

Sustainability Camps



Sustainability Activities for Youth

Developed By:
Tofino Botanical Gardens Foundation

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INTRO: Welcome to Sustainability Camp!
February 2007

Dear instructors/facilitators of “Sustainability Camp”,

The curriculum for “Sustainability Camp” has been developed with a vision of delivering a 6-day camp for grade 6/7 students. The goal of the camp is to increase youth knowledge and awareness about the global ecological crisis, with the hope that this increased awareness will help moderate the behaviour of future generations and inspire political action for positive environmental and social change. The camp seeks to provide young people with the skills to take initiative in their own lives and communities.

The curriculum is outlined in a series of 3-hour blocks, which was intentional so that these could be adapted for a 3-day, or even shorter, youth program. The “Program Flow” document (see page 7) is a recommended sequence for these blocks for a 6-day camp. Instructors are encouraged to use the Welcoming and Closure and Celebration blocks for a 6-day or 3-day camp scenario, however for shorter programs, these blocks may not be necessary.

Each instructor or facilitator will bring their own knowledge, experience, and energy to program delivery. The following curriculum is intended as a starting place for the “Sustainability Camp” program. Instructors may wish to arrange the blocks in a different sequence, change, enhance, adapt, or remove activities. Depending on the students needs and interests, the instructor may choose to focus on some themes and not others. The 6-day outline is definitely a full agenda – don’t be afraid to just take an afternoon to play games or hang out in the gardens or on the beach. You will have to adjust the program to everyone’s needs throughout the week. Be flexible.

Listed below are some key principles to consider during program delivery:

- Get to know your learners, and how they best learn. This could be accomplished through a pre-program class visit (suggested, see Appendix A: “Ideas List”), talking to the teacher, and assessing the success of different activities throughout the program. Also review and consider the theory of multiple intelligences – people have different “intelligences” or styles of learning.

These are: (1) Visual/spatial, (2) logical/mathematical, (3) verbal/linguistic, (4) musical/rhythmic, (5) bodily/kinaesthetic, (6) interpersonal/social, (7) intrapersonal/introspective, (8) naturalist, and (9) emotional (a recent addition). The curriculum has been developed to honour these different ways of learning.

- **Experiential / Outdoor** – This is an experiential learning program. Allow students to discover and explore, and spend lots of time outdoors. Make the learning real and relevant. Prompt students with questions and speculations, rather than giving them the answer all the time – ask them questions such as “What do you think?” “How does this relate to your life?”
- **Critical thinking and problem solving leading to ACTION!** Youth will likely learn and think about a lot of new concepts and ideas at this camp. Encourage them to put their knowledge and views into action, to find solutions to issues that are raised. The theme of taking action and contributing to social and environmental change extends across the curriculum and culminates in the block “Community and Citizen Contribution” where students will complete an action project or service learning project, as well as in the closure where students make personal commitments to taking action.
- **Journaling** – Journaling is introduced as a way for students to reflect on their learning and to explore, within themselves, how they will take their learning back into their own lives, schools, families and communities – after camp. Journaling is a great activity for kids and is incorporated into this program as there is much research that supports the use of journals in environmental and sustainability education. See the attached hand-out on journaling. Also see the works of Bill Hammond. Look for opportunities throughout camp to use the journal.
- **Modeling** - You are a role model for youth, and your behaviour influences students’ actions. This program encourages a love of learning and discovery, and of taking action on one’s beliefs and values. Set an example for learners. Set an example through your actions, and make an effort to model the messages of the program wherever possible. Modeling in program structure includes elements such as food (provide local, organic, low eco-footprint foods, and if possible, allow students to play a role in preparing and serving the food over the camp), materials (eg. use recycled paper, non-toxic paints and pens, no disposable containers etc), conserve water and energy (encourage turning off lights, tap, etc.), language (ensure your language is accessible to all students), and learning environment (use a circle instead of rows, ensure all voices are heard, etc)
- **Fun is fundamental** – Remember to have fun. While many of the topics we explore under the theme of sustainability are serious and concerning, it is important

to include humour and joy in learning. If you sense that students are tired, overwhelmed, bored, or depressed, choose to play a game or energizer. Even just having a break – 6 days can feel like a long time for a 12 year old. Don't be afraid to set an activity aside and just have some fun outdoors – kids need this.

- Debrief – Often debriefing an activity is just as, and sometimes more, important than the activity itself. In a program of several days, make connections between blocks and activities. Continue to build on students learning throughout the program by referring to previous learning. Debriefs can be short and succinct, or can be a longer discussion depending on the nature of the activity and the energy of the group – use your judgement. I often conduct debriefs in a sharing circle format, and a pair share or small groups is also a nice way to mix it up.

Many of the activities in this curriculum have been adapted from the works of educators before us – with many thanks! However, the curriculum as a whole has not been tested for the Tofino Botanical Gardens Foundation youth sustainability camp. I hope the curriculum works well and I am sure it will be improved as educators test and refine it. Please use the program evaluation form (draft) and other means of gaining constructive feedback to continue to improve the curriculum.

If you have any questions or want to talk about this curriculum, please contact me at nadiner@pembina.org or 250-358-2164. Good luck, enjoy, and may the force be with you!

Nadine Raynolds
Curriculum developer, Sustainability Camp

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
Morning Block (3 hrs)	Pre-Program Visit with class at their school: What is sustainability camp and how do I prepare?	Biodiversity Can be delivered by Raincoast Education Society	Nature's Resources Part 1: Something for Everyone Activity Part 2: Dead animals in your car? (mudflats – tide dependent)	Pollution Solutions Part 1: Who Polluted the Potomac? Interactive Story Part 2: Beach Art Boogie with Peter Clarkson	A Climate of Change Part 1: Climate change game? Part 2: Solutions dramatization	Closure and Celebration - Action project presentations Closing circle Letter to self Evaluation
Afternoon Block (3hrs)	Welcoming Part 1A: - Introductions - Community building activities - Intro to journals Part 1B: Spaceship Earth	Conservation Can be delivered by Raincoast Education Society	Renewable Energy Field trip to micro hydro site and/or biodiesel bus OR Re-Energy.ca: build a turbine or solar oven	Exploring our Eco-Footprint	Community and Citizen Contribution Small groups - students devise action projects (or participate in a local service learning project)	Post-Program Visit with class at their school: What did you learn and how are you acting on it?
Evening (various games, movies)	Make nature name tags? Other welcome games		Introduce Comm. and Citizen Contr. block – form groups, and start thinking of action projects!			

INTRO: PROGRAM FLOW – 6 day Sustainability Camp

Block 1A: WELCOMING

Time: 90 min (1/2 block, follow with SPACESHIP EARTH)

Place: Tofino Botanical Gardens, outdoors or indoors

Overview

The beginning of any educational program or camp is both exciting and scary for participants. The Welcoming block is designed to introduce students and teachers to the program, the field station, and their facilitators. It is designed to begin the program by creating a sense of community and teamwork within the group. A sense of participation and responsibility to community is a key aspect of creating ecological sustainability and social equity. A community functions well when there is trust, communication, cooperation and support. Students will engage in activities that seek to build these elements of a healthy community. The Welcoming session will also introduce the importance of personal reflection by inviting students to use a journal. Building community, contributing to community, and journaling are on-going themes and of essence in the activities throughout the camp.

Prescribed Learning Outcomes

- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Identify and demonstrate positive behaviours that show respect for individuals' potential, interests and cultural backgrounds; Select and assume responsibility for assigned roles while participating in a physical activity.
- √ Grade 6 Language Arts: Demonstrate a willingness to assume a variety of roles in group interactions.
- √ Grade 7 Language Arts: Create a written communication to record their views, opinions, values and beliefs; Encourage others to participate; Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Encourage others to contribute to a safe school and community.
- √ Grade 7 Fine Arts: Demonstrate leadership and responsibility within a group.

Objectives

- Students will understand the concepts of teamwork and community, and be active, respectful, and responsible members of their class community.
- Students will have fun and work together as a team, which will help them learn about themselves, each other, and strengthen their sense of community as a class.

- Students will know the ground rules of the program and the Clayoquot Field Station.
- Students will be introduced to the concept of reflection and be able to use a journal to record their own thoughts and ideas.

Materials

- Team building activity materials
 - Beat the Clock: a watch with a second hand
 - Electric Fence: 4m long rope, 6-8 bells that can be tied or clipped to rope (twist ties work well), 6 blindfolds, stuff sack to hold equipment
- Journals for each participant
- Samples of journals to demonstrate to participants
- Collection of various pens, pencils, felts etc.

Procedure

PART 1 – Introductions (20 min)

1. Ask participants to gather in a circle. Welcome students and teachers. Introduce facilitators and instructors, and explain why students are at the field station.
2. Name game (include everyone - teachers, students, parent chaperones, instructors and facilitators): Invite participants, one at a time around the circle, to introduce themselves by stepping forward in the circle saying his/her name while making a motion that shows how s/he feels. It could be a wave, a skip, or a movement that expresses excitement, sadness, worry, or anything else. It should not be a motion like a flip or cartwheel though because after each person introduces themselves, everyone else will step forward and repeat the person's name and motion. Continue around the circle.
3. Explain that this circle is our community for the next week. Ask: What is community? Why is community important to you? Talk about how they have a community in their classroom, a community of friends, a community of people, a community they live in (they may share views, values, interests, activities with their communities ie. church, hockey, music).
4. Explain that the place for our community for this week is the field station and the gardens. Explain rules that the community must respect, and expectations facilitators have of students (ie. be on time, participate, etc). Ask students if they have expectations of each other.

5. Explain that community is a key theme during this week, and that later in the week we will actually be going out into the greater community to do some neat projects that you (students) will come up with!

PART 2 – Community Building Activities (55 min)

Key concepts in building a team, or community: CATS - cooperation, appropriate communication, trust, and support. The following four activities can be completed in sequence, emphasizing each concept with each activity. Be sure to introduce each activity and the key concept, and conduct a debrief at the end of each activity. Then conduct a debrief at the end of all four activities. Focus on what participants learn about themselves and their group, the idea of community and teamwork, and the four key concepts. Help them become community CATS!

1. Beat the Clock (cooperation, 10-15 minutes)

This activity is excellent for bonding the students as a group, and requires a physical teamwork challenge, demonstrating the importance of cooperation.

- a. Start by asking participants to form a circle shoulder-to-shoulder, holding hands.
- b. Ask everyone to take 2 steps backwards.
- c. Tell the group their challenge is to “Beat the Clock”. “Pretend you are a big clock. In front of me is 12 o’clock. You must move clockwise all the way around the circle until you are back at your original position. The record is the same number of seconds as there are participants (eg. If you have 22 people, the record is 22 seconds). Remember if you break the circle, you must stop, join hands again, and then start again. Let’s see how much you can beat the record by. Ready, set, go!” (remember to time the group)

Variations:

- 1) Have the group go counter-clockwise to see if they can beat the record set in the clockwise direction.
- 2) Have the group go around twice or three times and time them.
- 3) To challenge a group that has completed variations 1 and 2, have them face outwards. You can now challenge them again doing the same “Beat the Clock” challenges.

2. Electric Fence (appropriate communication, 15-20 minutes)

This activity allows participants to learn about self, others, and teams. Every group requires a team at one time or another. Good communication (respectful language, active listening, sharing air time, clear communication) is essential to accomplishing challenging tasks.

- a. Tie the 4 m long rope tightly between two trees. The rope should come up to the belly button of the average height of the group members. If you have a very athletic group the rope can be raised a few inches. If the group thinks watching TV sports is exhausting, the rope can be lowered. Clip or tie the 6 to 8 bells to the rope. Make sure any obstacles are removed so that both sides of the electric fence are clear. (you could set the rope up in advance)
- b. Gather the group and tell them the story:

“Your group is being chased by a band of outer space pygmies who want to take over earth. They have set up this electric fence trap to catch you. Your group is on one side of the fence, and you must get your whole group over to the other side using only what you have on you. You cannot use any other equipment. Also, no part of your body, clothing, or equipment may touch the rope. If it does, the bell will ring and that person will be blindfolded and returned to the starting side to try again. Although you may step or stand underneath the electric fence, no person or equipment can be passed under the electric fence. The trees the rope is tied to is also electrified, and will cause you to be blindfolded. The area on the other side is also pressure sensitive therefore people must land lightly. Once a blindfolded person reaches the other side, the blindfold will be removed. Good luck with your challenge!”

