

Students will have completed mapping exercises in math class. Students have a basic understanding of ecological conditions required for salmon to complete the life cycle of being born, migrating from rivers to oceans, and spawning. Also, students have knowledge of conditions that could inadvertently effect salmon spawning such as water quality, stream flow and how flow might not only affect salmon production, but also erosion of land.

Materials:

* clip board and observation sheet
* meter stick
* calculator
* pen/pencil
* timing device
* an object that will float down the river-oranges work best
* A good educational website that has a complete lesson plan of measuring stream flow is available at...
http://www.scienceteacher.org/k12resources/lessons/lesson17.htm

Activity Description:

The lesson will start in class where students will review safety procedures. Following this, students will go to one of the streams/creeks in the Lakelse Watershed, preferably Williams or Hatchery Creek in mid September during the sockeye run. Teacher and students will walk up and down the stream writing down observations. Features to look at are water clarity – murky vs. clear, potential pollutants such as garbage, erosion along stream banks, and/or debris/barriers from fallen trees or log jams. Observations will be discussed during field trip and in later classes. Questions the teacher might ask the students are:

* Do you think the stream is a good salmon habitat/spawning ground?
* Do the rocks look like a good size for salmon spawning?

With the help from the teacher, students will measure stream flow and write down their findings. The website listed above has a method on measuring stream flow. A suggestion from the lesson plan above is to allow students to explore stream flow by throwing a plastic ball in the stream and observing it. Ask students to see if the ball floats down faster than they can walk or to make a guess at how long they think it will take the ball to travel 10 meters.

Suggested Complementary Activities:

1. Science: Students could explore streams and rivers more by looking at the environmental problems associated with the development of dams on rivers. Good website – http://www.nationalgeographic.com/xpeditions/lessons/14/g68/tgrivers.html

2. Social Studies/geography: Writing a few facts and mapping famous or major rivers in Canada for the younger grades and mapping rivers in the world for the older grades would be a good exercise for students to become more knowledgeable about rivers and their functions. Facts about the rivers students could look could include:

* What fish are found in the rivers?
* What economic development is affecting the rivers in terms of fish stocks?
* Who is fishing in the rivers? (commercial, sports fisherman, First Nations)

AQUATIC LIFE – LESSON 6

Lesson Plan: Water Cycle

Duration: 1-2 hours

Location: Classroom

Purpose:

The purpose of this lesson is to introduce students to the water cycle of a lake by having them draw a picture of a lake ecosystem, adding human impacts which affect water quality. Students will help fill in the components of a drawing of a water system. They will conclude by creating their own illustrations of human-induced changes to the freshwater habitat of a lake ecosystem.

Prerequisites & Skill Development:

Students will help the teacher draw a lake ecosystem on the whiteboard. Students will discuss the water cycle and the reasons why lakes are important. Students will be able to describe how humans can impact the water cycle and draw pictures illustrating a scenario involving human-induced changes to a lake ecosystem.

Materials:

* Blackboard or whiteboard
* Coloured chalk or erasable markers
* Drawing materials

Activity Description:

On the board, draw a picture of a lake with creeks flowing into it and a river flowing out of the lake. Draw some mountains where the creeks originate. Have students take turns adding the following features to the drawing: trees, animals, houses, farms, and people doing activities related to the things they have drawn (e.g. fishing, boating, swimming, etc.)

Ask students to look at the picture and think about why the creeks, the water from the lake and river is important to everything else in the picture. What do the plants, animals, and people in the picture use the water for? Why is it important that this water be kept clean?

Explain to the students that the water in the creeks and lake initially comes from the sky in the form of rain or snow. When it rains in the mountains or anywhere upstream, the water flows downhill through the creeks and eventually into the lake. Also when snow melts in the mountains, it flows down the creeks and into the lake. Ask students if they have ever noticed this.

Introduce students to the process of evaporation by explaining that, as water travels down the river and into the lake, it slowly evaporates and returns to the air. The river and lake will not become empty, however, because they will be replenished by rainwater and snowmelt.

Ask students to imagine that people have bought more property around the lake and most of them have cut down trees and have planted lawns which they fertilize. How does the fertilizer affect the lake? Would more people have an impact on the lake?

Ask students to look at the new changes that have been added to the drawing (more people, lawns, etc.). Think about all of the changes, what if there are more changes similar to these ones in the future? What might Lakelse Lake look like then?

Suggested Complementary Activities:

Have students work in groups to develop policies that they feel should be implemented to residents and visitors of Lakelse Lake in order to preserve the quality of the water. Once students have created their policies they can present them to the class and receive feedback from their peers.

HUMAN IMPACTS – LESSON 1-9

HUMAN IMPACTS – LESSON 1

Lesson Plan: What is the bathymetry of this sink?
Curriculum Links: Science, Socials, upper elementary

Duration: 30 minutes

Location: Classroom

Purpose: To help students begin to understand the fragile environment of Lakelse Lake and how to live responsibly and treat it with respect for future generations.

