



## Celebrating Earth Day

Each year on April 22<sup>nd</sup>, we celebrate the birth of the modern environmental movement. Earth Day has become the voice through which millions of people worldwide fight for a clean environment.

Gaylord Nelson, Earth Day founder and Senator from Wisconsin from 1963-1981, proposed the first large-scale environmental protest in 1970 in order to shake the political establishment and force environmental issues onto the national agenda.

Since that first Earth Day celebration, the world has come to recognize that we all have to do our part to keep our Earth clean and safe. We hope you enjoy sharing these ideas with your students and teaching the future generation about the importance of keeping our world healthy.



This Earth Day lesson is sponsored by Seventh Generation. If you'd like to send feedback about this lesson, please email [recycle@seventhgeneration.com](mailto:recycle@seventhgeneration.com) or visit us online at [www.seventhgeneration.com](http://www.seventhgeneration.com).

## Seventh Generation Household Carbon Footprint Calculator

### What's your family's carbon footprint?

This lesson helps students use a tool that calculates the amount of carbon dioxide and greenhouse gases generated by their household each year.

The Seventh Generation Household Carbon Footprint Calculator (CF Calculator) can be found at: [www.seventhgeneration.com/carbon-calculator](http://www.seventhgeneration.com/carbon-calculator)

The CF Calculator follows the methodology developed by The World Business Council for Sustainable Development and The World Resources Institute and is available at the GHG Protocol website: [www.ghgprotocol.org](http://www.ghgprotocol.org). Like any other carbon footprint tool, our calculator is an estimate. Whether measuring emissions from flights, driving your car, or recycling, there will always be some margin of error. However, this tool compiles the leading methodologies to provide a reliable estimate to help individuals understand their footprint—and to begin reducing it.

The FAQ section of the CF Calculator contains information on the sources and references for how the calculator works.

### National Science Standards

This lesson and its extensions address the following national science standards:

- Science as Inquiry (Content Standard A)
- Science in Personal and Social Perspective

### Grade levels 6-12

**Lesson Duration:** Flexible. Students will gather the household data to enter into the calculator as a homework assignment. This can be followed by a single-period results review and discussion.

**Goal:** Students investigate the individual impact that they have on the generation of carbon dioxide in the environment.



To complete this lesson, you should have:

- Carbon Footprint Calculator Worksheet (see Student Pages)
- PC with internet access
- My Impact Worksheet (see Student Pages)
- How Can You Reduce Your Carbon Footprint? (see Student Pages)

## Lesson Description and Outline

### Preparation

Because the tool requires students to do a little digging at home to get the numbers needed for the calculator, you should follow these steps before teaching this lesson to your class:

Try out the CF Calculator yourself at [www.seventhgeneration.com/carbon-calculator](http://www.seventhgeneration.com/carbon-calculator) to get a sense of the level of effort needed to find the data.

Based on your class, decide how you want students to use the tool:

- In-class with their own data
- At home

Determine how much time to give the students to gather the data for the tool (they will have to work around their parent's schedules). They may need some time to figure out how many miles they drive themselves (or the amount of miles that their parents drive specifically for them).

Check and share information about what items are accepted by the local recycling program.

Before the post-activity discussion, investigate the method used to generate electricity in your area (coal, natural gas, hydroelectric, nuclear, etc.) and the impact this has on carbon footprint.

You may want to research to find examples of how climatic changes will effect the student's immediate environment (more rain, shorter winter, hotter summer, decrease agricultural production, increased drought, etc.) The more specific these are to the student's region the better they will be able to relate with this assignment.

### Individual or Household results?

The CF Calculator compares the amount of greenhouse gases by your household with the average amount generated by households with the same number of people.

To help students understand the full impact of their entire family or household on greenhouse gas generation, they should include the travel of everyone in the household.

Students can remove travel by others from the calculator and divide the total by the number of people in the household in order to discover their individual carbon footprint.



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This may have a larger impact on students, since many of the most effective ideas for reducing carbon footprint require a commitment by the decision-makers in the house—things like energy audits, appliance maintenance, and plugging energy leaks.

### Introductory discussion and assignment

Ask: Who knows what we mean by “carbon footprint”?

Allow students to answer.

Provide a definition. The one used for the tool is:

*Carbon footprint is a measure of the amount of greenhouse gases emitted through the combustion of fossil fuels. A carbon footprint is often expressed as tons of carbon dioxide (CO<sub>2</sub>) emitted, usually on a yearly basis.*

*For individuals and households, a footprint typically covers the emissions associated with a person's daily life.*

Say: For this assignment, you are going to use a tool that will help you estimate your family's carbon footprint.

To use this tool, you'll have to work with your parents to get some information. The tool is based on the items that have the biggest impact on your carbon footprint. What do you think these are?

Allow students to answer, and then review:

- Energy use: Electricity, heating, and cooling your home.
- Transportation: Especially individual cars and plane travel.



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Ask: You also have a chance to give back a little. Any idea how?

Allow students to answer, and then tell them:

- Through recycling.

Hand out the worksheet and explain: This worksheet will help you work with your parents to get the information that you'll need for a web-based carbon calculator.

- You'll need your power bills, and bills from oil or propane supplier if you use those fuels.
- The total number of miles driven by all vehicles used by members of your household.
- The total number of miles that you and household members flew this year.

If calculating based on the entire household, students will also need:

- Total miles driven by drivers in your house.
- Total number of miles that you and you and members of your family flew this year.

The recycling question is pretty easy: Of the recyclable materials that are accepted locally, how much does your family recycle?

- Review the materials that are accepted by the local program. This can include newspapers, cardboards, other paper products, plastic, glass, and metal.

Say: The energy usage questions allow you to answer for the year or month.

Ask: What would be the better method to use? Why?

- Yearly numbers would give you a more accurate assessment of your family's energy use.
- Yearly numbers mean that the numbers aren't skewed by seasonal lulls or spikes.

Explain that the worksheet will help students and parents capture the information so they can enter it into the calculator.

Give students the assignment and due date.

## Reviewing results

Here are some ways to share and examine the results of the carbon calculator:

- Have students complete the calculator at home and review their results.
- Ask for a volunteer to use his/her data to complete the calculator as an example for the class.
- Use the data from your own home.
- Ask all students to share their results and compare them.

Explain that the calculator shows:

- A pie chart that compares how different sources contribute to your total carbon footprint (hold your cursor over each piece of the pie to see what it represents)
- A bar graph comparing the amount of carbon generated by your household to the average amount generated by households with the same number of people.

Ask: The amount of carbon dioxide produced by the average person in the U.S. is 9.1 tons. How did you come out against that number?

- Calculate this by dividing the total amount by the number of individuals in your household.

Hand out the My Impact Worksheet and say: Here's how numbers compare:

Tons of CO <sub>2</sub> emissions per year	Rating
Below 4.2 tons/year	Much less than average
Between 4.2 and 7.9 tons/year	Less than average
Between 7.9 and 13.9 tons/year	Average
Between 13.9 and 17.3 tons/year	More than average
Above 17.3 tons/year	Much more than average

Look for reasons why students' results can vary:

- Number of people in the household
- Amount of travel
- Age or size of homes

Note that the results are for individuals in the household.

## Discussion questions

- Are you surprised at how big a part of this is energy? Why or why not?
- Is there anything you are surprised to see?
- What do you feel you can do to help reduce your own carbon footprint? How can you work with the other people in your household to do this?

Option: Ask students to use the My Impact worksheet to make a commitment to do something to help their family reduce its carbon footprint. Hand out "How Can You Reduce Your Carbon Footprint?" to give them some ideas.



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