- c. Remind the group that communication is key. Encourage the group to hear everyone’s ideas for getting group members over. Ensure students are actively listening to one another and using appropriate language. Often, a few people take charge immediately with their own ideas. Challenge the group to consider all ideas, because they may need many different ways to get people over.

3. Wind in the Willows (trust, 10-15 minutes)

This is a short activity designed to build trust. It is essential that members of the team take their task seriously. There are safety concerns that facilitators must watch for. Each individual in the group becomes directly responsible for the safety and well being of the participant in the middle of the circle. Be sure to emphasize this to the group.

- a. Break the group into smaller teams of 5 to 10 (might be best to allow kids to self select teams). Ask adults to be a facilitator for each team.

- b. Have each team form a small circle, facing inward, where everyone is standing nearly shoulder-to-shoulder.
 - c. Invite one person to be the first “willow”, demonstrating and setting an example for the activity. Facilitators should be watching closely.
 - d. To be a “willow”: stand in the middle of the circle, with your feet close together, and hold your body stiff. Cross your arms on your chest. As the wind starts blowing through the willows they will start to sway. When the team is ready close your eyes and fall back, keeping your body stiff. The team members behind you in the circle will stop your fall after you have “swayed” back 30 to 60cm, and push you back up in another direction - this may be across the circle or to the right or left. Try to keep your eyes closed. Remind the team that the object is to build trust, not destroy it, so everyone must pay attention and do their job well.
 - e. After about one minute of swaying around the circle, have the “willow” open their eyes and stop. Now, someone else can be the “willow”. Continue until everyone has had an opportunity to be in the middle.
- * Some students may not want to be in the middle of the circle. Encourage them to give it a try, but don't push it. Tell them they can leave their eyes open. Have the group form a tighter circle so the “willow” won't sway as far. The rest of the group will likely encourage their classmates as well.

4. Sitting Circle (support, 5 minutes)

This is a simple activity that illustrates how a team or community supports all members. When all members offer support, all members are supported.

- a. Start by asking participants to form a circle shoulder-to-shoulder.
- b. Ask everyone to take 1 step forward so they are snug together.
- c. Ask everyone to turn to their left, so that each is facing the back of another.
- d. Explain that they are now going to slowly sit down on the lap of the person behind them. Everyone must move slowly and be able to sit down with fair comfort. People can shift closer to each other if needed.
- e. Allow the group to sit, supporting each other, for a few seconds.
- f. Now ask: What do you think will happen if one person does not support the community? Try it, by asking one person to leave the sitting circle. Then you could ask another, and maybe one more. What is happening?
- g. Ask the group to form the circle again on each others laps and give one big hoorah!

Debrief all four activities in a circle (5-10 minutes)

Use:

WHAT? (What did you learn?)

SO WHAT? (Why is this important or meaningful?)

NOW WHAT? (What are you going to do now? How will you act on your learning?)

Emphasize the four key concepts of community: CATS - cooperation, appropriate communication, trust, and support. Reiterate the importance of citizen and community contribution – an ongoing theme in this camp.

PART 3 – Journaling (15 minutes)

Through the ages right into today’s creative world, journals have been the working-thinking place of great thinkers, inventors, and artists. Journal keeping is an activity that promotes reflection and invites students to “be with themselves”. It is a creative process that allows students to capture their own thoughts, reflections, and questions that arise through their learning experience. Much research and practice in environmental and sustainability education promotes the use of journals.

1. Ask the group if anyone keeps a journal? Why or why not? Explain how journals can be a useful tool for collecting thoughts, questions, and ideas. They are a place to reflect. Explore the concept of reflection.
2. Explain and demonstrate with existing journals (if possible) that each journal is unique, and shaped by its keeper. Not all journals are just writing. You can draw, doodle, write, paste things, paint in them... whatever you are inspired to do.
3. Explain that students are invited to use journals during their stay at the field station, and that they should bring their journals to all activities unless the facilitator says they don’t need it.
4. Hand out a journal to each participant.
5. Ask students to take 5 min to make their first journal entry. You might start with: “Using whatever method you want (writing, drawing, etc) and using the pens and pencils I have here, on the first page of your journal I want you to reflect on the group activities we just did. What did you learn about how you can contribute to your classroom community?”

* You can also use any of the “Journal Entry Starter Actions” (pg. 4) listed in the printed facilitator handout. This handout is also useful for generating other journal activity ideas throughout the program.

NOTE: if the team building exercises end up taking longer, you could opt to introduce journaling as an evening session.

Block 1B: SPACESHIP EARTH

Time: 90 minutes (or less, ideally use after WELCOMING, and incorporate a short break in between ½ blocks)

Place: Tofino Botanical Gardens, outdoors or indoors

Overview

Earth functions as a massive life-support system for six billion human beings, as well as the trillions of other life forms that share the planet with us. Often students do not consider the earth as a system, nor human society as a system dependent on that ecosystem. This giant ecosystem is also a closed system – where everything is cycled, and recycled; nothing comes in and nothing goes out. The Spaceship Earth activity can be used to illustrate a variety of subjects within the context of ecological sustainability, and is a great opening to a program. The activity challenges students to design their own spaceship (their own ecological and human system), which triggers all sorts of questions and decisions about how people can (and should?!) live on “Spaceship Earth”. Designing a long duration space mission demonstrates that any life-support system we depend on will be patterned after that of Earth.

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems; Evaluate human impacts on local ecosystems.
- √ Grade 6 and 7 Physical Education: Identify and demonstrate positive behaviours that show respect for individuals’ potential, interests and cultural backgrounds.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.
- √ Grade 6 Language Arts: Create real and invented narratives, descriptions and informal oral presentations.
- √ Grade 7 Language Arts: Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Analyse factors that affect global health issues.
- √ Grade 7 Personal Planning: Practice responsible decision-making.
- √ Grade 6 Fine Arts: Express ideas and emotions using verbal and non-verbal communication; Demonstrate respect for the work of self and others.
- √ Grade 7 Fine Arts: Make 2D and 3D images for specific purposes; Demonstrate leadership and responsibility within a group.

Objectives

- Students will understand the complexity of systems and recognize that Earth is a closed system.
- Students will engage in a problem solving and critical thinking task to design a life-support system that is sustainable for thousands of years.
- Students will explore questions of ecological sustainability in a small group of peers, challenging them to come up with and articulate their own answers to community sustainability.

Materials

- One large cardstock paper (~22" x 30" paper) for each group of students.
- Collection of pens, pencils, felts etc, for drawing spaceship.

Procedure

6. Tell the students that something has happened to earth, and that people are preparing to leave. We are on the doorstep of an environmental catastrophe and people can no longer live on the planet. It is uncertain as to when, or even if, people will be able to return to planet Earth.
7. Explain that their task is to design a spaceship that will support a certain number of people for potentially thousands, or even millions, of years. Explain that they can take whatever they want from Earth, that their spaceship can be any size (within reason), but that it must be a fully functioning life supporting system (ie. all the people must be able to live on this spaceship indefinitely).
8. Tell students not to focus on how the spaceship will travel in space, but on how the people will live inside it. Remind them that this is a closed system; once they leave earth nothing will come in and nothing can leave the spaceship (eg. they cannot send their garbage or sewage out into space; they can however capture the sun's energy).

In making decisions about what their spaceship system will be like, students must discuss and resolve questions such as:

- a. How many people will you bring? (reasonable, eg. 1000 not one million)
- b. What will people eat?
- c. How will you provide adequate drinking water?
- d. Where will the sewage and garbage go?
- e. What technologies will you use?
- f. Will there be animals? bikes? cars?
- g. Will there be schools, hospitals, government?

9. Get students into groups of 4 or 5. Hand out one cardstock paper to each group.
10. Ask them to take about 15 minutes to brainstorm all the ideas they have and discuss the design of their spaceship. After your sign off, they will then draw their spaceship on the other side of the paper.
11. Circulate amongst the groups to ask probing questions such as those listed above, and others. Ask groups to get your sign off before they start drawing their spaceship on the other side of the paper. Your sign off will be one final chance to ask any more probing questions and to test some of the assumptions students may have made. (eg. ask them to explain their drinking water/wastewater system, or their government structure, or ask them how many males and females they will bring on board... why?). Search for holes in their system design, and ask probing questions that stimulate them to think deeper, and to ensure the spaceship is a closed system.
12. Allow ample time for groups to draw their spaceship systems. (30-40 minutes) Tell them that they are then going to present their spaceships to the rest of the class. Give a few minutes to prepare for their presentations.
13. Ask each group to present the details of their systems and why they chose what they did. Invite the rest of the class to ask questions of the group. Will these people on this spaceship survive for thousands of years? Why or why not? (take about 5 minutes per group).
14. Debrief the activity: What did you learn? What is a closed system? What are some of the key requirements for a spaceship to be sustainable over time? How are your spaceships similar to Earth? Have we designed our own lifestyles and communities to be sustainable over a long period of time? (5 to 10 minutes)
15. Students may enjoy the following quotes:

“There are no passengers on spaceship earth. We are all crew.”

Marshall McLuhan

“You get out there in space and say to yourself: that’s home. That’s the only home we have, and the only one we’re going to have for a long time”

Edgar Dean Mitchell, Apollo 14 Astronaut

As part of Earth's crew we all have a personal responsibility to make sure our planet is healthy and functional.

Block 2: BIODIVERSITY

Time: Full Block, 4 hrs (Parts 1 and 2 can be separated)

Place: Part 1: Tofino Botanical Gardens, classroom and outdoors (2 hrs)
Part 2: Mackenzie beach, outdoors (2 hrs)

Overview

This block is focused on introducing and defining the idea of biodiversity and understanding the importance of maintaining diversity through conservation of existing habitat and natural resources.

Part 1 will explore the meaning of biodiversity – referring to diversity within a species, within populations of a species, within different species within an ecosystem and between ecosystems throughout the world. Focus is on the unique biodiversity of the Clayoquot Sound region (eg. temperate rainforest, ancient old-growth forests and intertidal ecosystems). In Part 2 students will explore the concept of conservation and how we can be stewards to the environment.

Prescribed Learning Outcomes

- √ Grade 7 Science: Identify diversity within ecosystems; Assess the requirements for sustaining diverse ecosystems; Evaluate human impacts on local ecosystems.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Select and assume responsibility for assigned roles while participating in a physical activity.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.

Objectives

- Students will understand the concept of “biodiversity”, and its importance to a healthy ecosystem. Students will be shown the implications of losing biodiversity (ie. Change in the functioning of an ecosystem or the collapse of an ecosystem).
- Students will be able to distinguish between diversity within a species, within populations of a species, within different species within an ecosystem and between ecosystems around the world.
- Students will understand how to appropriately behave in the interest of conservation of resources.

- Students will be introduced to the four intertidal zones; spray zone, high-tide zone, mid-tide zone, and low-tide zone and the common intertidal species and their adaptations.
- To outline safety issues in the intertidal zones.