Prerequisites and Skill Development:

Students will measure the various depths of a plastic sink and graph it in a mini bathymetric map prior to using a real bathymetric map of Lakelse Lake to construct a model of it out of cardboard. (See next lesson: “Is Lakelse Lake a Sink?”)

Materials:

* Old sink with a small bucket in the bottom of it, upside down.
* Paper
* Pencils
* Measuring tool such as a tongue depressor with centimetre increments marked on it.
* 12 x 12 grid

Activity Description:

Teacher show class a sink/bucket that we are going to reconstruct with a bathymetric map on the board, using measuring sticks to determine its depth. Teacher shows class the bucket and draws a smaller representation of this on the board. Teacher asks two helpers from the class to come to the front to measure the depth of the bucket, as the rest of the class draws their own version of the bathymetric map on paper. Teacher explains that the helpers will help us draw the depth of the bucket by dipping the tongue depressor measuring sticks and recording this on our map. Teacher demonstrates this by putting the 12 x 12 grid over the water and showing the helpers how to dip one of the measuring sticks down into the water and reading the water level on the tongue depressor. Teacher shows class how to transfer this onto the diagram on the map/board by drawing the 12 x 12 grid over the bucket diagram on their papers. The helpers continue to measure at various places on the grid, as class records the results on their map. Once all of the pints have been drawn, teacher shows class to join all alike levels, similar to a dot to dot sketch. Then, the teacher asks each child to color the lowest depth a dark blue color, the next highest depth will be coloured a medium blue, the next highest dept will be a light blue, and so one until the highest level is yellow.

Suggested Complementary Activities:

* Look at a bathymetric representation map of Lakelse Lake on www.anglersatlas.com
* Field trip to Lakelse Lake to observe watershed.
* Aerial views of Lakesle Lake www.bcarchives.ca
* Colour a contour bathymetric map of Lakelse Lake in same colour scheme as above.
* Create a model of Lakelse Lake out of cardboard to understand the depth and topography of the bottom of the lake. See suggested activity entitled: “Is Lakelse Lake a sink?”

HUMAN IMPACTS – LESSON 2

Lesson Plan: Creating a model of Lakelse Lake Wetlands
Duration: 45 min

Location: Classroom

Purpose:

This lesson is intended for students to see the importance of wetlands within the Lakelse Lake Watershed. Most students have a negative first reaction to wetlands, as they are places not attractive for recreation. Lakelse Lake is known for its swimming and boating, many people do not realize that human impact on the lake will eventually destroy this beautiful “Hawaii” of the North, if it is not taken care of. This activity will show students how wetlands help filter silt and pollutants from the water. Wetlands also prevent soil erosion and are very helpful in reducing flood damage.

Prerequisites & Skill Development

This activity should take place while students are learning about the human impacts of Lakelse Lake and the importance of maintaining wetlands and the shoreline.

Students will create a model of the Lakelse Lake the model will demonstrate what happens in a wetland area. This demonstration encourages students to observe this unique environment that has important value to water quality and preservation of Lakelse Lake.

Materials: (For each group)

* Small foil pan
* Modelling Clay (enough to cover half of each pan)
* Carpet scraps (enough to cover half of each pan)
* Water botles filled with water
* Soil (from garden or other source) 1/4c per group

Activity Description

Step 1:

On one half of the pan, place the clay on a slope from the centre of the pan to the outer edge of the pan. This will represent the shoreline and will extend upward to create the land. Students will create an indentation (a stream bed) in the clay from the edge of the pan to the center of the pan.

Next to the clay students should place their carpet. This will represent the wetlands.

The students then need to sprinkle the soil on their land. Next the students can use the water to sprinkle (like rain) over the land.

Students can now make observations of their wetland model. For example, does any soil go through the carpet? What size of material goes through the carpet? Where is most of the material? Does the color of the water change?

Discuss in groups what happens as the water (rain) falls on to their model.

Ask the following questions:

* Did all of the dirt end up in the lake?
* Where did it go?
* How does a wetland help get the water clean?

Suggested Complementary Activities:

Number 1

Have the students remove their wetland (carpet) and pour out the water from their model, now try the investigation without the wetland.

What happens?

This will show the students how sediment and pollutants end up in the lake without the wetlands that act as a filtration system.

Number 2

Encourage the students to become socially active in preserving the wetlands at Lakelse Lake. Have the students create a poster or brochure that will encourage their community to appreciate the role of the wetlands of Lakelse Lake.

