

# Climate Connections Research

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## ALASKA NATIVE PERSPECTIVES ON EARTH AND CLIMATE

**TRADITIONAL WAYS OF KNOWING**

- [Spirit](#)
- [Air](#)
- [Fire](#)
- [Water](#)
- [Earth](#)

**EARTH AS A SYSTEM**

- [Atmosphere](#)
- [Biosphere](#)
- [Cryosphere](#)
- [Hydrosphere](#)
- [Lithosphere](#)



We have much to learn from both the traditional knowledge of Native peoples and ongoing scientific research. This collection uses both of these tools to provide complementary perspectives on Alaska's unique geology and the impact of development and climate change. As the environmental, economic, and political consequences of climate change are felt in Alaska, the Arctic, and throughout the world, Alaska Native scientists are working toward solving the challenges of survival using these two methods of observing nature.

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# Lesson Plan: Alaska Native Ways of Knowing

- **Overview**
- **Alaska Native peoples have traditional ways of understanding and relating to the world and to each other. Such ways of knowing are based on a systematic method of observing the natural world, much like Western science uses. Western science often develops theories based on a process of experimentation. While at times Alaska Native science may mirror a process of experimentation, Alaska Native peoples rely on direct experiences as well as knowledge and information passed down from generation to generation. This enables them to develop a holistic perspective of the natural world that is linked to their individual and community survival, well-being, and safety. Still, Alaska Native science and Western science are complementary. These different approaches each contribute relevant information about an object, problem, or natural system that can be used to enhance the understanding of a given topic.**
- **Over the centuries, village Elders have shared their vast body of accumulated knowledge and life wisdom through stories and demonstrations. This lesson begins with two videos that present how local knowledge is acquired, passed on, and applied. Following a brief class discussion, students watch more videos that will help them prepare for their primary assignment: completing a science fair project that demonstrates the application of traditional knowledge to a scientific topic. Through interviews with community members, especially Alaska Native Elders, students will develop and refine their project ideas. They will make observations, conduct experiments, create demonstrations, and report their findings in poster displays. The lesson ends with a classroom science fair, during which projects are evaluated on cultural and scientific content.**

# Objectives

**Learn about the interconnectivity between the air, water, land, fire, and spirit**

- **Examine the importance of "reading" the land, knowing the local language, learning from Elders, and living in harmony with nature**
- **Understand that Alaska Native ways of knowing is a systematic method of observing nature and passing on knowledge that is time-tested and successful**
- **Explain how Western science can complement Alaska Native ways of knowing**
- **Grade Level: 3–12**

# Media Resources/AN Profiles

- **Media Resources**
- [The Spirit of Subsistence Living](#) QuickTime Video
- [Alaska Native Pilots](#) QuickTime Video
- [Science Fairs Are Fun](#)
- [To Show What We Know](#) (AISES science fair)
- *Alaska Native Profiles*
- [La'ona DeWilde: Environmental Biologist](#) QuickTime Video
- [Steve MacLean: Conservationist](#) QuickTime Video
- [Dustin Madden: Science Teacher](#) QuickTime Video
- [Dolly Garza: A Tlingit and Haida Scientist](#) Flash Interactive
- [Richard Glenn: Iñupiaq Geologist](#) Flash Interactive
- [Taqulik Hepa: North Slope Natural Resources](#) Flash Interactive

# Lesson Plan: The Effects of Global Warming in Alaska

- **Overview**
- **The effects of global warming in Alaska are significant, varied, and interrelated. They include melting permafrost, receding glaciers, eroding coasts, disappearing sea ice, and mounting problems for native species, such as caribou, sea otters, salmon, and polar bears. Because the Arctic is a bellwether of climate change, all of us, no matter where we live, should be concerned about what is happening there. The consequences of global warming are most immediate in the lives of those who live in the Arctic, including Alaska Native peoples, so it's their actions that may show how communities can learn to sustain traditional ways of life and ecosystems amidst the changing climate. The first step for students in solving the problem of global warming is to develop a greater understanding of the complex changes at hand.**
- **The lesson begins with a video that demonstrates the unsettling influence a changing climate is having on Alaska Native peoples and cultures. Following a brief class discussion, students break into small groups and begin inquiry activities intended to enhance understanding of three relevant themes: permafrost and coastal erosion, subsistence living, and contaminants. Students conclude by sharing their understanding of this complex subject. They will do this by delivering presentations to a fictitious audience composed of experts or officials.**