Materials

Part 1 – Biodiversity Powerpoint Presentation

- PowerPoint presentation available in Instructor Documents folder: “Biodiversity.ppt”
- journals
- pens and pencils

Part 2 – Intertidal Investigators

- students wear rubber boots and rain-gear!
- magnifying glasses

PART 1 – Biodiversity PowerPoint Presentation (~1/2 hr)

(if technology is not available, then writing key points on chart is just as effective)

Procedure

1. Seat the students in the classroom and distribute journals and pencils for note-taking.
2. Introduce the concept of biodiversity by showing an example of a diverse forest (ie. Many different tree species) and a forest that is not diverse (only one tree species) and before telling the students that one is diverse and the other is not, ask if they can see any differences between the two images.
3. Define biodiversity and a concept that has many definitions such as diversity within a species, within populations within a species, within species within an ecosystem and within ecosystems around the world. Provide examples of each. Encourage the class to take notes on the definitions.
4. Brainstorm with the class on examples of diversity in the Clayoquot Sound. Imagine what would happen if diversity did not exist.

Who am I? (~1/2 hr)

Procedure

1. Place the name and picture of an animal on the back of each student and have them find out what animal they are only by asking yes or no questions.

Web of Life (~45 min)

Procedure

1. Using the name and picture of an animal already assigned to each student from the “Who am I?” game have the students sit in a circle and starting at one animal and passing to an animal that is connected to the starting animal in the food chain. This will illustrate food chain dynamics as well as the interconnectedness of organisms in an ecosystem.
2. When the web is formed, the leader introduces certain environmental stresses which illustrates the interconnectedness of different species.

Discussion Questions:

- 1) Why is biodiversity important? (Eg. economics, ecosystem function, beauty, intrinsic worth).
- 2) How can we maintain biodiversity? (eg. Learning about organisms and the unique roles they play in the ecosystem, learning about food chain dynamics, identifying important organisms of environments and conserving organisms and their habitats through stewardship and changing our habits of destructive use.
- 3) What is an important organism in the Clayoquot Sound? How can we help to conserve this organism? Encourage kids to write this down in their journals.

Take a break!

Allow students 15 minutes to prepare for the beach field trip, have a snack, gather equipment etc.

PART 2 – Inter-tidal Explorers (2 hrs)

Procedure

1. Before heading out to the beach an inter-tidal check-list can be handed out and pasted into journals to aid in keeping track of the organisms that are found (if it's rainy consider leaving the journals in the classroom and them going through the checklists afterwards to avoid the journals getting too soggy).
2. Walk down to the beach (15 mins from Tofino Botanical Gardens).
3. Once at the beach ask the kids to split into groups (at least one supervisor to supervise each group) and search the beach wrack for interesting items for 10-15 minutes. After the 10-15 minutes are up ask the groups to bring the items back to a designated meeting place. Draw a circle in the sand and organize the items inside according groups (ie. Plant, animal, human garbage).
4. Go through the items and identify them as best as possible and mention their roles in the ecosystem. In the case of any garbage explain any negative effects that it can have on the ecosystem (eg. Animals mistaking it for food).
5. Incorporate the theme of conservation by going through all the ways that humans can negatively impact this ecosystem and then how we can act in ways which will not harm the plants, animals or habitat and therefore conserve the diversity.
6. Ask the kids to participate in conservation by being stewards for the inter-tidal ecosystem by passing along the information we talked about and the ideas for ways to conserve this unique habitat to others the next time they are at the beach.

Block 3: CONSERVATION

Time: 4 hrs (FULL BLOCK)

Place: Part 1: Tofino Botanical Gardens or beach, outdoors (~2 hrs)
Part 2: Tofino Botanical Gardens, indoors and outdoors (~2 hrs)

Overview

In Part 1 students will explore the concept of conservation and food web structure as well as survival of the fittest. In Part 2 Species at Risk will be defined, discussed and case studied.

Prescribed Learning Outcomes

- √ Grade 7 Science: Analyse the roles of organisms as part of interconnected food webs, populations, communities and ecosystems; Assess survival needs and interactions between organisms and the environment.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Identify and demonstrate positive behaviours that show respect for individuals' potential, interests and cultural backgrounds; Select and assume responsibility for assigned roles while participating in a physical activity.

Objectives

- Students will understand that all animals play roles within a predator/prey food web, and use various adaptive behaviours to survive.
- Students will understand the concept of "Species at Risk", and learn about specific examples.
- Students will explore the diversity of life on the forest floor and develop mapping techniques.
- Students will understand how to appropriately behave in the interest of conservation and how to act as stewards for the environment.

Materials

Part 1 – Predator-Prey game

- bandanas
- 125 food cards with different coloured dots marking them (25 of each colour)
- 125 water cards
- flagging tape

Part 2 – Species-at-Risk and Microworld Activity

- string

PART 1 – Predator-Prey Game (~2 hrs)

Procedure

1. This game requires a large group (~30+) and 7 adult helpers. The seven adults (or helpers) make the game run most efficiently. Five adults (one at each of the five food stations), one adult as the game leader—who players visit to exchange food and prey life cards for extra lives, and one rover to redistribute the food cards to food stations.

2. **BEFORE ACTIVITY:** Set up five food stations throughout the playing area with one adult at each station. A food station should be clearly marked by flagging tape. Each food station has 20-25 food cards accompanied with the same number of water cards. An adult at each food station will hand out food cards. Each food station has cards with different coloured dots in the bottom corner so that you can distinguish between food stations. Before you begin the game, decide on a sound that indicates when the game begins and when it is over. Then send out the prey animals first so they can hide. Five minutes later, begin the game with the associated sound and release the predators. Prey animals cannot use food stations until predators are released.

3. **Introduce the background:** This is a tag game. The object of the game is for your species to survive. Players designated as prey (mouse, squirrel, river otter, deer) aim to visit food stations. Prey animals must work hard to hide from predators and ensure that they visit all food stations. If a prey visits all food stations they gain a “life card”. Each time a prey is tagged by a predator the prey gives up a “life card” to the predator. Predators aim to tag the prey and take their life cards. But life is not

so easy for the predators because there can be prey that are assigned a “disease card” and if a predator tags a diseased prey the predator must give up a “life card”. But, if a predator that is still alive accumulates 10 “life cards” they can bring a member of their species back to life.

Note: The food is to be distributed only to prey animals (Deer, River Otter, Squirrel, and Mouse). When they are receiving the food, the predators cannot tag the prey animals. However, the food station is only a temporary “home-free”. Adults must ensure prey animals leave once they receive their food. Adults must also ensure that predators are not waiting too close to the food station. All food stations are also equipped with two disease cards. The disease card can be given to a prey animal when getting food. They then use it to take one life card from every predator that tags them. Use these cards as you see fit (probably towards the end of the game).

4. Review vocabulary: Herbivore, Carnivore, Predator, and Prey.

5. Designate at random who will be which type of animal (ie. Cougar, Bear, Wolf, Deer, River Otter, Squirrel, Mouse) each player will be. Squirrels and mice should represent 2/3 of the group. Hand out life cards to all participants and give headbands to all the predators (Cougar, Bear, Wolf). Each predator must only receive one life card.

Example (for a group of 30):

<u>Species</u>	<u># of lives</u>	<u># of players</u>
Cougar	1	2
Bear	1	2
Wolf	1	2
Deer	2	3
River Otter	2	3
Squirrel	5	8
Mouse	6	10

Game Rules

- ◆ Predators must allow prey animals to run away once they have tagged them and taken one life.
- ◆ A predator cannot tag one prey animal twice in a row. When a predator has successfully hunted 10 prey animals, the predator can exchange these life cards for one life card of their own. This life card can be used to bring an animal of your same species (including yourself) back into the game if they are killed by disease.
- ◆ Individual players can only survive off their own life cards.
- ◆ When a prey animal has visited all five food stations, they can trade in their five food cards (with associated 5 water cards) and receive one life card. The food stations are temporary “home-free” zones.
- ◆ If a predator or prey loses all its life cards it is out of the game.

Note: The game continues in this manner for as long as the game leader wishes (and as long as the game is running smoothly). If the predators are slaying the prey too quickly, you may choose to alter the predator-prey ratio. If the prey animals are visiting all five food stations very easily, you may make it harder by making it so each food station must be visited twice before the food cards can be traded in for a new life.

PART 2 – Species-at-Risk (~1 hr)

Procedure

1. Start with discussion of Species-at-Risk and what this means.

What does it mean when something is endangered...extinct?

2. Discuss the meaning of ‘conservation’ – the practice of making sure a species sticks around.

3. Explore some different approaches to conservation:

-Protecting whole ecosystems (parks etc).

-Protecting habitat (wildlife trees etc.)

-Protection of individual species

4. Special topics in Conservation:

Students will explore an example of a species-at-risk such as the Sea Otter or Rockfish through a hands-on interpretive program.

5. Follow-up:

Worksheet with questions relating to the species we studied.

Wordsearch containing new vocabulary.

PART 2 – Microworld Activity (~1 hr)

Procedure

1. Lay out a string in a circle and then choose 7 wonderful things in their model forest and mark them with flags.

2. Have the kids draw (or map) all objects in the microworld. They decide on a name for this microworld and write a vision statement for it. How do they envision this world being? (Will people live here? How will they make a living etc.) How will they promote conservation principles in this place?

3. Students will present a ‘tour’ of their microworld to the class at the end of the activity.

Block 4: NATURE'S RESOURCES

Time: Full Block, 3hrs (Part 1 and Part 2 could be separated)

Place: Part 1: Tofino Botanical Gardens, activity, outdoors or indoors (45min)
Part 2: Tofino Botanical Gardens, mudflats and classroom (2hr)

Overview

This block is focused on distinguishing between, and understanding the importance and appropriate use of renewable and non-renewable resources – all natural elements that are shared by the commons.

In Part 1, students will explore the meaning of “carrying capacity” – referring to the number of a given species that an area’s resources will support without impairing that area’s ability to continue supporting that population. Sustaining our natural resource base requires observation and the cooperative use of resources held in common. In this simulation activity, students desiring to draw renewable resources from a common pool devise, by trial-and-error, short-term consumption strategies that will preserve a long-term supply of the resource. The importance of behaving in the interest of the “commons”, and for the good of all, is emphasized. The “commons” is an important concept because it represents both the natural systems (water, air, soil, forests, oceans, etc.) and the cultural patterns and traditions (intergenerational knowledge ranging from growing and preparing food, medicinal practices, arts, crafts, ceremonies, etc). The commons are generally managed by local, provincial, and national governments, however all people, through their daily actions, are also responsible for protecting and acting in the best interest of the commons.

In Part 2, students will visit the Tofino Botanical Gardens’ mudflats. The mudflats will be used as a visual stimulator for primordial swamps to help students imagine the long, slow process of creating coal, oil and natural gas from ancient organisms. The process of creating fossil fuels will be explained through an energy story. During their visit to the mudflats students will be able to explore and discover the ecosystem and organisms that live there. Students will collect some mudflat organisms that can be viewed on the dissecting scope in the field station classroom.

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems; Evaluate human impacts on local ecosystems.

- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Select and assume responsibility for assigned roles while participating in a physical activity.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.

Objectives

- Students will be able to distinguish between renewable and non-renewable resources, and understand that oil, natural gas and coal were formed over millions of years from organic debris.
- Students will understand the concept of “carrying capacity”, and that natural resources are limited.
- Students will understand how to appropriately behave in the interest of common resources.
- Students will understand that the automobile fuel that their parents’ use is refined from a fossil fuel, and will be able to explain some of the implications of using fossil fuels at the current rates we are.

Materials

Part 1 – Something for Everyone Activity

- tokens (such as poker chips) - 10 per student
- candies (or other reward)
- someone playing live music, or CD player and at least 8 minutes of playing time

Part 2 – Mudflats and Field Station Classroom

- students wear their rubber boots!
- Buckets
- shovels
- magnifying glasses
- digital display dissecting scope and projection screen, petri dishes, (classroom)

PART 1 – Something for Everyone Activity (~45 min)

--- with thanks, this activity is adapted from Population Connection, 2002, <http://www.populationeducation.org/>

Procedure

5. BEFORE ACTIVITY: Count out ten chips for each student playing the game. Put one-fourth of them in a separate pile.
6. Seat the students in a circle.

