

Degrees of Change: Conservation in My Community



Educational Resource

A lesson plan and student materials to document community-based conservation efforts.

This companion to **SIX°DEGREES** COULD CHANGE THE WORLD was produced with the support of:



Temperatures are rising. Six degrees could change the world...

National Geographic Emerging Explorer and author Mark Lynas has analyzed climate models to understand how each degree of warming could threaten Earth in the next hundred years. Learn more at NGCSixDegrees.com.

"We have signs of very great changes occurring on the planet. It's difficult for people to visualize the future impacts of global warming, but it's something I really wanted to try to do."

– Mark Lynas

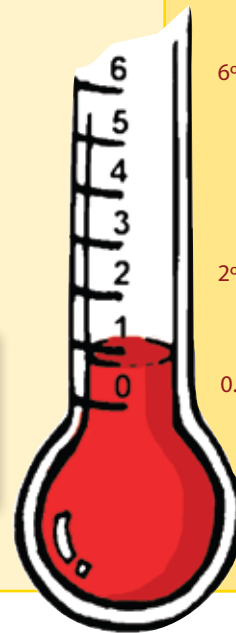
What's Inside:

Conservation in My Community includes a lesson plan and printable handouts for students in Grades 3–8. During the activity, students become reporters or photographers to document a local conservation effort.

What could happen if the global average temperature increases...

°C = Celsius

- + 1°C Many tropical coral reefs and mountain glaciers become lost.
- + 2°C Forests take root in Canada's melting tundra; Greenland's ice sheet reaches a point of unstoppable melt.
- + 3°C Parts of the Amazon's rainforest collapse due to cycles of drought and fire.
- + 4°C Glacier-fed rivers such as the Ganges, a major source of freshwater in India, begin to dry up.
- + 5°C Higher sea levels cause coastal cities such as New York to flood during seasonal storms.
- + 6°C Many species face extinction.



6°C : Equal to nearly 11° Fahrenheit

2°C : Possibly the tipping point that could fundamentally change life on Earth

0.8°C : Increase in the global average temperature in the past century (1.4° Fahrenheit)

...what is your community doing to decrease global warming?

Understanding Global Warming



Review and discuss some key concepts with students before they start their project.

✓ What is global warming?

- The planet's rising average surface temperature is known as global warming. The rise in surface temperature has caused the winds and ocean currents that move heat around the globe to change, altering the world's climate.
- Earth's average surface temperature has climbed 1.4° Fahrenheit (0.8° Celsius) since 1880, much of this in recent decades. The 20th century's last two decades were the hottest in 400 years.
- The world's coldest spots are really feeling the heat. Average temperatures in Alaska, western Canada, and eastern Russia have risen at twice the global average.

Discuss: What is global warming? Why is it a concern? Should it concern you?

✓ What is the primary cause?

The planet's atmosphere is made up of gases, such as carbon dioxide (CO₂), that trap the sun's energy, in a process known as the *greenhouse effect*. This is necessary to support life on Earth. However, when the amount of gases in the atmosphere increases, too much heat is trapped, causing global temperatures to increase.

- The primary cause of increased CO₂ in the planet's atmosphere is the burning of fossil fuels such as coal, oil, and gas for energy.
- Since 1990, the yearly emissions of CO₂ and other greenhouse gases have increased 20 percent.

Discuss: We know that global warming is a danger to life on Earth. Scientists know some of its causes. If we know the problem, and its causes, why do you think it is so difficult to stop global warming?

✓ What is the impact?

Scientists are tracking climate changes to assess the current and future impacts of global warming. Based on current models, the impacts of global warming could include:

- Global sea levels could rise by more than 20 feet with the loss of shelf ice in Greenland and Antarctica, devastating coastal areas worldwide.
- Some areas will experience more precipitation while other areas will experience increased drought and wildfires. As habitat zones shift, ecosystems will be altered and species extinction will accelerate.

Discuss: Do you think global warming is a real problem? What do you think people can do to stop global warming? What changes in your everyday life can you make that will help make a difference?

ONLINE RESOURCES:

National Geographic—What is Global Warming?
<http://green.nationalgeographic.com/environment/global-warming/gw-overview.html>

National Geographic—Is Global Warming Real?
<http://green.nationalgeographic.com/environment/global-warming/gw-real.html>

National Geographic—Causes of Global Warming
<http://green.nationalgeographic.com/environment/global-warming/gw-causes.html>

National Geographic—Effects of Global Warming
<http://green.nationalgeographic.com/environment/global-warming/gw-effects.html>

National Climatic Data Center—Global Warming FAQ's
<http://www.ncdc.noaa.gov/oa/climate/globalwarming.html>

U.S. Environmental Protection Agency—EPA Climate
<http://epa.gov/climatechange/kids>

TRY THIS

Brainstorm (Grades 3-5): Ask students, how might global warming affect you personally?

