



GREEN TEACHER RESOURCE PACKAGE SUMMER 2006

WELCOME!

The following information is design to introduce you to the Sierra Club of Canada, BC Chapter's **Green Teacher Program**. This package includes:

- Endangered Species Primer
 - Key Terms
 - Activity 1: Awaken Your Senses Scavenger Hunt
 - Activity 2: Miniature Hike
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- Climate Change Primer
 - Key Terms
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 - Take Action! On Climate Change: Stewardship Activity Ideas
 - Resources

INTRODUCTION

The Sierra Club of Canada, BC Chapter's Summer Programs are focused on three main topics, Endangered Species; Climate Change; and Stewardship. The goals of these programs are to help camp and other summer program leaders deliver effective programs, to provide a reference resource for camps, faith groups, and other community organizations, and to encourage as many youth as possible to change their personal actions in a way that benefit our natural world.

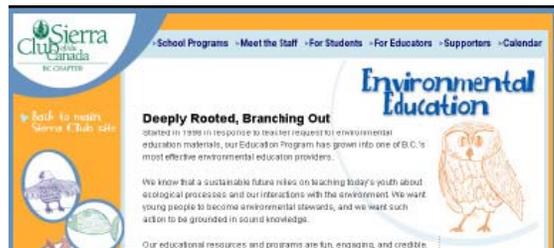
We have selected activities that are easily set-up, have limited props or materials, and suit a variety of ages. For some activities that do require props or materials we have included templates for the easy reproduction of these materials.

In addition to our summer programs the BC Chapter also offers a number of other programs and resources throughout the school year:

Education Program E-newsletter. Sent out to your class each month, the e-newsletter has updates on programs, resource materials, events and opportunities for your class. The e-newsletter also highlights projects and stewardship activities that classes are engaged in following a Sierra Club program. To receive the e-news, please email us.



Website & Email support. Our website has free teacher and student-directed learning resources and program support materials to download; information on our programs, an events calendar; an online *Ecoprovince Map* to explore; and a youth action center. www.sierraclub.ca/bc/programs/education.



School Programs: The BC Chapter offers a variety of FREE in-class school programs throughout the year. If you're a teacher within BC interested in receiving in-class school programs send us your contact information (name, school, email address) and we'll add you to our registration notification list. Visit: www.sierraclub.ca/bc/programs/education/ and click on "School Programs" for more information

If you have any further questions or comments regarding this workshop or other Sierra Club activities please do not hesitate to contact us at:

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SECTION ONE: ENDANGERED SPECIES PRIMER

At the BC Chapter we place a great deal of importance on educating youth about the challenges facing many of the species and key ecosystems of BC. Without access to such knowledge youth will likely continue with habits that have been compromising our planet's future for generations.

BC is Canada's most species-rich province with over 5,000 different kinds of plants, 1,000 vertebrates (fishes, amphibians, reptiles, birds, and mammals), 60,000 insects, and 10,000 fungi. In BC there are approximately 1,363 species presently at risk according to the BC Government's Conservation Data Centre. There is currently no stand-alone endangered species legislation and recent studies show that the existing system of species management is not working. The BC Chapter is asking the BC government to create one law to protect all endangered species.

When teaching youth about endangered species the key concepts that we present start with basic knowledge. The following definitions can be useful:

- **Endangered** – Any plant or animal species whose ability to survive and reproduce has been jeopardized. A plant or animal in danger of becoming extinct.
- **Extinct** – No longer any left existing or living.
- **Habitat Requirements** – All animals require food, water, shelter and space.
- **Food Chain** – A series of steps in which one group of plants or animals serves as food for another and these, in turn, for another. For example, in a simple food chain, a green plant may be eaten by an insect and the insect may be eaten by a bird.
- **Keystone Species** – A keystone species is a species that is integral to the ecosystem where it lives. If we remove a keystone species from an ecosystem it means that almost all if not all of the animals and plants species in the system will be affected.
- **Old-Growth Forest** – A forest that has undergone at least two centuries of natural succession. They are marked by trees of at least two species, including several large, living Sitka Spruce or other coniferous trees that are at least 200 years old or more than 32 inches in diameter; a multi-layered canopy; standing dead trees and large fallen trees on land and in streams.

What are the main causes of species extinction?

Habitat loss – When species habitat is gone not only do they lose food, water and shelter but they also can't aren't able to breed with other same species members in other habitat patches.

Introduced species – Once an exotic species makes its home here it takes the space of the native species and has no natural predators to keep it under control.