7. In the center of the circle, place the pile comprising one-fourth of all the chips. (For example, if you have 4 students, use 40 chips total and begin with 10 in the center. If you have 10 students, you use 100 chips and begin with 25, and so on.)
8. Do not introduce the activity, just read the following rules carefully to the students. Allow time for questions and answers to make sure students understand the rules of the game thoroughly. DO NOT explain the significance of the chips before playing the game. The rules are the only instruction the players get.

Game Rules

- ◆ The chips belong to all of you, to the group.
- ◆ Music will be played, and while it is playing, each of you may take chips out of the pool of chips in the center.
- ◆ You may not put chips back into the pool once you have taken them out.
- ◆ Each of you may trade in 10 chips for a piece of candy (or other reward).
- ◆ As soon as the music stops, I will double the number of chips left in the pool at that time, and then continue the game.
- ◆ There will never, however, be more chips in the pool than there are at the start of the game. This is the maximum number of chips the pool can hold.
- ◆ You may not talk to anyone during the game.

9. Begin playing the game. You can vary the amount of time the music plays depending on how the game goes.
10. The players will most likely completely empty the pool almost instantly the first time the game is played. Point out that, as it is impossible to double zero, the game is over. Ask if they would like to try again. Each student must return all his or her chips to the pool.
11. Continue to play the game for several rounds without giving the students time to communicate with one another in between. Remember they can't talk!
12. If needed, explain again that "when doubling the chips in the pool, remember there can never be more chips in the pool than there are at the start of the game, this is the maximum number of chips the pool can hold". Think of the chips in the pool as fish, in a pond that only has enough room and food in it to support as

many fish (or chips) as there were in the pool at the start of the game. That number is the pool's "carrying capacity" for chips.

13. When timely, stop and ask students how they feel about the way the game is going (they might be extremely frustrated with their classmates!). As a group, help the students think of ways they could cooperate to allow more of them to get their 10 chips without depleting the pool of resources. Play again using these strategies developed by the students. The group may reach a point where they have figured out how to sustain the resource (the chips) while everyone gets a chance to exchange chips for a reward.
14. When you decide to stop playing the game, use the following discussion questions to debrief the activity.

Discussion Questions:

- 1) What do the chips represent?

Renewable resources, such as fish or trees. Coal, gasoline, oil, iron, aluminum are examples of non-renewable resources, and therefore are not applicable in this exercise. Talk about the difference between renewable and non-renewable resources. Why do non-renewable resources not apply to this game?

- 2) Can we draw any parallels between the way the group treated the chips and the way individuals, and society as a whole, uses or overuses renewable resources?

Deforestation: cutting trees down without planting replacements or at a rate at which newly planted trees are not given time to grow to maturity before they are harvested; or cutting down old-growth which can never be replaced. Overfishing: taking so many fish that not enough are left to reproduce and replenish the stocks for the next year.

Overfarming: depleting the soil of nutrients without giving it time to regenerate.

- 3) How many chips did each player take out of the pool in the different game variations? How many candies (or other rewards) did this generate? How did it make you feel about other members of the group?
- 4) How did talking about the game make you play differently? After discussing strategies, did it seem differing attitudes were behind different ways you played the game? Why did some participants take as many chips as they could reach and others left some behind? How did this make you feel?

- 5) Have you experienced a similar situation at home, with friends, in your community? (It may help to provide an analogy, such as several people in the house competing for hot water in the morning.)
- 6) How, in the long run, can more people benefit if individuals refrain from taking too much? What sort of attitude do we need to have as individuals to achieve the goal of the greatest benefit for all – people and resources, such as trees or fish?

Take a break!

Allow students 15 minutes to prepare for mudflats field trip, have a snack, gather equipment etc.

PART 2 – Dead Animals in your Car? (2 hrs)

Procedure

1. Gather students and explain that we are going down to the mudflats. Include any preamble about the mudflats. Note any safety issues, and requests for behaviour. Tell students we are going to walk down to the mudflats – ask one person to lead and one person to sweep.
2. Walk down to mudflats. (15min)
3. Allow students some time (~5min) to get acquainted with the mudflats, then ask them to gather together again, facing the mudflats.
4. Ask them to take a good long look at the mudflats (30sec) then ask them to close their eyes. In a primordial voice (long, slow, low tone) state the following:

“Hundreds of millions of years ago, before the time of the dinosaurs, the land was covered with swamps, filled with huge trees, ferns and other large leafy plants. The water and seas were filled with algae – like the green stuff that forms on a stagnant pool of water. This algae is like millions of tiny plants. [pause]

Over time, the trees and plants died, and they sank to the bottom of the swamps of oceans. There they formed layers of a spongy material called peat. Over many hundreds of years, this peat was covered by sand, and clay, and other minerals. The layers of swamps and algae were compressed and buried. [pause]

The mudflats in front of you are like primordial swamps, with hundreds of tiny organisms living in the sand. Millions of years ago when swamps like this existed, over time, more and more sand and clay and rock piled on top. The layers began to weigh

more and more. As the layers began to be pressed down, the peat was squeezed and squeezed until the water came out of it and it eventually, about 280 to 360 million years ago, it turned into coal, oil and natural gas – what we call fossil fuels. [pause]

Today, we take these fossil fuels from the earth and use them for various things – cars, factories, to make electricity. [students could open their eyes now]

To find the oil and natural gas, companies drill through the earth to the deposits deep below the surface. The oil and natural gas are pumped from below the ground by oil-rigs. They then usually travel by ship or through pipelines to large storage tanks and refineries.

Coal is mined out of the ground. Some coalmines are dug by sinking vertical or horizontal shafts deep under ground, and coal miners travel by elevators or trains deep under ground to dig the coal. Other coal is mined in strip mines where huge steam shovels strip away the top layers above the coal. The coal is usually shipped by train and boats, and sometimes in pipelines. [pause]

Fossil fuels take millions of years to make. We are using the fuels that were made more than 300 million years ago, before the time of the dinosaurs.”

5. Ask students to open their eyes. Entertain any questions or comments.
6. Facilitate a brief discussion about fossil fuels (5-10min):

- What are fossil fuels?
- Where and how do we use them? (oil, coal, natural gas)

Talk about how fossil fuels are the fuels that we use in our car – probably the most prominent use of oil and gas in this region.

- Are fossil fuels renewable or non-renewable?
- Do you think we are using them quickly or slowly?
- Since they are non-renewable, why shouldn't we use them quickly?
- What are some impacts of using up fossil fuels?

Introduce global warming/climate change if students don't say it; tell them we will also talk more about this later in the camp. Emphasize that once fossil fuels are gone, they are gone.

7. Now, explain that students can explore the mudflats and find some of the organisms that live here. Provide buckets, shovels, and magnifying glasses. Ask student to collect some organisms to view under the dissecting scope. Ask students to take notes about 3 different organisms in their journals – they could write descriptions of them, or draw them, or represent them in any creative way they wish. (45-60min).

8. Ask students to gather again, and explain that we will return to classroom to view the collected organisms.
9. Walk to the field station classroom (15 min)
10. View collected organisms under digital dissecting scope (15-20min).
11. Invite students to comment and ask questions.
12. Invite students to draw organisms in their journals.
13. Close by reiterating that these are the types of organisms that might have been compressed millions of years ago into peat, which formed fossil fuels. We put dead animals in our cars!

Block 5: RENEWABLE ENERGY

Time: 3hrs (full block)

Place: Micro hydro station field trip OR build a model energy system

Overview

We use energy every day. It surrounds us in different forms, such as light, heat, and electricity. Humans have invented thousands of machines and appliances that use energy to make our work easier, to heat our homes, and to get ourselves from place to place. Some of these machines use electricity, while others, like automobiles, use the energy stored in substances such as gasoline. Much of our energy supply currently comes from coal, oil, natural gas, or radioactive elements (nuclear). Some energy comes from renewable sources, such as solar, wind, and micro hydro. In BC we use a lot of large-scale hydro power, but this is not really considered a sustainable renewable resource because it disrupts the natural flow of water, causing an array of ecological impacts. Large-scale hydro power also will eventually not renew itself because reservoirs will fill up with sediment. They have a limited life span. This block is designed to build on what students already know about energy – renewable and non-renewable, and to gain direct hands-on experience with a form of sustainable, renewable energy.

--- with thanks, background information and activities are adapted from the Pembina Institute's Re-energy.ca.

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.
- √ Grade 7 Social Studies: Evaluate the impact of natural processes and human-induced changes in communities.
- √ Grade 7 Fine Arts: Demonstrate leadership and responsibility within a group.

Objectives

- Students will build on their knowledge of renewable and non-renewable resources and energy, and understand the importance of sustainable renewable energy sources.

- Students will have direct experience with a form of sustainable renewable energy – either by visiting a local micro hydro facility or through building their own solar oven, micro hydroelectric generator, or model wind turbine.

Materials

OPTION 1: Field trip – ask field trip facilitator/micro hydro station interpreter.

OPTION 2: Build a solar oven, hydroelectric generator, or model wind turbine (see below; materials for this option must be prepared well in advance)

Procedure

15. Ask students to gather in a circle (outdoors or indoors).
16. Use the script below to introduce renewable energy (or adapt with your own knowledge and ideas):

“We use energy every day. It surrounds us in different forms, such as light, heat, and electricity. Our bodies use the energy stored in molecules of substances like carbohydrates and protein to move, breathe, grow, and think. We also use energy to do work and to play.

Ask: What do we use energy for?

Humans have invented thousands of machines and appliances that use energy to make our work easier, to heat our homes, and to get ourselves from place to place. Some of these machines use electricity, while others, like automobiles, use the energy stored in substances such as gasoline. Most of the machines around us use either heat or electricity to do their work. An example is an electric clothes dryer. The dryer uses an electric motor to turn the drum that tumbles the clothes inside. The same motor also turns a fan that blows air through the clothes as they tumble. Lastly, a heating element creates large amounts of heat, which is used to dry the clothes more quickly.

Ask: Where does our energy come from in Canada? BC? Tofino?

Discuss. Note that much of our energy supply in Canada comes from coal, oil, natural gas, or radioactive elements (nuclear). These are considered non-renewable energy sources...

Ask: Why? (students should be able to recollect their learning from yesterday (Nature's Resources Block))

Renewable energy on the other hand... [prompt students to fill in the blank]

... quickly replaces itself and is usually available in a never-ending supply. Renewable energy comes from the natural flow of sunlight, wind, or water around the Earth. With the help of special collectors, we can capture some of this energy and put it to use in our homes and businesses. As long as sunlight, water and wind continue to flow and trees and other plants continue to grow, we have access to a ready of supply of energy.

Ask: Are large-scale hydro dams renewable?

(kids will probably say yes, which is not really correct, because renewable energy science and advocates state that large scale hydro is not a sustainable renewable energy source because it dramatically disrupts the natural flow of water, and can cause severe impacts to aquatic (and terrestrial ecosystems). Reservoirs, which dams depend on, will also eventually fill up with sediment, making it a non-renewable resource because it has a limited time frame)"

17. Explain that today we are going to have some direct experience with a sustainable renewable energy source...

OPTION 1 – Field trip to micro hydro facility.

Ideally there will be someone knowledgeable to lead the group through a detailed learning experience at the Marion Creek micro hydro station, the importance of the station, how it works, etc. There may also be an opportunity to visit and learn about the biodiesel Tofino bus as part of this field trip. Or maybe students can ride the biodiesel bus to the micro-hydro station! Now that would be setting an example. While at the station, take some time for students to use their journals – reflect on the morning session, fossil fuels and renewable vs. non-renewable energy.

* The exact nature of this option, and whether this field trip can happen, will be determined by John before the inaugural camp.

OPTION 2 – Build a solar oven, hydro generator or wind turbine

These models can be built using Re-Energy.ca building instructions. These activities work well when students are divided into small groups (ie. build 4 or 5 models in total). Each of these activities requires materials that must be gathered in advance. See instructions below. The Pembina Institute offers support of educators and students who use these activities. You can email or phone education@pembina.org or 780-485-9610 Ext. 102 for help. There is a lot of background information on renewable energy at their site www.re-energy.ca as well.

