

Going Carbon Neutral

Duration:

1 class for introduction
1 class to carry out calculations and estimate offsets

Long-term: this exercise can be carried out, rechecked and altered throughout the year

Objectives:

Students will:

- Use simple calculations to estimate personal greenhouse gas emissions
- Learn how to calculate becoming carbon neutral
- The class will make a plan to be carbon neutral

Vocabulary:

Carbon Neutral

A lifestyle that reduces greenhouse gas emissions and compensates for remaining carbon output in other ways.

Carbon offsets

A system to reduce emissions by trading output amounts for investment to reduce emissions in other ways

Emissions

By-products of combustion, usually referring to greenhouse gases

British Columbia PLO's:

Science 6, 7, 8
Math 6, 7
Social Studies 6

Background:

This is a good activity to use in the middle or at the end of the climate change unit. The students need to have a basic knowledge of climate change and its impacts. The activity focuses on one of the many actions individuals and groups can do to minimize abrupt climate change both now and in the future.

Global warming and climate change are happening. Becoming carbon neutral by minimizing our greenhouse gas emissions and then taking responsibility for the remaining emissions we produce is a great way to start reducing our impact. Families, schools, and businesses are all taking important steps to reducing their emissions.

There are several online programs you can use to become carbon neutral. By simply inputting your monthly values for utilities such as gas and electricity, you can compute what your CO₂ output is. Some of the information you need to know to calculate your carbon footprint may not be easy to find, but with some effort and a little bit of guidance, you can track down the information you need.

Once you know what your output is in kilograms, the program will give you a dollar amount that you can pay in carbon offsets in order to become neutral. Carbon offsets are simply credits for emission reductions produced in other projects. The money that you pay into the credit system is put towards removing CO₂ from the atmosphere by investing in clean alternative energies and related technologies. The ultimate goal is to live in a sustainable way that can be maintained.

This activity looks at how students can assess their own environmental impact and become carbon neutral. Ultimately, the goal is not necessarily to have students pay carbon offsets but for them to become more aware of their impacts on their surroundings, and what they can do to minimize their own effects. The practice of becoming carbon neutral can also be extended to the family, classroom, and even the entire school.

Materials:

- *Oceans News* article *Going Carbon Neutral*
- Computers with internet access
- Calculators
- Information about the student's homes and the school depending on your goal

Information you will need to gather

- electricity in kilowatts used (available from monthly bills)
- oil consumed/month
- natural gas consumed/month
- gas efficiency of your car (can be found at www.fueleconomy.gov/feg/findacar.htm)
- kilometers/miles driven per week/month
- car gasoline consumed/week or month

Procedure:

1. With the class read the *Ocean News* article *Going Carbon Neutral*.
2. On the board ask the students to list any of the words that they did not fully understand in the reading. Ask the students for ideas and develop definitions together that the students can write down in their notebooks.
3. In their notebooks have the students Think-Pair-Share about the sources of the emissions they create on a monthly basis. Once their emission sources have been identified, have them discuss how they can reduce these over the next week, month, etc.
4. On the computer, have the students visit the different carbon neutral calculators and list what information they will need for their calculations. You can write the websites of the calculators that you wish them to use on the board or have them browse the different types.
5. For homework get the students to research the energy values they will require to complete this exercise.

Next Class

1. Have the students return to the websites they used the previous class and begin to enter their values. For students who were unable to obtain values, the national or provincial averages can be used for their calculations or they can work with a partner.
2. Once the students have computed their emission offset total, get them to discuss the two main actions that they should

undertake: (1) looking at ways to reduce their emissions and (2) investigating what their options are with respect to buying carbon offsets. As a class, visit the David Suzuki Foundation webpage where a list of carbon offset vendors can be found.

3. Get the students to make a budget showing how they could offset their carbon emissions (i.e. wind power, solar power, investing in green developments in other countries). Encourage the students to make their own plans on how they would like to spend their offset money, and have them justify their decisions.
4. Ask the students to brainstorm how they could raise money to become carbon neutral.

Long-term

1. As a class, add up the total offsets required (by each student or pair) to become carbon neutral. Collectively, make a strategy to fundraise the money needed to make the classroom carbon neutral. This could include all students paying a small portion, having a class garage sale, bake sales, a bike-a-thon etc. For ideas on classroom fundraising visit (www.canteach.ca/elementary/classman7.html)
2. Carry out the fundraising and purchase the needed offsets. Display the paperwork in a central location where classroom visitors can see them.
3. With the ideas generated to reduce emissions, ask the students to work out a plan for their homes and for the classroom.
4. After 6 months, get the students to re-estimate their greenhouse gas emissions and ask them to make comparisons with their old values. Discuss any improvements that could be made to help reduce emissions.

Discussion:

- Why do different countries have different average emissions?

- How do Canada's energy resources impact climate change?
- What role do you think Canada should take in becoming a world role model in carbon neutral living? How could this be done?
- Why do different provinces have different carbon neutral calculations?
- How does purchasing carbon offsets help the environment?

Extension and Resources:

- Get half the class to use one carbon neutral calculator and the other half of the class to use another one. Compare the results.
- An extension of this would be to figure out what the school would need do to become carbon neutral. Take the energy values for the school, add them together, and divide by the total school population.
- Have students investigate the average hydro and gas emissions in different countries and compare emission rates. Many of the calculators are from different countries and give average emission amounts.
- The David Suzuki Foundation has great resources and information on carbon emissions, being carbon neutral, and carbon offsets.
(http://www.davidsuzuki.org/Climate_Change/What_You_Can_Do/carbon_neutral.asp)
- The Pembina Institute is a great source for information of greenhouse gases and living in a sustainable way. They also have great lesson plan on sustainability at their education website greenlearning.ca.
- The National Energy Foundation web page has a great article and map on “Why do some countries have higher Greenhouse gas emissions than others?”
(www.nef.org.uk/energyadvice/co2emissions/ctry.htm)
- The following offset calculators are easy to use to calculate emissions:
 - Carbon Zero: This is my favourite carbon calculator. It does the home, car and air travel and can bundle it for you with numbers that are easy to access. It is a

Canadian site so no conversions are necessary.

(<http://www.carbonzero.ca/home/>)

- Safe Climate: this is an American site. I like this one as it incorporates both travel and household energy. The fun part of this one is that it rates you against the American average and an animated figure shows up to tell you how well you are doing.
(<http://www.safeclimate.net/calculator/index.php>)
- The Environmental Protection Agency: this is a good overall calculator that shows good estimates. Is American so estimates may not apply and dollars must be converted.
(<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterToolsGHGCalculator.html>)
- Climate Care: good for the home, flights are very easy to compute. This site is from the UK and so calculates in the £ so a conversion will need to be made to figure out what the cost offset is.
(http://www.climatecare.org/calculators/house_calc.cfm)
- The Carbon Neutral Company: Is good for home calculations, does a general vehicle calculation. Is a UK site so dollars will need to be converted to pounds in order to calculate.
(<http://www.carbonneutral.com/cncalculators/householdcalculatorshop.asp>)
- Climate Mundi: an easy to use calculator. It is a French site and estimates will need to be converted from €
(http://www.climatmundi.fr/lng_EN_srub_14-Home.html)