HUMAN IMPACTS – LESSON 3

Lesson Plan: 3D Mapping with Lakelse Lake Watershed
Curriculum Links: Social Studies – Upper Elementary

Duration: 2 – 3 sessions

Location: Classroom

Purpose:

This activity allows for building map reading skills and for understanding how natural and contrived events (such as human impact) will alter a physical landscape. By using the Lakelse watershed students can better understand the abstract concept of taking a two dimensional map and visualizing it in a three dimensional format. Additionally, understanding the physical terrain lends itself to further discussions and activities which can involve current concerns and their development within the watershed. For example, understanding that the south end of the lake is at a low elevation allows us to facilitate understanding of flood plains, human development and possible or probable environmental concerns in this area.

Prerequisites and Skill Development:

This is a busy activity due to the fact that the physical landscape in the watershed is quite varied. Breaking the map up into five or six sections would allow for students to work in small groups and become 'experts' in their own sections and will require a good understanding of cooperative group work – the Jigsaw Method would work well here. However, if your students have not used this method you will need time to introduce it.

A basic understanding of contour mapping and topographic map reading is necessary and should precede this lesson. Alternatively, you may wish to choose an easier landscape to introduce contour mapping – Terrace Mountain works well for this – and have student groups create a 3D reproduction of this area instead and use the watershed 2D map as a follow up. In this case the watershed would be analyzed, but not necessarily reproduced in a 3D format.

Materials:

* Topographic map of Lakelse Lake and surrounding area (or, a preferred method would be to use an overhead or opaque projector – see below)
* Corrugated cardboard pieces
* Scissors and glue
* Toothpicks and file labels
* Pictures from around the lake for display purposes
* Paper Mache (optional)

Activity Description:

View a map of the watershed on an overhead; note the rivers, mountain peaks, highway, and rail lines etcetera to familiarize students with the physical area. Choose a topographic map that displays the land formation in the Lakelse Lake watershed. (Northwest Community College has great maps which can be used for this or try the website listed below for Atlas of Canada). It's useful to make an enlarged copy of the contours using either a photocopier or a projector to cast the contours onto the wall at whatever scale you prefer – 1/15000 would possibly work. Then, trace the contours onto a sheet of paper and have students glue these onto corrugated cardboard: one layer for each contour interval. Small groups of students can work together to cut out the intervals and stack the pieces up to replicate the land formation in a 3D format. You can use papier mache to smooth down the model and take away the stairs look if you prefer, either way, students should be encouraged to label the peaks, rivers, and major landmarks (a toothpick and sticky file label would work well for this). The groups would then join their sections with other groups to create the 3D replication of the entire area.

Discussion and possible follow up activities, such as journaling should involve critically assessing the terrain and what impacts various events might have on the health of the watershed. For example, "what might be the consequence of beavers damning Williams Creek?" (think of spawning salmon, among other things) or perhaps, "what might the consequences be to a family of cougars if clear cut logging where to occur above Hatchery/Granite Creek near the Hot Springs?" (Land erosion and slides, cougars and people being forced into a smaller area).

The Atlas of Canada – Topographic Maps found at http://atlas.nrcan.gc.ca/site/english/maps/topo/index.html will be of use in preparing this activity or alternatively, NWCC in Terrace has quality maps as well.

Suggested Complementary Activities:

Visit the lake and look for your labelled landmarks – take photographs to take back to class and display with the 3D replicas. Also see http://www.bclss.org/docs/Lakelse%20Lake_Final.pdf for further information and maps relating to the watershed

Using a pan of sand, allow students to make land forms and discuss elevation – add water and see what happens. What might happen in heavy run-off years at the Lake? How might this affect development and the natural environment and quality of the water?

Trace your hand – or if you don't mind letting students write on their hands: the fist provides a model for several terrain features. Make a fist. The knuckles form a ridge-line of mountains, between each two knuckles is a valley, and the back of the hand is a gently sloping hill/mountainside. Use a pen to draw contour lines around the knuckles and hand – rivers can flow down the hand to a lake at the top of the wrist from the 'mountain tops' as well. Then, if you flatten your hand, with your fingers out you model a flat 2D map to show how the lines are printed on paper.

A topic like landforms lends itself well to any lessons extensions which include the forces which build our land, like erosion, plate tectonics etcetera.

HUMAN IMPACTS – LESSON 4

Lesson Plan: Scavenger Hunt
Curriculum Links: Science/Socials

Duration: ½ day

Location: Lakelse Lake – picnic site (or other sites are possible too)

Purpose:

This activity is meant to encourage students to note the complexity of the interactions between the many life forms at Lakelse Lake and consequently, within the watershed. In addition, students will learn to document their observations in a manner which is ecologically friendly and to understand the effect that our interactions could have on a particular ecosystem. This is a two part activity which first has students exploring the general site, and then they will look more specifically at the water itself. This is organized so students may appreciate the complexity of the sites natural world.