Building solar ovens: Building solar ovens with the students is fun! You can bake brownies or nachos, and kids love it. (Be sure to have brownie mix or nacho ingredients on hand!) This particular Re-Energy.ca activity is probably the easiest and requires materials and equipment that are found easily at schools and in the grocery store. To be successful though, you need some sunshine (ie. Tofino is not always that sunny ☺). If you are going to have sun, go for this one. Activities located in APPENDIX A and can also be downloaded (along with other background material) at:

http://www.re-energy.ca/t-i_solarheatbuild-2.shtml. The Pembina Institute is also running a Solar Oven Challenge which might be an interesting larger initiative to link the sustainability camp to.

- BC Hydro has an alternate solar collector activity that is much more simple and requires less materials, but not as an effective demonstration and hands-on experience. See “Catch the Sun” activity at http://www.bchydro.com/education/4-7/4-7_1086.html

Building hydroelectric generators: Building model hydroelectric generators is also a great activity and especially relevant to Tofino’s renewable energy potential. This activity does however require significant materials that must be gathered in advance. See materials list in pdf, or go to: http://www.re-energy.ca/t-i_waterbuild-1.shtml

- BC Hydro has an alternate water wheel activity that is much more simple and requires less materials, but not as an effective demonstration and hands-on experience. See “Build a Water Wheel” activity at http://www.bchydro.com/education/4-7/4-7_1086.html.

Building model wind turbines: The Re-energy.ca wind turbine is another activity that is very valuable because kids will see how electricity is created – as they blow on the turbine and see an LED light up! It does however, also require significant materials that

must be gathered well in advance. The instructions are saved on this CD (pdf), and can also be downloaded at: http://www.re-energy.ca/t-i_windbuild-1.shtml

- BC Hydro has an alternate wind turbine activity that is much more simple and requires less materials, but not as an effective demonstration and hands-on experience. See “Make a Windmill” activity at http://www.bchydro.com/education/4-7/4-7_1086.html

Block 6: POLLUTION SOLUTIONS

Time: 3 hrs (full block, Part 1 (30min) and Part 2 (2-2.5hrs) could be separated)

Place: Part 1 – Tofino Botanical Gardens, outdoors or indoors
Part 2 – Beach clean up and found art with Peter Clarkson, Parks Canada

Overview

As human populations have increased and land uses have changed, many of our rivers, lakes, and oceans have become polluted. This block is focused on understanding pollution and pollution solutions from a global to local level.

In Part 1, through an interactive story, students will experience the pollution of a river over time, and propose methods to protect the river from current and future pollution. The story demonstrates that, just as we each contribute to the problem, we must also be part of the solution. A story in the history of a river (a river that could be almost anywhere in North America, or the world) provides insight into the affect population growth has on a natural resource and the cumulative impact of individual actions.

In Part 2, students will get outside and learn about ocean pollutants and how ocean currents contribute to ocean pollution as a global issue. In this “Beach Art Boogie” activity, lead by Peter Clarkson of Parks Canada, students may do a beach clean up and found art activity from the various materials found on their local beach.

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems; Evaluate human impacts on local ecosystems.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Select and assume responsibility for assigned roles while participating in a physical activity.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.
- √ Grade 7 Social Studies: Analyse ways that people’s interactions with their physical environments change over time.
- √ Grade 7 Language Arts: Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Analyse factors that affect global health issues.

Objectives

- Students will understand the principal pollutants that find their way into Canadian waterways, and waterways around the world.
- Students will understand how ocean currents carry pollutants on a global scale.
- Students will be able to draw connections between individual actions and results at the community level – the cause and effect relationship of various pollutants.
- Students will develop strategies for minimizing and counteracting cumulative environmental problems in our waterways and beaches.
- Students will engage in a hands-on artistic activity and local beach clean-up.

Materials

Part 1 – Interactive Story: Who Polluted the Potomac?

* materials must be prepared in advance

- One clear gallon jar (or bowl of water)
- One plastic film canister per student (often available from film processing stores)
- Canisters with ingredients and story character labels (see tables below).

Dry ingredients:

Story Character	Ingredients
Trees	Leaves (dry)
Construction site	Soil (clayish, dry)
Person fishing	Fishing line or dental floss
Farmers	Baking soda
Gardeners	Baking soda
Beach party	Assorted litter
Family pick-nicking	Assorted litter

Wet ingredients:

Story Character	Ingredients
Barnyard	Water and instant coffee granules
Washing the family car	Water + 1 drop dishwashing soap
Antifreeze	Water + 1 drop green food colouring
Mysterious liquid	Water + 1 drop red food colouring
Homeowner	Water + 1 drop yellow food colouring and toilet paper
Coal mine	Vinegar
Electric power plant	Vinegar
Commuters	Vinegar
Motorboats	Water + 1 drop each green and red food colouring

Part 2 – Beach Clean up and Found Art

- Wear rubber boots!
- Gloves?
- Garbage bags

* Peter Clarkson at Parks Canada is a good contact for this activity. Ask Peter about materials required and what Parks Canada might supply. Contact information below.

Part 1 – Interactive Story: Who Polluted the Potomac? (30min)

--- with thanks, this activity is adapted from Population Connection, 2004, <http://www.populationeducation.org/>

Procedure

16. Prepare and label the film canisters as described in the materials section, enough for each student to have at least one canister. There are 16 different canister labels, so for larger classes, some students will have identical canisters.
17. Fill the clear jar $\frac{3}{4}$ full with water. Place the container in a location that can be seen by all students.
18. Distribute one canister to each student. Ask them to keep the canisters closed and upright, and not to reveal the identities of their character or contents.
19. Explain that you will tell a story about a river, and that each of them will play a part in the story.
20. Read the story see below. Add emphasis as you read each bolded character name, and pause after each question to give the students time to think and respond.
21. Use the discussion questions below to debrief the activity at the end:

Discussion Questions:

- 1) Who polluted the Potomac?
- 2) What effect did the increasing population have on the health of the river? Can you think of any ways that population increases helped the river?
- 3) Think about the pollution contained in the canisters. Could something be done to prevent those types of materials from entering the water? How?
- 4) Challenge students to come up with ways to clean up the water in the jar; after all, everything has to go somewhere. Once this type of pollution has entered the river, how can we get it out? How can we clean up the river?

- 5) Do you think that it is easier to prevent pollution, or to clean it up later? Have them explain their ideas.
- 6) What could each of us do to help improve the health of our river by preventing some of this pollution?

Interactive Story: Who Polluted the Potomac?

For many thousands of years, people have lived on the banks of the Potomac River. They hunted in the forests, harvested foods from wetlands, and caught fish in the river.

Imagine that the jar of water in front of you was taken from the Potomac River by a First Nations person about 500 years ago.

- How does it look to you?
- Does this look like water that you might drink? swim in? eat fish from?

One of the first explorers to visit the river kept a journal of his discoveries. He wrote about the aboriginal villages, the tributaries of “sweet water,” and seeing so many fish that he and his crew tried to scoop them out with a frying pan.

Soon colonists began to arrive. They found fertile land for farming, forests teeming with wildlife, and a river that provided ample food and water. It was an outstanding environment for settlement, and the colonists prospered.

- How do you think the colonists used the river?
- Do we use our rivers in the same way/s today? What are the similarities and differences in the way we use the river?

(Students may immediately recognize direct similarities like transportation and food, but may not realize that the water they use everyday also may come from a local waterway to their tap.)

The river has changed a lot since it was first explored. This is the story of those changes. Listen for the name of the character printed on your canister. When you hear your character named, open the canister, and dump its contents into the river.

Years went by, and occasional storms drenched the area. High winds whipped through the trees and blew leaves into the water. Gradually, a city grew on the banks of the Potomac. Developers cleared wetlands and forests to build houses and businesses. Rains washed loose soil from construction sites into the river.

- Is this water safe to drink?

(If the response is “no,” ask if the river had leaves or soil in it when explorers first drank from it).

- Would you swim in it? Is it safe for wildlife?

At first, the city was small. Upstream, farmers planted crops to feed the city’s growing population. Some of these crops grew right up against the banks of the river, and fertilizer washed off the land and into the water. Other farmers kept pigs and other animals in their barnyards. As rainwater drained out of the barnyard, it carried some of the manure into a little creek behind the farm. The creek flows into the river.

- Would you drink this water now?
- Would you swim in it? Go boating on it?
- Is it safe for wildlife?

As the city grew, more and more people began to move to the nearby countryside. These rural houses are not connected to the city sewer system. Wastewater from these houses flows into septic tanks under the ground. One homeowner has not maintained the septic tank and poorly treated sewage seeped into the river.

To meet the electricity needs of the city, area officials decided that they would need to generate more power. Far upstream, a coalmine was dug. Rainwater drained down into the mineshaft and soaked the piles of wastes and scraps from mining. This made the rainwater become acidic—sort of like strong vinegar. Then the acid water trickled off the banks and back out into the river.

To burn the coal, and produce the power, an electric power plant was built along the river. Gasses coming out of the smokestacks combine with moisture in the air to form acids. The pollution falls back to earth as acid rain or smog.

- Would you drink this water now?
- Would you swim in it? Go boating?
- How could we determine if this water was safe for wildlife?

(Possible answers might include: noticing evidence of dead animals, testing for pH levels with litmus paper or chemical testing, viewing water samples under a microscope, performing organism counts, etc.)

Now, the city is one of the largest metropolitan areas in the country. Traffic congestion is a big problem for commuters who drive their cars to and from work. Car exhaust fumes (just like power plant fumes) cause acid rain. If a car is not kept in good repair it might also leak oil or other fluids, which will be washed off the pavement and into the river with the next rain.

And how do the residents of the city and its suburbs spend their time? In one neighborhood, lots of gardeners are out working in their yards. Many of them are using weed killers and insect sprays to keep the lawns pretty. The next rain will wash these poisons into a little creek nearby, and then into the river.

One father is teaching his daughter how to change the antifreeze in their truck. They pour out the used antifreeze into the driveway. Antifreeze is sweet tasting and can poison animals that lick it. It can also get into the nearby creek and poison fish.

Nearby, a boy washes the family car. The soapy water rushes down the driveway into the storm drain; the storm drain empties into the river. The grease and grime on a car can contain asphalt from the roads, asbestos from the brakes, rubber particles from the tires, toxic metals, and rust. If the boy had gone to a local car wash, the water would have been treated before it returned to the river.

Next door, a family is cleaning out their garage. They find an old rusty can with a tattered skull and crossbones label still stuck on it. What could it be? It looks dangerous and they want to get rid of it before someone gets hurt. But how? Junior gets an idea: "Let's pour it down the drain out by the curb!" So the mysterious liquid goes down the storm drain. The poison is out of sight – but is headed for the river.

On nice days, many people head down to the river. Some zoom up and down the river in motorboats and don't notice that a little engine oil leaks into the water.

A group of friends have spread blankets on the shore for a beach party. Lots of families are picnicking in the shore. With the next storm, that trash will wash into the river. On the shore a person fishing snags a hook on a log, and breaks off the nylon fishing line.

Take a break! Give students time to have a snack, use the washroom, and prepare for Peter's session.

Part 2 – Beach Art Boogie (2 – 2.5 hrs)

The intention is that Peter Clarkson will deliver the "Beach Art Boogie" program with students – this will likely include a beach cleanup and found art activity. Peter has years of experience deciphering and creating art with objects that make their way on ocean currents onto local beaches. He will come to the field station, or the group will meet Peter at a beach, for this session. Peter will teach students about ocean currents and their role in carrying pollutants on a global scale. Students will examine and decipher various objects found on local beaches, and create "found art".

Please contact Peter regarding this session:

Peter Clarkson, Assistant Chief Park Warden, Pacific Rim National Park, can be reached at: peter.clarkson@pc.gc.ca or 250-726-7165 ext. 222

Look for an opportunity for students to use their journals – perhaps they might sketch the found art pieces!