Overuse of plant and animal species – Hunting or using up more animals faster than they can replace themselves, leads to species extinction.

Pollution of the water, soil and air – Just because you can find chemicals on the store shelf doesn't make them healthy to put down your drain or in the ecosystem.

Global climate change – Air pollution changes the climate and many animals can't adjust. Scientists estimate that in 50 years polar bears will be extinct due to melting ice in the arctic.

Fragmentation – the splitting of ecosystems into smaller, detached areas as a result of road building, farming, suburban development and other activities. This can isolate wildlife populations and may result in areas too small to meet the habitat requirements of some species.

Some species in BC that on the Endangered List

Spotted Owl – Only 6 breeding pairs of Spotted Owls remain in Canada – a 87% decline since 1992. The Federal government refuses to step in to protect them while the BC government continues logging in their critical habitat. The main threat affecting this species is habitat loss.



Vancouver Island Marmot – is one of the world's rarest mammals as it can only be found on Vancouver Island. They are different from their mainland cousins in a number of ways including they're a different colour (a rich chocolate brown with white muzzle, chest and abdomen), and they use different vocalizations (they whistle like no other marmot!). Researchers learned that the logging roads and newly-cleared mountainsides gave predators (wolves and cougars) easy access to the higher elevations where the marmots lived.

Marbled Murrelet – a small seabird which nests in the coastal, old-growth forest, is listed as a threatened species under the Endangered Species Act. Unlike other seabirds, murrelets do not form dense colonies, and may fly 70 km or more inland to nest, generally in older coniferous forests. They are more commonly found inland during the summer breeding season, but make daily trips to the ocean to gather food, and have been detected in forests throughout the year. The habits of the murrelet make this bird vulnerable to forestry practices, gill netting, and habitat destruction.



Mountain Caribou – are found in the Yukon, Northwest Territories and in central/northern BC with a small pocket in the Central Interior's Chilcotin. Mountain caribou populations have declined by 40% over the past decade because of habitat loss and fragmentation due to logging. They live in BC's unique interior temperate rainforests and depend on old growth forests for their winter survival. Predators include wolves, cougars, bears and wolverines.

Vancouver Island Southern Resident Orca Whales – This group of killer whales, located on Canada's Pacific coast, is a naturally small population with less than 100 animals. Concern exists for the quality of the whales' habitat, with main concerns being availability of prey, human disturbance and pollution. These killer whales eat only fish especially salmon. It has recently been determined that of the five salmon species in BC, they selectively prey on Chinook salmon which are listed as threatened. Sources of pollution that also effect these whales include pulp and paper mills, marine waste dumping sites, agricultural and garden products, fire-retardant chemicals and sewage.

Sharp-tailed Snake – has a very restricted geographic range in Canada and is found in only on the Gulf Islands and on southern Vancouver Island. These populations are small and isolated, and are they are vulnerable to extinction from human disturbance, natural catastrophes, and chance events. The rarity of these snakes, combined with the loss and fragmentation of their forest habitats, raises concerns about the persistence of the species in BC.

ACTIVITY ONE: AWAKEN YOUR SENSES SCAVENGER HUNT

Purpose

- To engage children through exploring the natural world.
- To increase their understanding of the interconnectedness of plant and animal species.

Activity Overview: Gets children excited about exploring their surrounding. They use their senses to learn about the interconnectedness of all life big and small.

Materials: Scavenger Hunt Sheet, Clip board, Pen, An Imagination!

Time: 25 minutes

PROCEDURE

1. Warm-up – 5 min.

Stand in a circle and as a group awaken our senses before exploring the environment. What are our five senses?

- Ask the children to close your eyes and reach out with their ears and count all the different sounds they can hear. Then find out what they heard.
- Then have them close their eyes again and use their noses to smell the nature smells around them. Big deep breaths in through your noses. Same feedback process.
- Have children turn their backs to the group and look from their feet up in to the sky taking in as many plants and animals as possible. Have them do this SLOWLY.
- Ask the children what senses are left and then discuss whether it is a good idea to taste things in nature. (Potential danger/poison), endangered plants) .

2. Scavenger Hunt – 20 min.

Explore for about ten minutes, pointing out different habitats, smells, sounds, textures, colors, plants, and animals. Talk about how things in nature are connected. Ideally, the leader will have scouted out the area first so that they have an idea of what plants or animals are present. For each micro-habitat that is visited, the group will refresh what makes good habitat (i.e. review key components - food, water, space, shelter.)