Prerequisites and Skill Development:

Students should understand the importance of leaving the site just as we found it – if not better than we found it! To encourage and model this they should use a variety of collection strategies, such as 'rubbings', hand drawn facsimiles, and photographs. In order to facilitate this, they should understand the importance of caring for the cameras and also how to operate them efficiently. Students should also be able to work cooperatively in small groups with minimal teacher supervision as they search the site for their artefacts and evidence – although having parent volunteers is highly recommended. Students will recognize the complex life systems at work at the site and will begin to understand how integral each component of a healthy ecosystem is to its other parts. By looking at the water samples, students will be able to investigate whether or not this

particular link is weak in the ecological chain. The Water Pollution and Filtration Activity could precede this activity. (Also see www.lakelsewatershedsociety.com or http://www.bclss.org/docs/Lakelse%20Lake_Final.pdf for further information.

Materials:

* Digital cameras for each group (parents/volunteers can help if necessary)
* Clip board/pencils and blank paper for 'rubbings' or hand drawn samples/replica's
* Scavenger hunt list (see below)
* Water quality chart (see below)
* Magnifying glasses for each group
* Clear container to hold about 1 cup of water
* Large paper coffee filter and a funnel for each group

Activity Description:

In small groups students will set out to find evidence of as many items as possible from a teacher generated list. Working together they will document – but not disturb – their findings. For example, they will produce drawn or photographic evidence of:

Three different seeds – Cedar tree bark – Pine tree branch with cone(s) – Feather from a bird – A beetle or other small insect – Moss – A decomposer at work (e.g., beetles in log, fungi etcetera) – Something man-made – A flower – Two different leaves – Something left behind by a human – Drift wood or other material washed ashore (a visit to the site a day before hand is advisable and at this time, more can be added to the list).

To extend this – once all groups have finished their hunt – have them 'hunt' for 'things in the water': using a clear container, have each group collect about a cup of lake water then record their findings:

What we see with our eyes – in the container
What we see with a magnifying glass

Then, have them slowly pour the water from the container through a funnel, onto a large paper coffee filter and record:

What we see with our eyes – on the filter
What we see with a magnifying glass

Students can explore what their findings might indicate for the aquatic life in the lake. What do they feel are the ramifications of the water condition in relation to fish in the lake or the people who swim in or live near the lake? They should explore their own ideas of what can be done to ensure the water is of top quality for all who rely on and use it.

Note: These filters should be left to dry and taken back to the class for a future art activity (using eye dropper and colored tempera with a bit of water added – students can create a tie-dyed effect on the filter and after it dries, this makes great gift wrap). This extends the concept that we leave nothing behind and waste nothing – conservation and recycling messages are sent to the students.

Suggested Complementary Activities:

Collage pictures in classroom bulletin board display and use to journal reflective entries about water quality and its implications for the local ecosystem

Use the coffee filter for gift wrap

Couple this activity with the water quality activity on this website to determine how much of the pollutants in the lake might be cleaned up by the plants and soil –and what the implication is for fish or other water animals in the lake –is there a chain reaction when we have waste disposal issues nearby?

While at the lake site have students collect all the garbage left behind by others; take this back to the classroom and lay it out for analysis, graphing and charting. Students can then use this concrete data for creating an awareness campaign regarding the need for taking away whatever it is you bring to the lake with you. Or perhaps while at the lake they can draw a map of the site and note where the garbage cans are in relation to the area where the majority of the garbage is found. Are there sufficient garbage cans on site? Are there garbage cans near the parking lot so people can easily discard their unwanted items before leaving? Is there a need for a drink container recycling box on site? What are the consequences of the garbage left behind? What is the solution to reducing the amount of garbage being left behind? Devise a plan of action…

HUMAN IMPACTS – LESSON 5

Lesson Plan: Community Planners and 3D Mapping
Curriculum Links: Social Studies – Upper Elementary

Duration: 1 session

Location: Classroom

Purpose:

In this activity idea students will define ‘natural environment’, ‘human environment’, ‘adapted environment’, and ‘sustainable environments’. They will also assess how human impact might create non-sustainable conditions for other living organisms in a particular area. This is a board game type format which involves using play dough and other concrete materials to guide students’ community planning. They will work together in small groups to create a sustainable and ecologically friendly lakefront community. The main purpose is to invite analysis of the ecological ramifications of development around Lakelse Lake and its influence on the local ecosystems health.

Prerequisites and Skill Development:

Some understanding of basic community planning is necessary. For example, students must be aware that people create waste which must be dealt with, and we also need fresh water and access to services etcetera. They must also understand that each of our actions has many possible re-actions – We can never do just one thing: everything we do sets off a chain of events that are not always beneficial to the environment. For example, a local resident puts fertilizer on their waterfront lawn to 'green it up' – the rains come and the landowner is happy – this will wash the fertilizer into the soil – but unfortunately it also washes some residue into the lake, which is home to many aquatic plants and animals! Or, Joe Smith launches his boat at Furlong – proceeds to fill his tank while at the dock, but some gasoline spills over into the lake – again; the aquatic life is jeopardized. Students will be introduced to the term sustainability and will work together to define it. Also see http://www.bclss.org/docs/Lakelse%20Lake_Final.pdf for further information and maps relating to the watershed as you prepare your lesson.