Block 7: EXPLORING OUR ECO-FOOTPRINT

Time: 3 hrs (full block)

Place: Tofino Botanical Gardens, outdoors or indoors

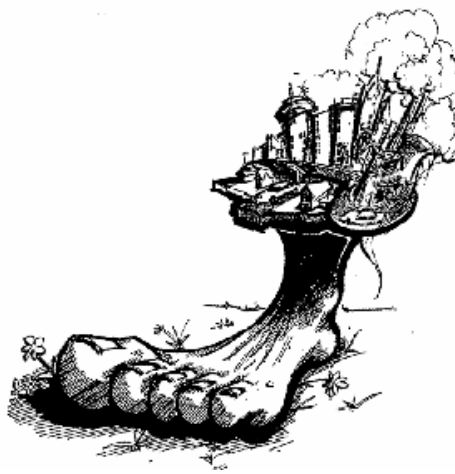
Overview

Each of us “consume” or use a piece of nature every day. We are dependent on natural resources - productive land to grow our food, build our homes, produce our energy, and to store our wastes. How much we take from nature depends on our daily habits – the things we do each day that help us satisfy our needs and wants. An ecological footprint estimates how much “nature” a lifestyles requires. It estimates productive land and water needed to support what we use and what we throw away, measured in hectares. Ecological footprints can be calculated for individuals, communities, and even countries, and there are several easy to use online tools to estimate these (see www.myfootprint.org or www.mec.ca). With the ecological footprint concept, the more we consume and throw out, the more natural resources we use – and the more our footprint grows. If the ecological footprint indicates that more natural resources are used than the Earth supplies, than this is not a sustainable lifestyle. For example, the average Canadian requires 7.8 hectares and the average American requires 12.4 hectares of productive Earth in order to support their current lifestyles. Based on current human population and bioproductive space, nature can provide, and sustain, only about 2 hectares of land for every person in the world. If everyone lived like people in North America, we would need at least 2 more planets!

In this block, students will learn about the ecological footprint concept. They will calculate their own footprints, reflect on it, and find ways to alter their lifestyle to reduce their ecological load. They will find ways to reduce ecological footprints of various aspects of society and take action by writing a letter to representatives of various institutions about how ecological footprints can be reduced.

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems; Evaluate human impacts on local ecosystems.
- √ Grade 6 and 7 Physical Education:



Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities.

- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.
- √ Grade 7 Language Arts: Create a written communication to record their views, opinions, values and beliefs; Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Analyse factors that affect global health issues.
- √ Grade 7 Personal Planning: Practice responsible decision-making.

Objectives

- Students will be able to assess the effects of different lifestyle choices on the local and global environments.
- Students will calculate and reflect on their own ecological footprint using an on-line (or print) Ecological Footprint Calculator.
- Students will identify ways in which different sectors of society can reduce impacts on the environment.
- Students will take action by writing a letter to a government official, industry representative, or other institution on how that agency will reduce their ecological footprint.
- Students will engage on a solo experience in the gardens.

Materials

Part 1 – Explaining Ecological Footprint

- two large apples

Part 2 – Calculating our Eco-footprints

- 4-5 computers set up for students to calculate their ecological footprints, or photocopies of “Personal Eco Footprint Calculator” (print copy in facilitator file; from Sea to Sky)
- pencils
- might be handy to have a pocket calculator too!

Part 3 – Reducing our Eco-footprints, Pen Power

- Lined paper (at least one page per student)
- envelopes (one per student)
- pens or pencils

Procedure

PART 1 – Explaining Ecological Footprint (~15 min)

--- with thanks, this demonstration has been adapted from “What is sustainability” activity, <http://www.kidsfootprint.org/lessonplans.htm>.

22. Ask students if they have ever heard of the concept of eco-footprint. What do you think it means? Explain that the ecological footprint is calculated in amount of land (use the overview information above or other knowledge you may have).
23. Use the following Allegorical Apple activity to demonstrate the amount of “bioproductive” land on Earth. This demonstration shows that, despite how large the Earth may seem, the amount of natural resources available for people to use are limited and we must use them carefully.
 - a. Present a good-sized apple to the group and explain that in this allegorical exercise, the apple represents the Earth.
 - b. Cut the Earth into four pieces and discard three of the pieces representing saltwater oceans, 75% of the earth.
 - c. Slice the remaining piece of Earth in half and discard one piece representing land, such as deserts, which is inhospitable to people.
 - d. Slice the remaining 1/8 of the Earth into four sections and set aside three of the sections representing areas too rocky, too steep, or too cold to produce food.
 - e. Carefully peel the skin off the remaining 1/32 slice of the earth. This represents the surface of the earth, the earth’s crust with its topsoil which humanity depends on. Explain that the earth’s topsoil is only about five feet deep and produces a relatively fixed amount of food. Over farming and erosion take away 24 billion tons of topsoil per year. Each inch of top soil requires 100 years to form.
24. Explain that there are 51 million hectares of surface on Earth, but that 12 billion (10 billion land and 2 billion water) are biologically productive, therefore capable of supporting human demand for resources and treatment of waste. Ensure students understand this.
25. Ask students how many people are on Earth (6+ billion and growing!). “So, if we have 12 billion hectares of land and 6 billion people, how many hectares do we get each?” – 2 hectares each! Explain that if we are to share the Earth’s resources equitably and have a sustainable lifestyle, our eco-footprint must be 2 hectares or

less. Use the outdoor space you are in to help students envision how small 2 hectares are.

26. If someone points it out, follow their comment/question, otherwise at this stage, ask students “Now, are humans the only creatures on the Earth who need food, shelter, energy?” No, we share the Earth with 10 million other species who also need bioproductive land. So that means our eco-footprints should actually be less than 2 hectares if we are going to leave any land for other 10 million species besides us.

PART 2 – Calculating our Eco-footprints (~45 - 60 min)

1. If possible, use the eco-footprint calculator online www.myfootprint.org. This will only work if you have a few computers though – you could possibly set up some lap tops and have kids work in groups and each calculate their eco-footprint. Otherwise, use the printed “Personal Eco Footprint Calculator”. I find the online one easier and much more fun, but the printed one will force kids to do some math!
2. Have students share what their eco-footprint is in pairs.
3. Then, as a group, discuss how students felt when they learned how big their eco-footprint is. Is it big? Why? What are the “big ticket items” that make their footprints large?
4. Take a few random eco-footprint numbers and quickly calculate how many earths would be needed if everyone lived that lifestyle. Use:

$$\text{NUMBER OF EARTHS NEEDED} = \frac{\text{ECOFOOTPRINT OF INDIVIDUAL}}{\text{FAIR EARTH SHARE (2 hectares)}}$$

So that is: $X = \frac{10}{2}$ (ex) = 5 earths!

5. Ask students what the problem with this is. Discuss.

PART 3 – Reducing our Ecological Footprint (~20 min)

1. To start thinking about how individuals can reduce their ecological footprints, explain that students will go on a solo out in the gardens. Have them to bring their journals with them, and tools for writing, drawing etc. They are going to find a place alone (where they can't see or hear anyone else), and spend 10

minutes reflecting and brainstorming on ideas to reduce their own ecological footprints.

2. Help students find a solo location – which may take several minutes to place the entire group in their own private places. That is ok - this is also a time for them to be in the gardens by themselves.
3. Ask teachers and parent chaperones to help ensure students are focused on the task and not disturbing other students. They should have a good 10 minutes of solo time.
4. Explain that when they hear this sound [whatever loud holler sound you want], then it is time to return to the field station.
5. Debrief the solo after the break....

Take a break (~15min)

Part 4 – Reducing Eco-footprints with Pen Power (~60+min)

6. Debrief the solo by starting with students getting into pairs and sharing their ideas on how to reduce their eco-footprints.
7. Bring the students together and have people share ideas with the whole group. How can we reduce our energy impacts? How can we reduce our eco-footprint from food? What about waste? Transportation?
8. Discuss the difference between “needs” and “wants”. What is something we need? What is something we want? Are these the same? Have students come up with examples of needs vs. wants. Do you need or want food? Do you need or want to fly in an airplane? Do you need or want to wear leather?
9. Also ask how the solo experience was for them. Was this a good way to brainstorm? How was it being in a spot with only yourself for awhile? What did you notice?
10. Bring the discussion a little broader – from individual, to community, to country: how can we reduce the ecological footprint of our communities, of Canada?
11. Explain that you would like students to now use their “Pen Power” and write a letter to a government official, business, corporation, industry, or any other institution. Discuss the importance of writing letters as a key aspect of being a responsible and active citizen. It is our role to tell government, industry, our community what we think about problems, issues and solutions. One way to do this is to write a letter to the appropriate decision maker.

12. Help students choose the right person, government, or institution – eg. for community issues they could write to the Mayor and Council, for logging issues they could write to a logging company or the government, for food concerns they could write to a major food producer or to the agricultural ministry. (You will need to look up the exact contacts online afterwards, or if some students are done early you can get them to find the address using the computer in the library).
13. The theme of the letter is to ask the recipient how they are going to reduce the ecological footprint of their institution, and for the student to make some suggestions. Ask the students to explain in their letters what the ecological footprint concept is and why they are concerned about it. Have the students make a request of the person, government, or institution. Use the letter writing tips below, and remind students that these are tips for whenever they may write letters in the future on issues they are concerned about.

TIPS FOR WRITING EFFECTIVE LETTERS

- State your purpose for writing.
- Make a very specific request.
- Tell them about what you have been learning about, or about field trips you have done, and how you feel about the issue you are writing about.
- Make sure the letter goes to the right person. Should it go to anyone else as well? You can cc the letter to others.
- Be honest, and include only necessary facts and opinions.
- Be concise, brief, and organized. It would be nice if your letter fits on one page.
- Be courteous and polite. Respect goes a long way.
- Ask for a reply. Ensure your correct mailing address is on the letter and envelope.
- Check your letter before sending it: edit, revise, check for spelling.

14. Hand out envelopes, and collect the letters from students. Ensure they have put their return home addresses on the letter and envelope. Fill out the receivers'

addresses as the letters are completed, or look the addresses up later. You can mail the letters after camp is over.

15. You may have some extra time (~15-20min), depending on how long it takes students to write their letters. You could use this time to have students look up addresses on the computer or phone book. As students will likely finish writing their letters at different times, you could also ask the teacher or parent chaperone to take students into the gardens to explore each others' solo places, or you could have a fellow facilitator start a game with the students who are done. See the list of games and initiatives printed for ideas.

* Camouflage is a good one because it would work well in the gardens and players can join in as the game continues: In the gardens, the wolf finds a place to stand and calls "camouflage!". S/he then covers his/her eyes and counts to 20. Everyone else must find a hiding place where they can see the wolf. The wolf may only rotate in place while searching for the hiding players. If the wolf sees a player, the player is out. At the end of 2 minutes the wolf calls "Fingers up" and hidden players must try and see the number of fingers being held up by the wolf. After about 2 more minutes, the wolf calls "come out". Whoever has not been caught stands up where they are, holding up correct number of fingers. The closest player to the wolf who was not caught and has the correct number of fingers is the winner and becomes the wolf.

Block 8: A CLIMATE OF CHANGE

Time: 3hrs (FULL BLOCK, Part 1 and Part 2 could be separated)

Place: Tofino Botanical Gardens, outdoors or indoors

Overview

Climate change caused by emissions of greenhouse gases (GHGs) from human activities is one of the greatest threats to ecosystems in the 21st century. The potential implications of climate change are bigger, and potentially more catastrophic, than for any other environmental issue. Through erratic weather patterns, forest fires, and glacier melt, we are already experiencing some of the effects of climate change. Even worse, based on the levels of greenhouse gases we have already put in the atmosphere, the process of climate change is likely to increase the severity of ecological and human impacts. If we allow levels of greenhouse gases to continue to rise, the disasters of today will be dwarfed by future catastrophic events.