Possible answers: I live near the coast and my home may be flooded. Or, I live in an area that is already hot and dry; there may be droughts or wildfires. Or, my family's farm no longer receives enough rain to grow the crops we depend on.

Mini-research activity (Grades 6-8): Have students choose a region of the globe, such as Australia's Great Barrier Reef or India's Ganges River Valley, and research how global warming has affected the area's natural environment, wildlife, and people. Encourage students to use such graphic aids as graphs and maps in their mini-report.

Conservation in My Community

Objective

Students learn about global warming and their community's conservation efforts. Students develop and complete a project documenting, via reporting or photography, a local conservation effort.

Handouts

One hour class time; additional time to complete the project will vary



Grades 3-5

Photographer's Workbook ([download PDF](#))

Reporter's Workbook ([download PDF](#))

Grades 6-8

Photographer's Project Organizer ([download PDF](#))

Reporter's Project Organizer ([download PDF](#))

Note: Materials also available at nationalgeographic.com/xpeditions

Vocabulary *(See Glossary, p.5)*

Global warming

Conservation

Carbon emissions

Fossil fuel

Carbon dioxide

Greenhouse effect

Greenhouse gases

Directions

- 1. Explain.** Many of our daily activities contribute to global warming. However, decreasing energy consumption, and reusing or recycling materials can help reduce carbon emissions. Tell students that they are going to become photographers or reporters as they learn about a conservation project in their own community.
- 2. Distribute Grades 3-5 Workbooks ([download PDF](#)) or Grades 6-8 Project Organizers ([download PDF](#)) to students.** Review handouts with students to make sure they understand the assignment.
- 3. Brainstorm.** Talk about how students can identify a conservation project taking place in their community. Ask:
 - What are your families, schools, churches, or community centers doing to conserve energy or protect the environment?
 - Who are the people you can speak to, such as school principals, store owners, and community officials?

Option: Visit the National Recycling Coalition's Web site (www.nrc-recycle.org) to locate recycling and conservation initiatives in your community.
- 4. Identify.** Help students identify a community conservation effort around which they can plan their projects.
- 5. Complete activity.** Students can use their Workbook or Project Organizer to guide their work.
- 6. Presentation and Discussion.** Invite students to present their completed reports to the class. Afterwards, lead a class discussion about conservation projects in your community. Help students make the connection between global warming, community conservation efforts, and the reduction of greenhouse gases in Earth's atmosphere. Finally, you may wish to collect the reports and bind them in a classroom book for display in the classroom.



Safety Tip

Remind students to organize interviews with the help of a guardian or teacher. Visits with community members and to sites should be under the permission and supervision of a guardian.

Student Assessment

Rate students on a scale of one to five based on the following components.

Reporting projects

- Selected a community conservation effort to document
- Researched community conservation effort
- Contacted an individual associated with the project to set up an interview
- Completed an interview and recorded it with a recording device and/or notes
- Made a transcript of the interview and created an outline of key points
- Completed steps in Workbook or Project Organizer
- Wrote a report that is accurate and interesting
- Included quotes from the interview in the report
- Made a connection that community conservation efforts help to diminish global warming

Photography projects

- Selected a community conservation effort to photograph
- Researched community conservation effort
- Contacted an individual associated with the project to arrange permission to photograph
- Completed steps in Workbook or Project Organizer
- Made a site-visit to prepare for assignment
- Took photographs of the conservation effort
- Created a photographic report or essay to document conservation effort
- Included captions to annotate photographs
- Made a connection that community conservation efforts help to diminish global warming

Glossary

Global warming – The increase in the average temperature of the Earth’s air and oceans.

Conservation – The preservation of natural resources.

Carbon emissions – Carbon that is released into the air through the burning of fossil fuels such as coal, gas, or oil.

Fossil fuel – An energy rich deposit of coal or petroleum that is the fossilized remains of dead plants and animals.

Carbon Dioxide (CO₂) – A gas that is produced by all animals and plants during respiration and used by plants during photosynthesis. Carbon dioxide is also the by-product of burning fossil fuels.

Greenhouse effect – When certain gases in Earth’s atmosphere trap energy from the sun. If the amount of gases in the atmosphere increases too much, excess heat is trapped, causing global temperatures to increase.

Greenhouse gases – Components in Earth’s atmosphere—including water vapor, carbon dioxide, methane, nitrous oxide, and ozone—that contribute to the greenhouse effect. These gases help keep the sun’s light energy close to Earth rather than reflecting back into space. Without greenhouse gases, Earth would be too cold to live on.

Credits

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