Materials:

* 11 x 17 outline map of Lakelse Lake and main rivers – minus the labels and major sites!
* Playdough for small groups
* 1cm squares of coloured construction paper (or alternative – see below)
* Sticky tack or masking tape to temporarily apply the construction paper

Activity Description:

Trace an outline map of Lakelse Lake and copy to 11 x 17 paper for small groups of students and create a set of playing cards which list community planning situations that will have to be addressed and will guide students planning. (See Aerial Photo Maps)

Pre-teaching might include brainstorming the definition of 'environment', 'sustainability' and 'sustainable environments'. Ask students to suggest some basic components of the natural and human environment. Answers may include rocks, water, vegetation, the air, the sun, buildings, roads, landfills, and other features that people have added to the landscape. Make sure all students understand these two concepts before proceeding with the activity. Next, student should be arranged into small groups of 3 or 4 and given the outline map, a set of 'playing cards' to guide their planning, and a collection of materials to use as their 'props' (as per the materials list).

The following is a list of some sample situations the game cards might pose. Keep in mind that these cards should encourage community development with an emphasis on having as little negative ecological impact as possible:

Create at least one campground/picnic site – Provide a spot for a bird sanctuary – Ensure that the migratory path of the deer population is not disturbed to the north of the lake – Fifteen new families have requested permits to build waterfront summer cottages on the lake – where will you allow them to build? – You're under pressure to establish a park with camping facilities and showers and a swimming beach, where will you put this? – The nearby community has requested a designated picnic area with access to walking trails and swimming, where will you put this? – Twenty more people want to build year round houses on the lake, where will you put them? – A local ecologist has noted that bacteria (coliform) levels in the lake are rising, you must create a liquid waste disposal site for both sides of you lake – You've discovered a rare species of birds that frequent the cedar stands around the lake. You must ensure they have at least 30% of the forest surrounding the lake for their home – Where's your boat launch? – Where's your bear sanctuary? – The residents are tired of having to boat across the lake to get to their cottages and homes, you now need a paved road – where will this go without messing up salmon spawning channels or other sanctuaries? – Returning fish stocks and over-

wintering aquatic animals require high quality water and reed beds in that are found in the south end of your lake. How will you adjust your community to ensure this area is left untouched and healthy for these animals? – What else might you add to your ecologically friendly community?

As students choose the playing cards they must alter their 'map' and fictitious lake front community. Playdough (or similar) can be used to create 3D houses that can be easily moved about as they alter their plan based on how the game/cards play out. There are also any number of methods that can be used to represent forest, public areas etcetera – for example, 1cm squares of green paper could be attached with 'blue sticky tack' as protected forest cover and 1cm red squares could represent the public areas – the important point here is that whatever method or material you choose – the pieces need to be movable and reasonably stable so that when students reach across the map to move pieces they are not accidentally bumping other pieces out of the way. They should be encouraged to ensure the environment is protected always and to move pieces around as necessary – will the liquid waste plant damage the lake during flood season? Will the people be reasonably protected from the sanctuary animals – and vice versa? Will the fish survive? What about recreational use, how much will be too much – will the year round residents be overrun with summer tourism noise and commotion? Students should brainstorm the conditions in their models which allow for use of the environment but at the same time protect it.

You can follow this up by having the students take a second map sheet and labelling it as Lakelse Lake actually is at present – they can reflect upon how their communities differed from the actual situation today at the lake and predict what implications there might presently be at the lake due to human habitation and development.

Suggested Complementary Activities:

You may choose to not tell your students that the first outline map is actually Lakelse Lake and after they have finished their community planning exercise ask them to consider what issues and challenges they found and if their communities were actually ecologically friendly and if, in their opinion, the current land use practices are eco-friendly . You could set the stage by telling them that they have just inherited a lake, but that the bequest stipulates that it must be developed into an area that always protects the local ecology in a safe and sustainable manner. However, there is a nearby community, and people from this town want to be allowed to use the lake too, so it will be up to the students to decide how to best make this work for everyone. Then use this to lead into discussions about concerns within the Lakelse watershed. The Lakelse Watershed Society and Kitimat-Stikine Regional District can be good sources of information.

A possible research activity for a class project: Salmon return to this warm water lake every year for spawning and the people want a viewing platform to watch this migration. Where will we find the money and how will we ensure the stream is undisturbed – groups could be assigned to research location and funding, impacts, and the pros and cons.

Have students create a diorama with a natural environment on one side of the box and an adapted-ecologically friendly environment in the other half – or find sample pictures of natural environments in various nature magazines. Cut these in half and have students choose one to past on a sheet of paper, but they will hand draw in the second half, making it an ecologically friendly, shared environment. Another idea would be to create an altered, but friendly shoreline; see http://www.livingbywater.ca/main.html for further details.

