

The Field Museum Education Department Presents

Polar Thaw: Global Warming in the Arctic and Antarctic *Climate Change Grades 4-12* **Educators' Guide**

The Field Museum Education Department develops on-line Educators' Guides to provide detailed information on field trip planning, alignment with Illinois State Goals and Learning Standards, as well as hands-on classroom activities to do before or after your visit to the Museum.



Illinois State Standards

Science State Learning Standards: 12, 13
 Language Arts State Learning Standards: 3, 5
 Social Science Learning Standards: 17

Climate Change

Discover the environmental consequences of a steadily warming Earth through striking color photographs of the Arctic and Antarctic. This exhibit is a visual photography exhibit that is focused on global warming. Many of the photos emphasize landscape features, habitat, and species diversity, and how global warming affects each of them. Since this exhibit is primarily visual it is important to prepare the students with activities such as those suggested below.

Pre-visit Activities:

1. The photographs within the climate exhibit are divided into two sections, the Arctic and the Antarctic. A Venn diagram of the Antarctic and Arctic will help the students recognize the similarities and the differences between the two.

Topics for consideration:

- **Plants and Animal Species**
- **Geography and Landscapes**
- **Climate**
- **Accessibility to Humans**
- **Population Concentrations**

2. A significant portion of the climate exhibit highlights the concept of a chain reaction, in regards to habitat, species population, and the food chain. In order to emphasize the concept that every species of life is dependant on another, have the students model a chain reaction/web of life. For example, how would the food chain be affected if the bumblebee were to become extinct?
 - a. Assign each student a different element of an ecosystem. For example, one student could be the sun, another could be a flower, and another could be the soil, and another could be the rain.
 - b. Using string to show connections between each element. The first student (the bumblebee) will hold on to one end of the string and then toss the other end of the string to another element they rely on or connect with in order to survive. This process continues until each student has a hold on a part of the string, forming a web.
 - c. Once this portion of the activity is completed, point out the interconnectedness of elements of an ecosystem. How would global warming affect an ecosystem like the one created by the students?
3. Have the students view portions of the exhibition on-line at www.worldviewofglobalwarming.org. This website contains some terms that will aid students in their comprehension of the exhibition. Discuss what the students have learned, and clarify any misconceptions the students may have about the following concepts:

- | | |
|------------------------------|-------------------------|
| • Permafrost | • Habitat |
| • Erosion | • Species |
| • Migration | • Global Warming |
| • Scientific Research | |

Field Trip Activities:

1. Use the Climate Change Student Activity Sheet to focus students' attention while in the exhibition.
2. There are also other permanent exhibits at the Field Museum that further explore the ideas set forth in the *Polar Thaw: Global Warming in the Arctic and Antarctic Exhibition*. Some of those other exhibits are:

Life over Time – This exhibition explores the earliest life forms that are still found in the polar climates.

Nature Walk – Students can view specimens from the Polar Regions in the World of Birds and Bird Habitats Exhibitions.

Arctic Peoples and Northwest Coast Indians – The life and environment of people who live in the Arctic can be found within this exhibit. Please note especially pertinent information is found near the end of the exhibit.

Post-visit Activities:

1. Have students create a 3-dimensional map or model of the future, with the assumption that global warming will continue. This model could be on a global scale or it can focus on one continent and its climatic changes. Students can make this model to simulate 20 years or 50 years into the future.

Things that may be included within the map or model:

- Types of Animals and Plants
- Sea Level
- Elevation
- Types of Biomes or Ecosystems
- Relative Population Densities of Different Species
- Coastal Boundaries

2. Have students write an essay on what life might be like in the future, if we take heed of the warnings about global warming and new technologies that are available.

Items to research might include:

- Alternative forms of energy
- Green Technology
- Green Building and Architecture
- Organic Farming
- Alternative Fuels
- Biodegradable Products
- Economic Impact of Environmentally Friendly Products

2. Compare and Contrast Essay

If global warming remains on its present course, which changes affecting the arctic or Antarctic pose the greatest challenges to humanity? Use the information on the Student Activity Sheet to give support and evidence for your point of view.

Credits:

Credit all photographs © Gary Braasch

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Science in Action for Conservation, made possible by a grant from NASA's Earth Science Education Program is a video available FREE to all schools and organizations. For more information visit us at www.fieldmuseum.org/scienceinaction

Student Activity Sheet: Climate Change

Students will use this chart to record evidence of global climate change in the Arctic and Antarctic and how these changes affect species, scientists, and us. All the evidence needed to complete this chart is located within the Polar Thaw Exhibition.

Changes in...	Arctic	Antarctic
Species (Plants + Animals)		
What changes in habitat have been created due to global warming? What changes in populations have occurred due to global warming? What adaptations have taken place due to global warming?		
Scientists Work and/or Research		
Why are scientists studying global warming within the Arctic and Antarctic? What are they learning? How have scientists changed their methods of studying the Arctic and Antarctic?		
Climate		
How has the weather changed due to global warming? How have water temperatures changed due to global warming? How have landmasses changed due to global warming?		

Compare and contrast how global warming has impacted the Arctic and the Antarctic. What surprised you most about the images you saw in the Polar Thaw Exhibition?

Located in the “The Daniel F. and Ada L. Rice Gallery”. The two images and credits can be used on the map guiding teachers and students through the exhibit. (See above for credit lines).

Pre-visit Activities:

Dessert

Desert	Human	Animal
	Name a society/culture:	Name an animal:
	What cultural adaptations has this society made to survive in the savanna?	How has this animal adapted to survive in the savanna?
	1.	1.
	2.	2.
	3.	3.
	4.	4.
	5.	5.

African Biodiversity (October)

Located in the Africa Exhibition Hall. Insert images from the website and insert questions or quotes below near exhibit areas:

Savanna Animals:

Learn more about Africa's vast Savanna region, a **grassy plain** that covers about third of the continent. Discover how endangered Savanna animals, such as the giraffe, black rhino, and hippopotamus, survive as *megaherbivores*, eating large quantities of vegetation between them and thereby sustaining the Savanna itself.

The Rift:

Explore the ecosystems of the Great Rift, you begin your journey at the Geology Field Station and move through the region's biomes, going from volcanic lakes to **lush mountain rainforests** to the barren afro-alpine, to the grassy savanna plains and finally to the parching desert to discover adaptations made by indigenous creatures.

Caravans:

Visit Mauritania, Mali, Niger, Chad, Sudan, and Nigeria. An ecological and cultural story is told through the Tuareg people, camels, salt and caravans. Explore the **complexity of a desert ecosystem** and end your journey in the metropolitan trading city in the Sahel—Kano, Nigeria.

"The elephant has an important presence in African culture and is often represented in folklore and art," says Chap Kusimba, Ph. D., Anthropology Department, Field Museum. "But its most important impact on African people has been in the way it has shaped much of the natural landscape making some areas more suitable for human habitation."