The scientific evidence that human-induced climate change is happening is unequivocal. There has been international political response beginning with the negotiation of the United Nations Framework Convention on Climate Change (UNFCCC) at the 1992 Earth Summit. The Kyoto Protocol was then established in 1997, which sets legally binding GHG emission targets for each of 38 industrialized countries, including Canada, for the period 2008-2012. Canada ratified the Kyoto Protocol in December 2002, thereby agreeing to be legally bound to meet a target of reducing its GHG emissions to 6% below the 1990 level during by 2012. We are not on a path to meet these targets, while we have all the technology and structures to do so. The issue is whether we, everyone, has the will to create change. One of humanity's principal challenges in this century will be to stop climate change, and make significant economic, political and social changes. We must drastically reduce our greenhouse gas emissions, and address our fossil fuel addiction.

In this block students will learn about climate change through an interactive workshop with guest presenters (Part 1) and will explore, through creative and theatrical expression, "ugly" and "beautiful" futures depending on how people choose to address climate change (Part 2).

Prescribed Learning Outcomes

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; Identify and demonstrate positive behaviours that show respect for individuals' potential, interests and cultural backgrounds.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry; Design, implement and assess detailed courses of action to address national problems or issues.
- √ Grade 7 Social Studies: Evaluate the impact of natural processes and human-induced changes in communities.
- √ Grade 6 Language Arts: Create real and invented narratives, descriptions and informal oral presentations; Demonstrate a willingness to assume a variety of roles in group interactions.
- √ Grade 7 Language Arts: Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Analyse factors that affect global health issues.
- √ Grade 6 Fine Arts: Express ideas and emotions using verbal and non-verbal communication; Demonstrate social and group skills in dramatic work; Demonstrate the ability to collaborate when combining ideas in dramatic work; Demonstrate respect for the work of self and others.
- √ Grade 7 Fine Arts: Demonstrate leadership and responsibility within a group.

Objectives

- Students will understand that climate change is real and happening, and that political, community, and personal action must be taken immediately.
- Students will be able to express solutions to climate change within various sectors of society.
- Students will engage in a creative process to express what the future might be like depending on how humans choose to address the reality of climate change.

Materials

- Video – “Inconvenient Truth”, which the field station owns, if option 3 of Part 1 is selected.
- Students may need materials for their skits, such as props (Part 2).

PART 1 – Introducing climate change (1.5 - 2hrs)

Three options for introducing the issue of climate change, including the science behind global warming and greenhouse gases, and the political, economic, and social nature of the issue, are provided. As the main facilitator/educator you may also want to deliver this based on your own experience and knowledge with climate change. The options below are drawing from existing successful programs currently running on Vancouver Island and in BC.

OPTION 1: BC Sustainable Energy Association – Climate Change Game

The Climate Change Game is a free program delivered as an 80min workshop in classrooms. The workshop includes a board game, which encourages teamwork as students collaboratively move around the board, learning about positive and negative environmental consequences that result from individual and societal actions and behaviours. The workshop includes a Climate Change Show video, guided worksheets, student take-home brochures with tips to meet greenhouse gas emission reduction goals and a Superhero Showdown: a two-week contest for students.

Shirlene Cote of the BCSEA has been contacted regarding delivering a Climate Change Game workshop at sustainability camp. She thought it was unlikely that someone could deliver the workshop in Tofino, but it may be possible depending on timing. The game and video could be purchased (\$70-100), and there is a potential that you could be trained to deliver the workshop. I have heard good things about the video and game and this is a promising, and probably the best option for introducing climate change.

See www.bcsea.org/activities/ccgame for more info, and contact:

Shirlene Cote

Project Leader, BCSEA Climate Change Game

778-785-3951, scote@bcsea.org

OPTION 2: Nanaimo Recycling Exchange, guest presenter

Contact has been made with Lindsey Bingley, Environmental Education Program Coordinator of the Nanaimo Recycling Exchange. She currently delivers workshops for elementary students and is in the process (Feb 2007) of developing a workshop for senior high students. She is interested in participating in the sustainability camp, and may be able to deliver a workshop to introduce the concept of climate change.

Contact Lindsey to arrange a workshop during the camp:

Lindsey Bingley

Environmental Education Program Coordinator

Nanaimo Recycling Exchange

250-758-7777, education@recycling.bc.ca

OPTION 3: Inconvenient Truth (video)

This recent and already renowned film outlines the issue of global warming, and exposes many of the myths and misconceptions that surround it. It is an eye-opening film littered with scientific facts and compelling images. The film is more suited to an older audience, however there are many useful sections that could be shown to introduce the issue and severity of climate change. The film is centred on Al Gore's efforts in what he calls our "planetary emergency". The field station owns this video and it could be viewed on the large screen in the classroom. This would be a great option for students, especially if they are a relatively mature and keen bunch. It is 96min though, so might be best to use sections of it, rather than showing the entire film. The film, along with some of the basic activities from Global Warming 101 might make a great combination for this section. See Global Warming Lesson Plans in pdf, or go to www.globalwarming101.com.

Take a break! (~15min)

PART 2 – Creative Expression of Climate Change Solutions (1-1.5hrs)

Procedure

27. Explain to students that you would now like them to envision the future. They are going to work in groups to create and present a skit (~5min skit) about what the future could look like. Half the groups will present the "ugly" future of climate change, and half the groups will present the "beautiful" future of climate change. The ugly future will represent people not taking action to address

climate change, and the beautiful future will represent people taking immediate action to combat climate change.

For example:

Ugly future might be something like everyone lives in glass, climate-controlled domes—same temperature, moisture, etc. all the time. Quite boring. No one can go outside without being dressed in special outfits to combat the heat and reflect the sun's rays. Outside, the ground is dry and cracked, like in a desert, or Tofino is under 3 ft of water (ie. Tofino residents have had to relocate). There is very little growing, no trees, therefore very few birds, squirrels, bugs, etc. Fewer trees so now it's harder to breathe. Streams and rivers might be dried up, or flooding – salmon, frogs, fish affected... Food is scarce – we might be eating just pills... let the students create their own imaginations based on the knowledge they gained in Part 1.

Beautiful future might be people living in eco-villages, where kids play outside. There are birds and animals galore. Solar panels on the roofs of houses, wind turbines out back... Lots of gardens and food to eat. Rather than a lot of cars on the road, people would be biking or walking. Buses might be running, and all that came out of them was water-vapour instead of exhaust. New games have been invented like wind-powered full-body kites that allow you to fly... let the students create their own imaginations based on the knowledge they gained in Part 1.

28. Students will have 45 minutes to prepare their skit, so it should be well thought through, and prepared. They can use props, and they can draw on literature in the library, internet, teachers, parents, or other resources.
29. Emphasize that students should include not only the future for humans, but the other species we share the earth with (for example, polar bears, birds, insects...) How are other species affected? Include them in your skit.
30. Circulate amongst the groups to help. Student may wish to use the break out rooms, library, or go outside to think through their ideas and prepare their skits. Ask questions like, what are some of the major impacts of climate change? How will our future look if those happen? (ie. Tofino will probably be displaced with sea level rise). And... If we are going to deal with climate change, what does community transportation look like? How would you design schools and homes? How would our agricultural system change?
31. This may be a challenging activity for students, but that is part of the point – dealing with climate change is a huge challenge. We are potentially staring at an ecological crisis, or we are on the verge of people leading our society into sustainability. Give students a lot of support through this activity. Encourage

them to go deep in their thinking, especially those who are creating the “beautiful” future.

32. Present skits (about 5min each). Have the groups who are representing the “ugly” future go first and finish with the “beautiful” future scenarios.
33. Discuss and debrief all of the skits thoroughly at the end. Which future do we want? How can we get there? Remind students that, while climate change presents a very gloomy “ugly” future, we are very capable of addressing climate change. Human history indicates that we have surmounted significant challenges in the past (nuclear war, apartheid, ozone layer). We currently have all the technologies and structures we need to immediately, drastically reduce our greenhouse gas emissions. What we seem to be lacking is the will. Many argue that climate change is a moral issue. Discuss this with the class. Do you think this is a moral issue? Why or why not?
34. Close by summarizing the learnings from this entire block and reiterating that while climate change is a daunting challenge, it can be seen as an opportunity to demonstrate just what a caring, thoughtful, capable creature we are on Earth.

Block 9: COMMUNITY AND CITIZEN CONTRIBUTION

Time: 3hrs (FULL BLOCK)

Place: Tofino Botanical Gardens and possibly various locations

Overview

Sustainability camp aims to maintain a strong focus on action oriented learning and community service. Many environmental education programs help learners build new awareness and put them on a path for taking action, but rarely do they allow learners to actually field-test their ideas in a real-world context during the program. Sustainability camp aims to do this. Studies on the effectiveness of environmental education programs have shown that hands-on learning set within a community context were most effective in prompting learners to share their knowledge and experience with their parents and fellow community members. This full block is dedicated to students designing and delivering a small action project where they make a contribution the community.

* Please note this activity must be introduced a few days in advance so that by the time of this block, students have action project ideas and small groups formed (see Program Flow)

Prescribed Learning Outcomes

Any or all of the following may apply:

- √ Grade 7 Science: Assess the requirements for sustaining healthy local ecosystems; Evaluate human impacts on local ecosystems.
- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Identify and demonstrate positive behaviours that show respect for individuals' potential, interests and cultural backgrounds.
- √ Grade 6 and 7 Social Studies: Identify and clarify a problem, issue or inquiry.
- √ Grade 7 Social Studies: Evaluate the impact of natural processes and human-induced changes in communities.
- √ Grade 6 Language Arts: Demonstrate a willingness to assume a variety of roles in group interactions.
- √ Grade 7 Language Arts: Create personal and informational communications, instructions, reports and lyrics; Develop strategies for resolving conflict and solving problems.
- √ Grade 6 Personal Planning: Encourage others to contribute to a safe school and community.

- √ Grade 6 Fine Arts: Demonstrate respect for the work of self and others.
- √ Grade 7 Fine Arts: Demonstrate leadership and responsibility within a group.

Objectives

- Students will understand that they play an important role in contributing, as citizens and community members, to creating ecological sustainability. They may also learn that making such a contribution can be a very rewarding experience.
- Students will engage in an action project of their own design that makes a real contribution to the local or regional (or provincial) community. Students may learn a variety of action skills, such as observation, investigation and inferencing skills, organization skills, communication skills, research skills, presentation skills, conflict resolution skills.
- Students will share their action projects with their peers through presentations, including their own reflections on what they learned through the process.

Materials

- Students may require a variety of materials, depending on the projects they choose. As students will have chosen their projects in advance, you should be able to have most materials ready for them. Keep it simple though!

Procedure

35. Introduction – DO THIS IN ADVANCE! (as an evening session on Day 3 – see Program Flow). Discuss with students how they have learned and experienced a lot so far at camp (and hopefully have been reflecting on that learning). Explain that an important part of learning new things, is acting on them. Explain that on (whatever day it will be – Day 5 Afternoon as per Program Flow) students will have the entire afternoon to deliver a small action project. Talk about what an action project is, or might be, using examples from the list below.
36. Encourage students to come up with their own ideas and make a decision and commitment in small groups. You will likely want students to form their groups on the evening you introduce the block, or by the next morning. Groups can be any size (2 to 6 people).
37. Some students may be very motivated and excited and want to develop their own idea. Some may just want a simple service learning exercise. Use the list of ideas below as a starter. Be flexible, and allow students to pursue their own aspirations, but be sure to focus on positive projects and courses of action.

38. Clearly explain that students will have from now (evening, or whenever the action project is introduced) until the Community and Citizen Contribution block to choose an action project they want to do and tell the facilitator. They can talk with their teachers, fellow students, and facilitators over the next few days to decide. When they decide on a project, also have them tell you what materials they may need. Remember – when you start the afternoon block, students should already be in groups and have their idea decided (you don't want to waste time during the block doing this!)
39. Tell students that on the last day of camp, they will present their action projects to the rest of the class (ie. 5min presentation).
40. Students will have this entire block (block 9) to develop and complete their action projects. Ask a teacher, facilitator, parent chaperone to accompany each group during the block. Some projects will likely include travel into town, the beach or elsewhere.