HUMAN IMPACTS – LESSON 6

Lesson Plan: Forest Practices
Curriculum Links: Social Studies/ Language Arts

Duration: One 30 min computer lab period, two 60 min class periods plus a 90 min field trip to the cut block. Alternately, photos of the cut block can be viewed and a map of the Lakelse Lake watershed highlighting the upper Furlong Creek identified.

Location: classroom and/ or the blow down of trees within the cut block on Furlong Creek in the Lakelse Lake watershed.

Purpose:

This lesson will help students understand that they can be active citizens in society and will give them an opportunity to experience one way to take action.

Materials:

* Forest Practices Board Website: http://www.fpb.gov.bc.ca/index.htm
* Photos of Furlong Creek blow down.
* Link to map of Lakelse Lake watershed
* Collection of resources discussing environmental impact of logging

Activity Description:

Students will visit the Furlong Creek cutblock, or, if not possible to reach it, view the pictures of the blow down provided and a map of the watershed that indicates Furlong Creek. (See link to map) Allow the students 30 minute to explore the Forest Practices Board Website at http://www.fpb.gov.bc.ca/index.htm. Have students locate the link to, Complaints, and discover what the mandate for the Forest Practice Board is, which Complaints the FPB can consider, and how a citizen would file a complaint.

After visiting the cutblock and or the resulting blow down and completing the research on the Forest Practices Board website, brainstorm environmental issues that students feel were a valid concern in the cut block. Alternately, students could view a photo of a blow down of trees and a map of the water shed indicating where the logging took place and where the blow down occurred. (See photo attached and link to map) Blow down is located upstream on Furlong Creek.

Next, have students come to consensus on one concern they feel they could report to the Forest Practices Board.

Tell the students that half of the class will be concerned citizens and the other half will be the Forest Practices Board. After dividing the students into the two groups allow at least 30 minutes of class time for both groups of students to research the concern. The concerned citizen group will chose a spokesperson who will present the problem to the board. The citizens group will justify why they think their concern is a problem that needs to be addressed by the FPB.

The Students acting as the Forest Practices Board will hear the citizens' complaint, will briefly deliberate, and then report their findings to the citizens.

Both groups of students will be required to complete written statements outlining either the complaint or the resolution. Students can refer to models presented on the Forest Practices Board website to act as a guide in their writing.

Suggested Complementary Activities:

Activity 1

Examine what organizations, such as the Lakelse Lake Watershed Stewards Society, are doing to protect the environment. Through the use of guest speakers or by having students conduct personal interviews with members of the Lakelse Lake Watershed Stewards Society students could begin to understand what small groups are doing at the grassroots level to protect the environment. Another excellent example of a grassroots environmental movement for students to examine is the People's Action Committee for Healthy Air located in Prince George (http://pachapg.ca/).Alternately, have the students come up with ideas and resources to present to the Lakelse Lake water shed society to promote community awareness of the Lake.

HUMAN IMPACTS – LESSON 7

Lesson Plan: Finding a Solution to Local Environmental Problems
Curriculum Links: Grades 3-7 Science and Socials

Duration: 90 minutes

Location: Classroom

Purpose:

The purpose of this lesson is for students to use their critical thinking skills to come up with a solution on how they would clean up a local stream increasing salmon production.

Prerequisites & Skill Development:

Students will have completed a unit on local watersheds and how humans have impacted the streams and creeks inside the watershed. Within the unit, students will have observed and discussed the impacts and consequences humans have had on streams and salmon production. Students are now ready to try and deal with and solve this problem.

Materials:

* Blank paper
* Crayons

Activity Description:

Students will try to solve their local environmental problems by holding a conference or a round table discussion. This activity is something that should be modeled, so students have a clear understanding of what is expected of them. Students will be put in groups and the teacher will explain to the students that within their group they need to come up with a solution together and present their idea to the rest of the conference members or members of the round table. Students will need to back up their solution with some sort of reasoning. Then the students would vote on the best solution. Some solutions might be to build off channels to slow the velocity of the streams down. Another solution could be to add woody debris, with permission from someone with authority, so the fish can spawn in the deep pools the woody debris causes.

A good way to end the lesson is for students to create their own newspaper, which would need to be modeled for them. On a blank piece of paper, students would write the title of their paper, either Daily News or School Newspaper. Then they would write a headline to capture citizens' attention about the local environment problem, and following this, the students would then draw a picture of the problem, with a caption below the picture. The caption would tell the reader how they are trying to solve the environment problem.

Suggested Complementary Activities:

1. Science and Language Arts: After students have come up with a solution/s to a local environmental problem, they could invite a member from the Department of Fisheries and Oceans (DFO) to talk as a guest speaker about problems and solutions. Following this, students could take action by writing a letter to the Minister of Fisheries and Oceans Canada.

2. Science: A good follow-up field trip would be to bring students to a salmon hatchery, so students could make a connection between human environmental impact on streams=low salmon production=introduction of salmon hatcheries.