Sample scenario:

- Look up in the sky. What do they see? (clouds, bird, rain) Discuss what clouds make, why rain is important to plants and what needs plants.
- Challenge them to make connections and make it fun. If you were examining the grass, ask who might live there. (snails, earth worms..) Then have everybody squiggle like an earth worm. Have them think of what might eat a worm. (robins).
- Have them act like a robin including sounds. Find out if they know where robin's live. (In the tree). Travel (fly) to the nearest tree and examine the tree.
- Have them pretend their arms are branches. Ask what they need to grow, who else might live among their branches. (squirrels).
- Have them pretend they are squirrels and find a hollow tree.
- Linking areas in nature together will help the children see the interconnectedness of our environment and start to build ecosystem awareness.
- Have the groups come back together and share some of the plants and animals they have seen, smelled, touched and heard.

ACTIVITY TWO: MINIATURE HIKE

Purpose

- To closely examine a small section of the forest ecosystem
- To visualize some of the lifestyle habits of various forest floor critters

Activity Overview: This activity challenges youth to be creative and imaginative about the life of small creatures on the forest floor. Youth will have some quiet time to look closely at a small section of nature and imagine what might happen there.

Materials: 1 Length of rope or twine 4 – 6 feet long for each team or individual

Time: 15 minutes

Procedure

- Once in the forest explain that, today we are going to create our own tours for each other! Each child or pair of children will be given a rope and they will explore the area and plan a miniature hike along their length of rope.
- The children will come up with four or five stops. Encourage creativity! Slug homes, ancient moss, mushrooms, nurse logs, mouse homes, etc.
- Have students share their hikes with each other. Ask the children to give some reasons why their stops are important and unique to them.

ACTIVITY THREE: ENDANGERED SPECIES WILDLIFE TAG

Purpose: To help children remember the names of endangered species.

Activity Overview: A fun, running game that will help children remember the names of some of B.C. endangered species. This activity follows well after the scavenger hunt.

Materials: Area markers to mark game area

Time: 15 minutes

Procedure

- Have participants list as many animals as they can that live in the British Columbia.
- This game is similar to frozen tag. Except, just before someone's touched, they need to yell out the name of an animal or a plant that lives in BC. If they do they are safe and can't be tagged. If they don't, and they are touched, then they are 'frozen'.
- Depending on numbers you may want 3 people to be "it". At the beginning of each round, make sure everyone knows who is "it".
- Then start the game. To 'unfreeze' someone, another children needs to go under their arm to un-freeze them.
- Start by having children say animals and plants from BC or animals and plants that live in the Temperate Rainforest.

- Have each round last 4-5 minutes. In each round choose new children to be it and take on the characteristics of other animals. For example, you might get them to slithering like snakes while trying not to be tagged.
- **Endangered Species Variation:** Now that they know lots of animals, have them say the names of only endangered species. Brainstorm as a group what a few of those are first.
- In the next round, make the playing area smaller. Explain that the land is inaccessible to animals due to human development. How do the youth feel now? Is it much easier to be caught? Emphasize that this is the main reason why species are going extinct. Ask what we can do to prevent habitat loss from occurring at the present rate? (I.e. Build higher not wider, use space efficiently, plant native species...)



ENDANGERED SPECIES LEARNING RESOURCES

PRINT

The **BC Chapter** has a number of elementary and secondary resources available to teachers, including our *TRFic! A Temperate Rainforest Teachers Guidebook and Poster*. As well our *Green Star!* newsletters (available at www.sierraclub.ca/bc/programs/education/students/greenstar/newsletter.html) contain information on many of the endangered plants and animals of BC. Visit us online to download free copies of the newsletter.

Downloadable PDF guidebooks: The *For Educators* section of our website has a number of resources, including recommended web links and downloadable guidebooks. The direct link to this is: www.sierraclub.ca/bc/programs/education/educators/resources.shtml

WEBSITES

- www.environmentalleadership.org: This site provides ideas for taking action.
- www.cosewic.gc.ca/eng/sct5/index_e.cfm: This is the government website that lists species at risk for various areas.
- Take action by writing to your MLA you can find the address at www.gov.bc.ca.

ENVIRONMENTAL GROUPS

Western Canada Wilderness Committee This local Victoria not-for-profit organization welcomes volunteers and is a great resource when trying to gather further endangered species information. Their webpage is: <http://www.wildernesscommittee.org/>.

World Wildlife Foundation Canada has been active for many years in Canada and runs the rare plant rescue program. www.wwf.ca/.

