



Guide for Teachers

This instructional packet focuses on using the Global Warming Wheel Card as a tool for students to learn about sources of greenhouse gas emissions and actions that can be taken to reduce them. It also provides basic background on the topic of climate change for teachers and students. Additional educational resources on climate change are listed below.

Take-Home Messages

By using the Global Warming Wheel Card and undertaking the activities described in this packet, students should come away with the following understanding:

- Many activities that people engage in every day (turning on a light, riding in a car, heating or cooling a building, etc.) result in emissions of carbon dioxide and other greenhouse gases that contribute to climate change.
- Individuals, families, schools, and businesses can reduce their emissions and save money by taking a few simple steps to reduce their energy use.

Background on Climate Change

The brochure included in this packet, "Frequently Asked Questions About Global Warming and Climate Change: Back to Basics," provides an overview of the greenhouse effect, present and future climate, the potential impacts of climate change, and resources for more information.

Other resources that teachers and students may find useful in learning about climate change include:

- EPA's Climate Change Site: <http://www.epa.gov/climatechange/>
- EPA's Climate Change Frequent Questions:
<http://www.epa.gov/climatechange/fq/index.html>
- EPA's What You Can Do At School Site:
<http://www.epa.gov/climatechange/wycd/school.html>
(be sure to check out the "Related Educators Links" in the Related Links box at the top right of the page).
- EPA's Climate Change, Wildlife and Wildlands Toolkit:
<http://www.globalchange.gov/climate-toolkit>
- EPA's Climate Change Glossary:
<http://www.epa.gov/climatechange/glossary.html>





Key Conceptual Themes

- Climate change is a complicated problem, but one of the most effective solutions is very simple: reduce the use of fossil fuels.
- Unlike many other environmental problems where there are just a few main sources of emissions (such as factories or power plants), everyone contributes to greenhouse gas emissions through daily activities that require energy. Electricity use, heating, transportation, and waste are the main sources of greenhouse gas emissions from individuals.
- Because we are all part of the problem, we can all be part of the solution. One individual's contribution may not make a big difference, but a lot of people acting together can make a huge difference.
- You can reduce fossil fuel use through **energy conservation** (using less energy, such as by turning down the thermostat in winter), **energy efficiency** (using less energy to provide the same services, such as by adding insulation and energy-efficient windows so you can leave the thermostat setting unchanged but use less energy to heat the building), or by switching to **alternative energy sources** (such as wind and solar energy).

Teacher Notes On Activities

Student Activity #1: Using the Global Warming Wheel Card

Classroom Time Needed: Without classroom introduction to greenhouse effect and carbon dioxide: 15–20 minutes

With introduction and discussion: 30–40 minutes

- You may want to send students home with the “Back to Basics” brochure the night before you do this exercise, so that they are familiar with all the terms and the issues of climate change.
- We have provided a homework activity that follows up on the classroom exercise. This activity asks students to ask their parents about their electricity bills and their heating bills. Because some families live in housing in which they do not pay utilities, you might want to prepare some sample heating or electric bills that students can use to complete the exercise.
- This exercise helps reinforce students’ abilities to follow written directions. However, if your students find reading the instructions too difficult, demonstrate how to put together the wheel. You may need to do this twice for all students to comprehend the process.
- This exercise also helps students practice fine motor skills. However, if you have students with impaired mobility or limited fine motor skills, you may want to cut the pieces out in advance and provide them with partially prepared wheels.



continued

TEACHER NOTES ON ACTIVITIES

Student Activity #2: What You and Your Community Can Do to Reduce Carbon Dioxide

Classroom time needed: 40 minutes
(20 minutes for group discussion, 20 minutes to discuss responses)

- You may want to reinforce some of the key concepts from all four areas of the Global Warming Wheel Card, because Activity #1 focuses on transportation and waste disposal. If the students have not completed the homework activity, you may want to walk them through the “Electricity Use” and “Home Heating” portions of the Global Warming Wheel Card to remind students that those are also controllable sources of carbon dioxide.
- This is a group exercise. Be sure to point out that all four members of the group are equals—each person gets to contribute his or her fair share to the process.
- Require that all students write down the answers to the questions. This will reinforce writing and organizational skills.

Student Activity #3: A Simple Energy Audit

Classroom time needed: 20–45 minutes

- Another possible activity would involve having the students perform an audit on other rooms in the building, such as the cafeteria, gymnasium, or even another classroom.
- Don’t forget the resources right there in your own school. You may want to ask your facilities manager to conduct an in-house field trip to show students the school’s energy systems (heating, ventilation, cooling, and lighting) and waste management program. You might also invite the facilities manager to come to your classroom to discuss these programs and answer student questions.
- You can expand the energy audit to include waste and source reduction. For example, does your school offer recycling for paper and plastic? Do students use their own reusable water bottles? Does your school compost food waste?
- If your school is already very energy-efficient, adapt the exercise for students to do at their own homes or in another building.