HUMAN IMPACTS – LESSON 8

Lesson Plan: Logging the Lakelse Lake Watershed Debate

Curriculum Links: Social Studies/ Language Arts
Duration: Two 30-minute periods
Location: Classroom

Prerequisite:

Students will have spent time researching the environmental impacts, on watersheds, of such activities as logging, road building, and housing developments.

Purpose:

The purpose of this activity is for students to experience the perspectives of all of the stakeholders in a proposed logging operation and to begin to understand the need for cooperative resolutions to environmental problems.

Materials:

- Role playing cards (provided)
- Student journals

Activity Description:

Read the following scenario to the students:

"TreeCut Company has applied for permission to harvest an area of ancient rainforest within the environmentally sensitive Lakelse Lake watershed. Many people, as well as the watershed and lake, are likely to be affected by the government's decision to permit or turn down the proposal. Some of them have asked the government committee for an opportunity to present their view about the logging proposal in a debate. The people can also make suggestions about guidelines that TreeCut Company will have to follow if the logging is allowed. At the end of the debate, the government committee will vote to recommend that the legislature either refuse the logging plan or approve it with guidelines."

Students will play the role of the people in the debate. They will inform the government committee about what they think of the proposed logging in the Lakelse Lake watershed and why.

The class will be divided into nine groups and each group will be given one of the role playing cards. The groups will have 1-3 minutes to state its position on the logging proposal and to explain why it feels that way. Following the group presentations allow 10-15 minutes for the groups to question members of any other group, each group will then give a brief summary statement reiterating their position.

The government committee members will discuss the debate and make their decision to either refuse the logging of the ancient rainforest within the Lakelse Lake watershed or allow it to go ahead with guidelines placed on it.

While the government is making its decision, ask the rest of the students to consider the following questions by writing about them in their journals.

Questions

Before the debate, what was your view on the logging proposal? Has your view changed since the debate? Explain why.

Did you agree with the position that your group had to present? Explain why. If you didn't agree with your group's position, how did you feel about preparing it? Explain the importance of considering the views of others, even if we don't agree with them.

This lesson plan has been copied and adapted from A Lesson by Anne Lindsay in the book *Teaching Green: The Middle Years,* and more information can be found there.

Suggested Complementary Activities:

Activity 1

As part of a Language Arts activity students could be reading the novel Ring of Tall Trees by John Dowd. This book is effective at portraying the perspective of all stake holders in the issue of forest practices, which in this case is clearcut logging. As part of their novel study students could perform tableau, which would also help them understand the perspective of the various groups interested in the logging industry.

Animals and Plants of Lakelse Lake: You wish to remain in the ancient temperate rainforest, which is one of the few places where you can find your natural habitat. You believe that you have the right to shelter, food, clean water, and space. You know that logging – particularly clearcut logging – will destroy your habitat and you will probably die.	**First Nations Elder:** You are a Tsimshian and your people have lived in the area surrounding the Lakelse Lake watershed for thousands of years. You believe that your people should have the final decision about what happens to the forest in your ancestral homeland. Your people have used the forest respectfully, but you would consider some logging if similar consideration was carried out by the loggers.	**Treecut Logging Company President:** You have been in the forestry business for more that 50 years, providing jobs for thousands of people. You admit that some of the practices used in the past were irresponsible and you are taking steps to improve them. If the government does not allow logging in the Lakelse Lake watershed your company will start to lose money and might have to lay off some of the long-time workers in several towns.
Tourist: You are planning a trip to the Terrace area next summer for camping, fishing, canoeing, hiking, and photography in the forest. You will spend a lot of money to hire a guide and to fly yourself and your equipment to Terrace. You are against the plans for logging, as it would ruin your chance to experience the beauty of an ancient temperate rainforest around Lakesle Lake.	**Business Owner in Terrace, BC.** You own a restaurant near a Treecut company mill, the biggest business in town. People who work there and their families enjoy meals at you restaurant. If Treecut's proposal to log the Lakelse Watershed are is not allowed, many of the people in your town might lose their jobs and have to move to find work. Without their business, your restaurant might have to close.	**Environmentalist:** You are an environmentalist who has lobbied government for a long time to protect the Lakelse Lake watershed from all industry including logging. Already large areas of the forest have been destroyed by clearcutting and the lake has suffered the repercussions of sedimentation as a result of soil erosion. You believe that replanting trees only provides another crop of trees for the logging company to cut; it can never replicate the complex ecosystem of a true ancient temperate rainforest or replace the habitats that will be lost.