SECTION TWO: CLIMATE CHANGE PRIMER

Climate change is a phenomenon that affects everyone on the planet. It's important to teach now about how our actions – both current and future – can affect our climate.

Since the industrial revolution our planet has experienced a drastic and rapid increase in the amount of greenhouse gases in its atmosphere. This process has triggered a condition called global warming. Today there is little doubt that the symptoms (severe weather, glacial melting, species extinction and insect infestations) we are experiencing have been influenced by climate change.

Climate change is a cumulative condition caused by the increase in greenhouse gases in our atmosphere. Many of our daily behaviours continue to contribute to this problem. During programs focussed on climate change it is important that youth understand the basic concepts, but it is equally important that they learn that there are many things that each of us as individuals can do to help counter climate change.

When teaching about climate change understanding certain key words can be helpful:

- **Atmosphere** - The mixture of gases surrounding the earth.
- **Biodegradable** - Material that can be broken down by bacteria or other decomposers.
- **Carbon Dioxide (CO₂)** - The greenhouse gas whose concentration is most affected directly by human activities.
- **Carbon sinks** - Areas that take in and store more carbon than they release. Forests and oceans are common carbon sinks.
- **Climate** - The average weather for a particular region and time period.
- **Climate change** - A significant change from one climatic condition to another.
- **Deforestation** - Removing the tree cover from land.
- **Emissions** - For climate change, releasing a gas, especially a greenhouse gas, into the atmosphere.
- **Fossil fuel** - Geologic deposits of carbon from living things, including oil, coal, natural gas, and tar sands; these can be burned for energy.
- **Global warming** - An increase in the near surface temperature of the Earth.
- **Greenhouse effect** - When greenhouse gases allow incoming solar radiation in to the Earth, but stop part of it from escaping back into outer space. Life on earth wouldn't exist without the natural greenhouse effect.
- **Greenhouse gas** - A gas in the atmosphere that absorbs radiation. This includes water vapour, CO₂, methane and nitrous oxide.
- **Population** - The group of individuals of the same species that live within an area.
- **Recycling** - Collecting and reprocessing a resource so it can be used again.
- **Renewable energy** - Energy from sources that are essentially inexhaustible, like sun and wind.

ACTIVITY ONE: CLIMATE CHANGE INTRODUCTORY SKIT

Purpose

- To introduce some basic concepts of climate change
- To present climate change is a fun and interactive way

Activity Overview: This activity is most effective with the help of a volunteer and quickly conveys to the youth the basic concepts of climate change. The concepts outlined include fossil fuel and their source, green house gases, how they are created, and the effect they are having on our planet.

Materials: Six signs with the images of each of the following:

- earth
- ferns
- fossil fuel
- uses of fossil fuel (cars, trucks, boats, electricity, fire, and gas)
- the green house effect, and
- a list of species and ecosystems that are affected by climate change.

Time: 15 minutes

Procedure

1. Pick a volunteer from the group. Explain that you are going to discuss:
 - How climate change is happening
 - Where they come from
 - What fossil fuels are
 - Impacts of human use of fossil fuels.
2. Ask your volunteer to hold up the first sign. The **1st** image has an earth on it.
3. Ask the youth what this is an image of? Then tell them that the earth is approximately 5 billion years old. There's been a LOT of changes in that time – landscapes, animals, plants, and climate. But, it to save time we won't be reviewing all that history!
4. Have the volunteer show the **2nd** image which has ferns and little animals on it. Then explain that we are going to look back to the **Carboniferous** period. 360 million years ago, during this period the earth was covered in big ferns, trees and other green stuff, as well as big swamps. There were no dinosaurs yet, but some small creatures did exist. When these small animals and the ferns and trees of that time died, they fell into the swamps and oceans, piling up until they started to pack down into these thick layers of stuff called **peat**. Over thousands of years, the peat was covered by rocks and clays, and the weight of those rocks pushed down on the peat, pushing all the water out of it and turning it into something else.
5. Then have the volunteer hold up the **3rd** card and show the image of fossil fuels or a pile of black goo. Ask them what they think it is? (Fossil Fuel) If they can't figure it out start giving them hints like: "We burn it to create energy. One form of it goes it to our cars." Over time humans have found ways to take it out of the earth and use it for many things.
6. Have the volunteer hold up the **4th** image. The image is a picture of cars, boats, fires, and gas pump. Explain that back in the 1700's, people figured out that we could burn coal to heat up water in engines, and the steam from the water could power machines to make clothing and other goods. Enter the modern factory. Ask them what they think we get from factories. (Get lots of answers)