ACTION PROJECT IDEAS:

Below are examples of action projects that could be used or adapted. Encourage students to come up with their own ideas, but you can use these as starters:

- Go on a biodiversity detective tour through local stores in the community, and record evidence of the world's biodiversity found. Students could go into hardware, furniture, grocery, electronic stores, lumberyards, and others.
- Plan and build a model of a green town or city. Students could write a letter to the mayor and council and present their model.
- Conduct a bird survey and write an article for the local paper.
- Set up an information booth in town for a couple of hours on a topic of interest that students wish to share with others.
- Invite a local government official to the field station and conduct an interview about a topic of interest.
- Conduct a survey of the public (ie. on the streets in town) on a topic of interest.
- Conduct a supermarket survey in a grocery store(s). Focus on a theme, such as product packaging (overpackaging!), where in the world food comes from, or other themes.
- Make a brochure to hand out to people on the street in town. Brochure could be about climate change, biodiversity, water – any issue of interest.

- Interview local businesses about their views or practices relating to an issue.
- Make bookmarks about local wildlife (or other) and hand them out to people on the streets or on the beach.
- Design the menu for a low eco-footprint dinner for the entire class. Maybe they could even cook it!
- Make light switch covers to hand out to people – light switch cover outlines can be easily traced on paper and decorated with images and words such as “Turn out the lights!”, “Turn me off!”, etc.
- Make paper (easy to find recipes on internet), and send cards to people or organizations that have helped create positive change. (ie. students could research organizations they support and send thank you cards)
- Write a press release about what you learned at camp and send it to local media.
- Conduct a beach clean up or some broom bashing (removing invasive species)
- Spend the afternoon with Streamkeepers.

Block 10: CLOSING AND CELEBRATION

Time: 3 hrs (full and final block)

Place: Tofino Botanical Gardens, outdoors or indoors

Overview

The closing and celebration of a sustainability educational program is often very important for participants. It is a way to wrap up the learning from the week and an opportunity for students to express how they will further build on their learning, and take action on new insights and ideas. This Closure and Celebration block is designed to close the program for students and teachers, and to celebrate a love of learning, community, and citizen action. It invites students to present their action projects, engage in an activity about their own ethics (which may have evolved over the week!), to enjoy their last moments at the field station, to celebrate their community and to make commitments to further action. This closing also includes time to solicit constructive feedback on the program from students, which is extremely valuable.

Prescribed Learning Outcomes

- √ Grade 6 and 7 Physical Education: Participate safely in activities in a natural or alternative setting; an outdoor experience; Follow rules, routines and procedures of safety in a variety of activities; Identify and demonstrate positive behaviours that show respect for individuals' potential, interests and cultural backgrounds; Select and assume responsibility for assigned roles while participating in a physical activity.
- √ Grade 6 Social Studies: Support a position on a national issue by considering competing reasons from various perspectives.
- √ Grade 6 Language Arts: Create real and invented narratives, descriptions and informal oral presentations.
- √ Grade 7 Language Arts: Create a written communication to record their views, opinions, values and beliefs; Encourage others to participate.
- √ Grade 6 Personal Planning: Encourage others to contribute to a safe school and community.
- √ Grade 7 Personal Planning: Practice responsible decision-making.
- √ Grade 6 Fine Arts: Express ideas and emotions using verbal and non-verbal communication.
- √ Grade 7 Fine Arts: Demonstrate respect for the perspectives of self and others.

Objectives

- Students will present their action projects (from Community and Citizen Contribution block 9), emphasizing what they learned, new skills they have gained, and the importance of the contribution they made.
- Students will take positions and articulate their thoughts about ethical issues related to the environment and social issues, and consider the opinions of their classmates.
- Students will engage in energizer games and activities to celebrate community, having fun and learning.
- Students will make commitments to action in a circle of their peers.
- Students will write a letter to themselves articulating their personal commitments to the health of the earth.
- Students will experience through a physical activity how they are supported by their community and how as responsible citizens of the earth, we can reach for and salute the sky! ☺

Materials

Part 2 – Taking a Stand

- signs reading: “Strongly Agree” “Agree” “?” “Disagree” “Strongly Disagree”

Part 4 – Action commitments

- Object such as a stone, leaf, feather or an Earth Ball (see list of resources to get an Earth Ball)
- Piece of paper, envelope, and pen for each student

Part 6 – Evaluation

- flip chart (at least 3 different sheets)
- markers

Procedure

PART 1 – Action Project Presentations (~40 min)

41. Give students about 5 minutes to make any final preparations for their presentations. Each presentation is to be about 5 minutes long and should include what their action project was, how it was successful, what could have been done

to improve it, and what they learned through the process. Each student must participate in the presentation.

42. After each presentation, allow a couple of minutes for questions and discussion.
43. After all presentations are complete, make a closing statement thanking students for their work, summing up what they learned, the new skills they may have acquired and reiterating the importance of contributing to one's community.

PART 2 – Taking a Stand (~40 min)

--- with thanks, this activity is adapted from Population Connection, 2004, <http://www.populationeducation.org/> Eco-Ethics (dilemma cards is an alternate activity – see CD of curriculum)

6. Start with a simple “Move your Butt” energizer game (useful as a transition from presentations and into Taking a Stand ethics activity):
 - a. Have everyone stand in a circle with one person in the middle. The person in the middle will say “move your butt if you _____ (something true about themselves)”. eg. “move your butt if you are the youngest person in your family” or any kind of statement they wish. Everyone who that is true for must move from their spot and find another one at least two spaces from their own. They cannot return to their own spot. Last person in the middle starts again “move your butt if...” (it might help to actually have space markers – such as pieces of cardboard or plastic lids (like musical chairs).
7. Now explain that we are going to play a slightly similar game, but that the questions are going to ask everyone to “Take a Stand”. Explain that, as we have learned over the week, there are many challenging issues that we are facing. Many of these are ethical issues, where people must make tough decisions about how they will behave and respond. Explain that this activity challenges each and everyone to take a stand on a variety of issues.
8. Place the signs reading: “Strongly Agree” “Agree” “?” “Disagree” “Strongly Disagree” in different places (could make this along a line’ provide ample space for students to move and see who is standing where).
9. Explain to the students that you will be reading several statements to them (see statements below), and that they should stand in front of the sign that most closely represents their reaction to the statement you have read. They will then be asked to explain their particular stand on each issue. They are free to move to a different sign if/when their opinions change after hearing their classmates’ views.

10. When facilitating the activity, try to give equal time to representatives of different sides of the issue and solicit remarks from as many students as possible. You may pose questions to help students articulate their thoughts.
11. Remind students that there is no right or wrong – everyone’s opinion is valid!
12. You may want to use some of the following techniques to keep the debate on track. To show respect for viewpoints different than their own, have students paraphrase the opinions offered by others before they speak. To stay focused on content, not personalities, assign students a position that they must defend, even if it does not mesh with their personal values.

Statements:

Note: Use your discretion in choosing statements that you feel students have enough information on to form an opinion and that fits best with the themes or learnings from camp. Make up some more statements, and you could also have students come up with statements, or adapt the dilemma cards in the alternate activity titled “Eco-Ethics” (pdf on CD).

1. Without reducing our eco-footprint, it will be impossible to solve the world’s global ecological challenges.
2. Because we live in one of the richest countries in the world, we should welcome all those from other nations who wish to live here.
3. Arable land in this country should not be used for housing, businesses or other non-agricultural uses.
4. In a real crunch, jobs are more important than environmental quality.
5. Automobile makers in this country should be required by law to make all their vehicles very fuel-efficient, even though the vehicles might cost the consumer more.
6. Clothing manufacturers should be able to use child labour oversees if it makes the clothes cheaper for consumers here.
7. Communities across Canada should be required to shift to renewable energy.
8. Any new construction or other project that may threaten water quality should be prohibited.
9. Every individual plays a role in protecting our natural resources.
10. Science and technology will solve many of our environmental problems.
11. To lower our use of energy and levels of air pollution, we should spend more money on improving our public transportation systems than on our highways.
12. Endangered species’ habitats should not be developed for any reason.
13. People in Canada should be required by law to separate their trash and recycle newspaper, glass and cans.

Take a break! (~10min)

PART 3 – Salmon, Bears, Mosquitoes Energizer (~20 min)

16. This game may be familiar to students as there are several versions and they are all based on the classic “rock, paper, scissors” game. For this game:
 BEARS EAT SALMON
 SALMON EAT MOSQUITOES
 MOSQUITOES EAT BEARS
17. Split the class into two teams on different ends of a large space. Have students come up with a physical action/sign to represent each character – bears, salmon, mosquitoes.
18. Teams will decide with each round whether they are bears, salmon, or mosquitoes. On the count of three they make their action/sign. If they are going to be eaten, students must run to a safe zone before being tagged. If tagged, they change sides and join the other team.
19. Continue to play until one team wins, or you are out of time.

PART 4 – Action Commitments (~45 min)

1. This section of the closing is an opportunity for students to form and express their own personal and community commitments to taking action for the earth. Give students a couple of minutes to think of a commitment they would like to make. Ask them to make it something detailed, realistic, and timely. Examples are: “I am going to ride my bike to school from now on”, “I am going to reuse and recycle all the paper I use”, or they may be something like “I am going to write a letter to government once per month” or “I am going to start a school environment club”
2. Get students standing or sitting in a circle. Use some kind of object to pass around the sharing circle (could be a feather, stone, or I like to use the Earth Ball (see resources list)). Whoever holds the item gets to speak. You could simply go around the circle, or use the “popcorn” method where whoever is ready, speaks. Everyone takes a turn.
3. After everyone has made their commitment, thank students and ask them to take a piece of paper (provided) and write a short letter to themselves about this

commitment and/or any other personal commitments they are making to help the earth's health.

4. Give each student an envelope and make sure they put their full name and address on it because you will be sending the letter back to them in a few months.
5. Collect the letters in sealed envelopes.
6. Letters should be mailed about 3 months after camp, or they could be hand delivered to the class as a post-camp follow-up program.

PART 5 – Salute the Sky! (~15 min)

1. As a final closure to the camp, students who wish can salute the sky! This initiative is a great demonstration of community support and individual freedom, and is a fun and exciting activity for all involved.
2. Ask students to line up in two rows facing each other about 1m apart. You will need at least one student at either end as well.
3. On each students' turn, the "sky saluter" will stand with their back to one end of the row and then lean back onto all the arms of the students in rows.
4. When ready, all students will lift the person into the air. People holding the "sky saluter" will likely have their arms raised – lifting the person above their heads (see photo below).
5. The person being lifted can open their arms, lean their head back, and relax, as they salute the sky.
6. Allow each person a turn, unless someone really doesn't want to.



PART 6 – Evaluation (~10min)

DON'T LEAVE THIS ONE OUT!!! VERY IMPORTANT!!!

1. Inviting students' feedback is an extremely important part of the program. Please make sure you do this – it will help you tremendously and it will make all future programs better for future participants.
2. Use the flipchart and markers to ask students for their constructive feedback. Ask them for the “positive” and “negative” aspects of the program, and “things to change/add”. Use 3 different sheets to capture all ideas.
3. Do not place judgment on ideas, or make suggestions for improvements, just capture what the students say. This is not a discussion, but rather a brainstorm. All thoughts should be noted; all views valid.

* There is also an evaluation form that I have adapted from Sea to Sky's program. This is for teachers, and chaperones to complete. It is located in APPENDIX A and online here: <http://www.tbgf.org/curriculum/docs/program-evaluation.pdf>

AND FINALLY...

Thank the students for their participation. Make any final closing remarks and say good-bye!