Logger: You are the third generation of loggers in your family who have worked in you family for Treecut Company and you have three children to support. You are not trained for any other type of work and other jobs are hard to find in your community. If Treecut is not allowed to log the Lakelse Lake watershed area you might lose your job. You understand that saving the old-growth trees and protecting the lake is a good thing, but you have to make a living for your family to survive.	**Resort Owner In the Lakelse Lake watershed:** You own a small resort that is often used by families wishing to enjoy time at the lake and people who want to hike in the temperate rainforest. You have stayed in the Terrace area where you grew up so that you can spend your free time canoeing and fishing the waters within the Lakelse Lake watershed. If the rainforest is logged, and the watershed is destroyed, tourists may no longer have a reason to visit the area and stay at your resort. You may have to close your business and leave the area.	**Government Representatives:** You are newly elected and depend on everyone's support to stay in office. You must recommend to the legislature either to refuse or to approve (with guidelines) the logging proposal. Environmentalists want you to pressure the legislature to preserve what remains of your area's ancient rainforest and to protect the watershed of the only warm water lake in the area that also happens to produce 35% of the salmon stocks for the Skeena River sockeye runs. Loggers and others will lose their jobs and businesses if logging is not allowed in the Lakelse Lake watershed.

HUMAN IMPACTS – LESSON 9

Lesson Plan: Is Lakelse Lake a Sink?
Curriculum Links: Science, Socials, upper elementary

Duration: 60 minutes

Location: Classroom

Purpose:

To help students begin to understand the sensitive environment of Lakelse Lake and how to live responsibly and treat it with respect for future generations.

Prerequisites & Skill Development:

Students will view a bathymetric map of the basin of Lakelse Lake and build upon their prior knowledge of how to construct a model of the basin from the lesson "What is the bathymetry of this sink?". Students will construct this model by transferring the depth rings of the map (isobaths) onto cardboard sheets and gluing them together to show a scaled down model of the actual lake.

Materials:

* Bathymetric map of Lakelse Lake (see www.atlas.ca)
* 10 pieces of cardboard (or foamboard) cut to same size as the map is scaled to. (Suggested size is an increase of size with photocopier or by hand to fit an 11×17 piece of paper)

* Exacto knife or scissors
* Mat to cut on
* Pencil to transfer depth rings
* Tempura paint (optional)
* Glue

Activity Description:

Teacher shows a picture of Lakelse Lake. Ask class what they see. Responses will vary, depending on the children's prior knowledge and experiences surrounding the lake. Allow students time to share their ideas.

Ask the class to consider what else the Lake is used for. ie – place where fish live, frogs live, trumpeter swans visit, and ducks live in. Have you ever wondered what the bottom of the lake looks like? Does anyone know what kind of map would show us what the bottom of the lake looks like? (bathymetric map)

Show class a model of the 3D image that we are about to construct. For the teacher's model, you may wish to construct it out of foamboard, which is available at local craft store and is thick and precise for transferring the depth levels of the lake (isobaths) onto. Show class bathymetric map of Lakelse Lake. Explain that we are going to construct a scaled down version of this map out of cardboard so we can see a 3D model of it. From this model, we will have a clearer understanding of where these animals live and see Lakelse Lake as a home, not just as a recreational destination for us.

Divide the class into 5 groups of 6 people each. Give each group a bathymetric map of Lakelse Lake and explain that the lines that make up the rings are called isobaths and represent the various depths of the lake, (just like we did with the last lesson of mapping the sink). Assign each group a different depth to cut out of the paper. Ask each group to cut out the ring that represents the depth they have been assigned, keeping the surrounding paper intact. When they are finished cutting out the ring, it should look like a piece of paper with a hole cut out of the center. Hand out a piece of cardboard, the same size as the piece of paper that the students have just cut out. Transfer the ring that they have cut out onto the cardboard by lining up the paper with the sides of the cardboard and tracing around the inside of it. Once it has been traced, get some one else in the group to cut out the ring along the traced lines. When all groups have successfully completed this task, ask them to come to the front of the class with their pieces of cardboard. Explain that we are going to layer the pieces of cardboard, just like a triple decker sandwich. The bottom layer will have no hole in it, the next layer will be the lowest depth, the next is the second lowest, and so on until all of the layers are fit together. Glue the layers of cardboard together.

Once the layers have had time to dry, the students may want to paint the inside of the lake with brown/ blue tempura paint to make it look more realistic.

Suggested Complementary Activities:

Bathymetric map of Lakelse Lake can be attained from www.atlas.ca

Go to Lakelse Lake and bring the models of the Lake that the students have constructed and identify the landmarks on the model

“Causes of Pollution” lesson plan for Grades K-3 (could easily be adapted for any grade) can be found at: www.lessonplanspage.com/SciencePollution.htm

Go to Lakelse Lake and collect samples of the water and observe it under a microscope.

Get students to draw pictures of the organisms that they find under the microscope and label them according to the names they find on the above website and www.sciencespot.net

Discuss the importance of the food chain and how dependent the wildlife is on a healthy ecosystem to sustain their life. Get students to brainstorm ideas of how to be responsible when using this resource. For ideas, see www.env.gov.bc.ca/bcparks/kidspage/kids.html