7. Let them know that even though this seems great, when we burn fossil fuels the carbon in them doesn't just disappear, just like our breath doesn't disappear after we've inhaled.
8. Some fossil fuels by-products are used up as heat, but they also give off gases like **carbon dioxide**. Some of the gases that are given off when we burn fossil fuels – are **sulphur dioxide and nitrous oxide**.
9. Have the volunteer hold up the 5th card and show the image of the earth's atmosphere and how solar heat gets trapped by the increase of carbon dioxide. Using the graphic explain how the green house effect works. First the atmosphere – it is important because it keeps all the air around the earth, so we can breathe. Plus, the atmosphere acts like a blanket around the earth, and holds in some of the sun's heat so that the earth is warm. Ask if they know what this is called? (The greenhouse effect.) Without the atmosphere and the greenhouse effect, we'd be a frozen planet, like Pluto. These gases like carbon dioxide are similar to the glass in the greenhouse, keeping the heat in; this is why they are called **greenhouse gases** (GHG's). The more GHG's we produce the thicker our atmosphere will get. This is what is causing climate change.
10. Ask the group if they have any good ideas of things they can do to reduce their effect on climate change. Get children to contribute some ideas, randomly. Make sure to suggest some if they are having a hard time. The 6th sign has a short list of animals and earth systems that are being affected by Climate Change. Ask youth to brainstorm some of the ways the earth is affected by climate change.

Once the group has brainstormed some ideas of ways they can help reduce their personal impact on climate change, hand out the “**Sierra Club's 10 things you can do to help stop global warming**” handout (next page)



ACTIVITY TWO: CLIMATE CHANGE OLYMPICS

ACTIVITY OVERVIEW:

This series of activities are fun, and include several stations that engage youth in making connections between climate change and their daily life. Activities include reflective activities with the art stop, running games with the relays and making connections with the climate change scavenger hunt.



#1: ART PROJECT

Purpose: To leave the group of children with a visual representation of positive actions they can take to help with Climate Change

Activity Overview: Create a large poster with an image of an earth on it. Have the children contribute to the earth by drawing earth friendly modes of transportation or green energy or initiatives on the earth. Let all the children contribute and leave the poster with them so that they can keep it at the camp!

Materials: Large line drawing of the earth on roll paper

Time: 15 -20 minutes

Procedure

1. Provide each child with a small 6"X6" piece of paper to create their image on.
2. Brainstorm ideas of things we can do to help reduce their impact on the climate.
3. Circulate and support and listen as they explore ideas for their drawing. Then create!

#2: CLIMATE CHANGE SCAVENGER HUNT

Purpose

- To help youth recognize the affects of climate change is in their local surroundings.
- To share with youth positive options to their current actions.

Materials

- Climate Change Scavenger Hunt Sheet (see next page)
- Clip boards
- Pens or pencils

Time: 20 minutes

Procedure

1. Briefly review the scavenger hunt sheet with the campers. Set exploration boundaries.
2. Have the group break in to pairs or threes and hand-out the Scavenger Hunt sheets.
3. In small groups of 2 or 3 they will look in their immediate surroundings for evidence of climate change.
4. Meet back after the 15 min. and review what they found. Some suggested questions might include, "What they liked the best? What they found they didn't expect? If they discovered something they hadn't known about?"

THE OFFICIAL CLIMATE CHANGE CHAMPION SCAVENGER HUNT



Find as many as you can, and write them down as you go...

An effect of Climate Change that we see everyday _____



A human behaviour that ...

Helps reduce climate change in our environment _____



... Contributes to Climate Change _____

An Example of people-powered transportation _____



Something that releases oxygen _____

Something that reflects sunlight _____

An example of something that absorbs CO₂ _____

Something that can be recycled _____



Something that can be reused _____

A person interacting with their environment _____

A natural resource you depend on _____

An example of technology affecting the environment _____

People and wildlife experiencing some of the same problems _____



#3: THE CLIMATE CHANGE OBSTACLE COURSE

Activity Overview: This obstacle course is a combination of several smaller activities that can be rearranged or substituted with other activities.



HEATING UP

Purpose

- To have children physically experience heating up
- To create empathy for mother earth and the changing climatic conditions

Activity Overview: This is a speed event in the obstacle course where children speed dress and skip rope a set number of times.

