

EDUCATIONAL LEARNING RESOURCE: CLIMATE CHANGE

Climate change is a phenomenon that will affect everyone on the planet; it is only a matter of time. For that reason, students should be educated upfront about how their actions can harm and benefit our climate.

Since the industrial revolution, our planet has experienced a drastic increase in the amount of greenhouse gases in its atmosphere. This process has triggered a condition called climate change, often referred to as global warming. There has been a lot of debate around the existence, causes and effects of climate change, but today it seems there is little doubt that the symptoms we are experiencing (severe weather, glacial melting, species extinction, insect infestations and rising ocean levels) have been influenced by climate change.

Many of our daily behaviours contribute to climate change. During lessons focused on climate change it is important that students grasp both the basic concepts and the individual things we can do to reduce the rates and effects of this phenomenon.

FROM CONIFERS TO CRUSTACEANS

Trees and old-growth forests are often called carbon sinks because of their ability to absorb vast amounts of carbon dioxide and release it back in the form of oxygen. When teaching about climate change, it is important to understand the link between maintaining forest health and maintaining climate health.

Not only does climate change have drastic impacts on our forests, land resources and atmosphere, it can severely affect our oceans- our waters of life. Half of the world's oxygen is produced by plankton and larger plants living in the oceans. Every second breath you take is generated by the oceans! Aquatic plant and animal life can absorb large amounts of heat and greenhouse gases, making ocean ecosystems equally as important in creating a safe and healthy planet as land plants and ecosystems.

When teaching about climate change, the following key words can be helpful:

- ❖ **Atmosphere**- The mixture of gases surrounding the earth.
- ❖ **Biodegradable** - The ability of a substance to be broken down physically and/or chemically by micro-organisms. Many chemicals, food scraps, cotton, wool, and paper are bio-degradable; plastics and polyester generally are not.
- ❖ **Blue Carbon** – carbon that ocean ecosystems safely store without releasing it into greenhouse gases.
- ❖ **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 climate to another.
- ❖ **Deforestation** - Removing the tree cover from land.
- ❖ **Emissions** – As referring to climate change, this means 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 restrict some from escaping back into outer space. Life on earth would not exist without the natural greenhouse effect.
- ❖ **Greenhouse gas** - Any gas in the atmosphere that absorbs radiation. This includes water vapour, CO₂, methane and nitrous oxide.
- ❖ **Overfishing** - to take so many fish out of an ecosystem at once that populations cannot reproduce quickly enough to maintain a healthy ecosystem.
- ❖ **Population** - A group of individuals of the same species living 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: BLUE CARBON

Activity Overview: To understand ocean ecosystems' abilities to absorb and store large amounts of carbon from the atmosphere.

Materials: A large playing court or field with ropes/pylons to designate a start line, finish line, middle line and boundary.

Time: 10 minutes

Procedure

1. Have two volunteers agree to be plankton. They must stay between the middle line and the finish line at all times.
2. Have the rest of the students line up on the start line. They are all carbon. Their goal is to run to the finish line without being "absorbed" (tagged) by the plankton. They can line up at the start line again and wait for you to say "Go!"
3. Once carbon is absorbed, the students sit on the ground in the same area as the plankton and become coral. They remain seated but can wave their arms around to try and absorb other carbon that is running by. If that carbon is tagged, they also become coral. The game continues until no carbon is left.

Debriefing Questions

1. What happens when there are more plankton and coral in the oceans?
2. What happens when more carbon is absorbed and stored by ocean ecosystems?
3. What are some things we can do to keep our ocean ecosystem healthy?



ACTIVITY TWO: CLIMATE CHANGE OLYMPICS

Overview

This series of activities is super fun and include several stations encouraging students to make connections between climate change and their daily life. Activities include **reflective activities** with the Art stop, **running games** with the relays, and **individual connections** with the climate change scavenger hunt.

#1: Art Project

Purpose: To leave the group of students 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 the earth. Students contribute to the earth by drawing earth-friendly modes of transportation or green energy or initiatives.



Materials: Large line drawing of the earth on roll paper

Time: 15 -20 minutes

Procedure

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

#2: Climate Change Scavenger Hunt

Purpose

- To help students recognize the affects of climate change in their surroundings.
- To share with students 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 students. 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 _____



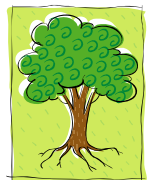
Something that can be reused _____

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

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

A. HEATING UP**Purpose**

- To have students 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 students speed dress and skip rope a set number of times.

Materials: One skipping rope per team; A set of hat, and scarf per team

Time: 10 minutes

Procedure

1. Students 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.

B. WATER LEVEL RISING RELAY

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

Activity Overview: A running activity to introduce the idea of sea levels 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 students, "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 students 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 squeezes 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?"

CLIMATE CHANGE LEARNING RESOURCES



PRINT

Teaching About Climate Change: Cool Schools 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.

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:

http://www.sierraclub.bc.ca/education/ed_educators.

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, but an excellent resource.

www.chf-partners.ca/education - Resources for teaching global education from the **CHF Global Education Program**.

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 BC communities. Programs include the *Climate Change Solutions Teacher Workshops*. www.wildbc.org. You can also contact them by phoning 1-800-387-9853 ext. 4 or emailing wildbc@hctf.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.