Materials: One skipping rope per team; and a hat and scarf per team

Time: 10 minutes

Procedure

1. Children take turns speed dressing, skipping and then undressing. They have to put on 2 items of clothing - a toque and a scarf to represent current trends in global warming.
2. The skipping rope (representing human powered travel) and each child has to jump 10 times with the winter clothes on.
3. Because they participated in alternative energy production their personal impact is reduced. After jumping rope, they take off winter clothes and move to the next activity.



WATER LEVEL RISING RELAY

Purpose: To have youth recognize that human activity is causing a rise in ocean levels

Activity Overview: A fun running activity to introduce the concept of sea level rising.

Materials: Two buckets per team; one sponge per team; something to mark the area you are playing within.

Time: 15 minutes

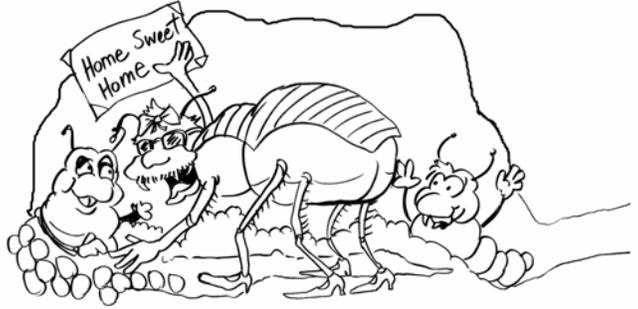
Procedure

1. Ask the youth, "Did you know there are two kinds of glaciers? Ones that are in the water and one that are on land." In this game we will be recreating the effect when glaciers on land start to melt and run in to the ocean.
2. The 1st bucket has a sponge in it and is filled with water. The 2nd bucket is empty.
 - a. Bucket #1 = glaciers melting
 - b. Bucket #2 = the sea levels rising.
3. When the relay starts children will go one at a time and takes the sponge (full of water) out of the first bucket, and run it to the second bucket. There they squeeze it out and then returns it back in the first bucket.
4. Once each team member has gone have the teams check which bucket #2 has more water in it. Then ask them, "Where do you think the rest of the water went? In nature can water go in to the earth instead of in to the ocean? What do you guys think we can do to help stop ocean levels from rising?"

ACTIVITY THREE: PINE BEETLES & CLIMATE CHANGE

Purpose

- To show the habitat requirements of a mountain pine beetle.
- To demonstrate the effects of climate change on a mountain pine beetle ecosystem.
- To use the mountain pine beetle as one example of the influence of climate change on global ecosystems.



Activity Overview: This is a running game based on a tag model that looks at how Mountain Pine Beetles are affected by climate change and how this is changing our landscape.

Materials

- A hat and scarf
- 30 arm band
- A red t-shirt for fire
- A blue scarf for frost
- Six pylons to set boundaries
- Two ropes for safe zones
- A whistle

Time: 30 minutes

Procedure

1. Discuss the following questions with the group:

- What is climate change?
- What is the mountain pine beetle?
- What does it eat? What specific parts of trees?
- How is climate change related to mountain pine beetles?

2. Remind the group that the beetle infestation is just one of many visible effects of climate change. Brainstorm some other effects [dramatic weather fluctuations (more severe hurricanes), drought, species movement (grizzly bears north, polar bears south), rising sea levels, etc.].

Outdoor Game

Set up: Remind students that pine trees need long bouts of cold during the winter to kill the mountain beetle larvae that nest under their bark. This game is played similarly to *freeze tag*. Set up a rectangular play area approximately 20 meters by 30 meters using the pylons. Near each long end lay a rope on the ground to make a safe area. Split students into $\frac{1}{4}$ pine beetles and $\frac{3}{4}$ pine trees; give all students an arm band, but have pine beetles hide their arm bands to start. One facilitator wears a red t-shirt to represent fire, and the other wears a blue scarf to represent frost.

Play: The beetles start by trying to catch the pine trees. When trees are tagged by a beetle they are frozen and become beetle larvae for 10 seconds. If they are not unfrozen by another tree they become a beetle (remove their arm band), and begin chasing the pine trees. Trees can find refuge in the safe zone for 10 seconds – which is a below-zero cold zone where the pine beetles can't. As the game progresses the time that they are allowed

to be in the cold zone starts to shrink because of climate change and shorter winters. The facilitator decides when to decrease the time in the cold zone until there is no cold zone (i.e. there is no sub-zero winter anymore because of climate change).

When you see that there are too many beetles running around then send in a leader as FIRE, who then runs around for 30 seconds and randomly tags everyone. They are frozen for 10 seconds, and if they are a beetle, they change into a tree. The other facilitator is the FROST which runs through the game and tags beetles so that they become trees. Explain to the group that if there were no cold winters then the beetle population would continue to rise. The game ends when the 20 minutes is up.

Evaluation

Following the activity, spend time with the group discussing some of the following ideas:

- How long did students last as pine trees? How much more difficult was the game as the cold zone shrank? What were the effects of climate change?
- What sorts of systems are also affected by natural disasters? Could these natural disasters be affected by climate change?



CLIMATE CHANGE LEARNING RESOURCES

PRINT

Teaching About Climate Change: Cool School Tackle Global Warming. Edited by Tim Grant and Gail Littlejohn. An excellent guide to school activities and background information for teachers, focussing on climate change stewardship. Green Teacher Magazine & New Society Publishers. 2001. Order through the website at www.greenteacher.com/

WEBSITES

www.pembina.org/climate-change/index.php. A mega-site with tons of information on climate change reduction ideas targeted from individuals to organizations. High-level information, and an excellent resource.

www.bcclimateexchange.ca A centre for climate change information & programs in B.C.

www.climatechange.gc.ca The Government of Canada's climate change website, including teacher and student resources, and a greenhouse gas calculator.

ENVIRONMENTAL GROUPS

Wild BC. Provides education and stewardship workshops for educators and communities across BC. Programs include the *Climate Change Solutions Teacher Workshops*, and many others. www.hctf.ca/wild. You can also contact them by phoning 1-800-387-9853 ext. 4 or emailing wild@gems5.gov.bc.ca.

The Pembina Institute. An amazing organization that focuses on renewable energy and energy alternatives. Their website will teach you about climate change and energy sources, with many links to education resources, such as www.re-energy.ca where you can learn to build your own solar-powered car! www.pembina.org.

Check the links page on our website at www.sierraclub.ca/bc/programs/education/educators/weblinks.shtml for more websites and environmental groups of interest.

SECTION THREE: STEWARDSHIP PRIMER

Stewardship is an integral concept that staff at the Sierra Club of Canada, BC Chapter try to integrate in to all our educational programming. It is important for youth to be educated about environmental issues, with clear actions that they can take to create positive change.

The Action Challenge component of our in-school programs has been huge success for classrooms around BC. These activities have motivated and inspired classes to change both classroom and personal behaviours. The simple action of turning out the lights at lunch time or purchasing items with less packaging can be measured, and children are often amazed to see what a difference they can make over a short period of time.

When teaching about stewardship understanding the following key words can be helpful:

- **Stewardship** – The conducting, supervising or managing of something;; the careful and responsible management of something entrusted to one’s care.
- **Interconnections** – To connect with one another; to be or become mutually connected.
- **Compost** - Decayed organic matter than can be used as a fertilizer or soil additive.
- **Biodegradable** – The ability of a substance to be broken down physically and/or chemically by micro-organisms. For example, many chemicals, food scraps, cotton, wool, and paper are bio-degradable; plastics and polyester generally are not.
- **Recycling** - Collecting and reprocessing a resource so it can be used again.
- **Sustainability** – of, or relating to, or being a method of using a resource so that the resource is not depleted or permanently damaged.

ACTIVITY ONE: RECYCLING RELAY

Purpose

- To get children actively thinking about what things can be recycled and cheer each other on when recycling.
- To create an opportunity to talk about the three R’s (reduce, reuse and recycle) and why they are in that order.

Activity Overview: This is a running relay race where children sort through a box of recycling and organize them into the appropriate categories. This works best with two or more teams.

Materials: A box of recyclable materials (enough so each child can go once or twice). Four signs that say: ‘Glass’, ‘Metal’, ‘Plastic’, and ‘Paper and Cardboard’.

Time: 15 minutes

Procedure

1. Start your introduction by asking the children if they heard of the 3 R's before? Can they tell you what they are? (If not, remind them they are Reduce, Reuse Recycle.)
2. It is important to have children understand the order of the R's is on purpose and relates to the amount of energy needed to do each this. Reduce encourages us to take in less stuff! For example bringing a bag to the store so you don't need to get one when you are there to carry things home in. Reusing encourages us to find new uses for things that have already been made. The first R uses the least energy, then reusing and then recycling which uses the most energy.
3. Show the group the box of things you've collected and ask them where it should go. Explain that these things are not biodegradable. Ask if anyone knows what *biodegradable* means? (That it can rot and turn back into soil.) Ask what things they think are biodegradable. Ask where they can put all those extra fruit and vegetable bits left in their kitchen that they don't eat? (compost pile) Food in a compost can turn into soil and be reused in your garden to help plants grow.
4. Let children know paper is also biodegradable. Ask them where paper comes from? (*trees!*) Trees get mashed up and turned into paper, but we don't have many trees left so we should **reduce** the amount of paper we use and **re-use** the paper we already have. Have the group repeat that: "REDUCE AND REUSE". Ask what else they think happens when we cut down lots of trees? (Animals lose their homes!).
5. Things like plastic, glass and tin cans can take thousands of years to break down and turn into soil, so if we throw these in the garbage or the ocean they will still be here when their grandchildren's grandchildren's grandchildren are born! But, a machine can melt down the glass, plastic, or metal and recycle the material into new things!
6. Explain to the children how a relay race works and that at the end you will be checking to see if everything goes it to the right category.
7. "You are going to have a race against each other to see which team can pick something from the pile of recyclable things and stick it in the right place the fastest.
8. Celebrate the proper sorting of the recycling and remind them that the less we throw out and the more we recycle the happier our planet will be for years to come!
9. Review the 3 R's with the children and then go through the piles with them to see how well they did.



ACTIVITY TWO: STEWARDSHIP HEADBANDS

Purpose

- To brainstorm possible stewardship ideas
- To create something the children can take home with them to remember the program

Activity Overview: This is a quiet activity and a good wind down after some of the running games. The children create their own headband with a stewardship idea on it.

Materials

- Outlines of animal images with "I will..." on it
- Strips of paper for headband
- Coloring material
- Pens or pencils

Time: 20 minutes

Procedure

1. Each child is given a paper with a fish, owl or a polar bear on it that says " I WILL"
2. Then the children have to brainstorm ways of helping the animal.
3. Possible ideas include: recycle, turn off the lights, not pick wild flowers etc.
4. Have each child write their idea on the animal picture and then staple the animal to a headband (do this activity with the group – each youth leader can also make their own headband and wear it).



STEWARDSHIP PRIMER LEARNING RESOURCES

PRINT

Canadian Parks and Wilderness Society (CPAWS)

The CPAWS website contains a well-developed series of online resources, including "*What is Good Environmental Education*" and "*How to Get Action in Your Environmental Education Program*". You can also find numerous activity guides and lesson modules, including *Grizzly Bears Forever!* and other biodiversity and conservation activities. www.cpawscalgary.org/

WEBSITES

www.sierraclub.ca/bc/programs/education/educators/resources.shtml Visit the Sierra Club of Canada, BC Chapter webpage and explore the downloadable resources.

ENVIRONMENTAL GROUPS

Drinking Water Stewardship is a local BC group that focuses on water quality issues in the CRD. Check out their webpage at: www.crd.bc.ca/ecostar/Water.htm

TAKE ACTION! STEWARDSHIP ACTIVITY IDEAS

Here are some ideas to get you started on **taking action!** This list focus on concrete actions that you can take to reduce waste and consumption - you'll be reducing your greenhouse gas emissions at the same time! The action ideas are grouped by the level of commitment required to see the project through.

A Little (Done with just a bit of thought)

- Purchase food items in bulk with minimal disposable packaging rather than in individual portions.
- Whenever possible, open up the blinds and use natural light instead of artificial.
- Use a cotton handkerchief instead of paper tissues.
- Make sure that both sides of each piece of paper are used before recycling. This includes photocopying, camp handouts and artwork.

A Bit More (Done in a couple of sittings)

- Create a "Reuse or Donate" box.
- Set up a regular check to keep all air vents on walls or windowsills free of books, furniture, and other obstacles.
- Have a camp-wide policy to report on leaky taps, water fountains and running toilets.
- Have a camp set of dishes that can be reused for cafeteria and other lunches.

A Handful More (Needs a couple days to do)

- Hold a painting, photograph or poster competition with a climate change theme.
- Take up a 'clean your neighbourhood drive'. Have prizes for the most litter collected. Make sure to separate the garbage into recyclables!
- Arrange a wall display highlighting an environmental occasion like Earth Day.
- Start a program to give toxic chemicals (including batteries, paint, and harsh solvents) to the local depot for proper storage or disposal – don't throw them in the trash!

A Lot More (Needs a week or two)

- Organize a No Waste Day – include lunches (campers and staff), the cafeteria, and camp supplies. Give workshops on how to reduce and eliminate waste from daily activity.
- Start up a compost system for organic waste (kitchen and yard waste).
- Coordinate a clothing swap at the end of each session, and donate leftover clothes to charities or sent them overseas. Definitely include sporting equipment!