# Objectives

- **Learn about the effects of global warming in Alaska and how everything is interconnected (Earth as a system)**
  - **Explain why Arctic and sub-Arctic regions are particularly vulnerable to changes in temperature**
  - **Examine how global warming is changing habitats and affecting ecosystems and wildlife populations**
  - **Understand how Alaska Native peoples rely on permafrost and are being affected by changes to it**
  - **Understand how declining wildlife affect Alaska Native peoples**
  - **Learn about different global warming mitigation and adaptation strategies**
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- **Grade Level: 6–12**
  - **Suggested Time**
  - **Two to three class periods**

# Media Resources

- Media Resources
- Several of the following may be used to support the lesson and activities. Viewing all of the media is not required.
- *For class viewing*
- [An Unpredictable Environment](#) QuickTime Video
- *For small group viewing (by topic)*
- Permafrost:
- [Melting Permafrost](#) QuickTime Video
- [Losing Permafrost in Alaska](#) QuickTime Video
- [Changing Arctic Landscape](#) QuickTime Video
- Subsistence living:
- [The Spirit of Subsistence Living](#) QuickTime Video
- [Gwich'in Tribe Protects Caribou and Culture](#) QuickTime Video
- [Living from the Land and Sea](#) QuickTime Video

# Resources

- **Contaminants:**
- [What Happens When an Oil Spill Occurs?](#) Flash Interactive
- [Oil Contaminants Hidden from View](#) QuickTime Video
- [Safeguarding Alaska's Waters](#) Flash Interactive
- [Contaminants in the Arctic Food Chain](#) QuickTime Video
- [Contaminants in the Arctic Human Population](#) QuickTime Video
- **Arctic haze (optional topic):**
- [Arctic Haze](#) QuickTime Video
- *For extension activity (optional):*
- [Take Action for Nature and Your Community](#) Student Activity
- [S.O.S. Project—Save Our Shishmaref](#) Web site
- **Materials**
- **Science notebooks**
- [Glossary of Alaska Native and Western Science Terms](#) PDF Document
- [Effects of Global Warming Activity](#) PDF Document
- *For optional topic:*
- [Elders in the Classroom](#) PDF Document

# The Lesson

## Part I: The Effects of Global Warming in Alaska

- 1. The effects of global warming in Alaska extend to the physical environment and the living things it supports, as well as to the spiritual core of Alaska Native peoples. To begin this lesson, show students the [An Unpredictable Environment](#) QuickTime Video. As a class, discuss some of the consequences and concerns expressed in the video. Ask students to share some ways in which changes in climate are affecting their own community—whether they live in Alaska or elsewhere.
- Note: You may want to distribute the [Glossary of Alaska Native and Western Science Terms](#) PDF Document to students and encourage them to refer to it as needed.
- 2. Break students into small groups and have each group focus on one of the following themes that relate to global warming in Alaska: (a) permafrost and coastal erosion, (b) subsistence living, or (c) contaminants. An optional fourth theme—Arctic haze—can also be assigned. These themes and the suggested resources will be the basis for inquiry activities. Depending on how many students there are in the class, you can assign the same theme to more than one group.

# Lesson

- 3. Print out the [Effects of Global Warming Activity](#) PDF Document and distribute the appropriate pages to each group. Have the groups view the resources and complete the suggested activities for their selected theme. Inform them that they will be expected to give a class presentation or demonstration of what they learned at the conclusion of the lesson.
- Using visuals, such as posters, to help explain their topics, presenting groups will be asked to make their case to a hypothetical audience of experts or government officials that a problem exists and suggest a plan of action for the audience to take. On completion of each presentation, the class will determine whether the case was made strongly enough to convince them of both the need for change and that the suggested action plan is appropriate. Evaluations will be made on both the scientific understanding of the topic and how well cultural concerns are represented. Presenting groups should be prepared to answer questions from their audience and their teacher.
- Note: Because safety is always a concern, if students will be conducting interviews for the optional Arctic Haze Activity, be aware of the interviews that students are setting up outside of school. Make sure that the subjects are well known to the students. Have students go in pairs (or with an adult family member or friend) to any interviews outside of the classroom. You may also consider having an Elder or a panel of Elders come into the classroom.
- Part II: Optional: Extension Activity
- 4. Encourage students to take some kind of action with respect to ameliorating the effects of global warming. Ideas include advocating change by their local government, restoring habitat, using energy more efficiently and conservatively, recycling, and organizing a hazardous waste collection day in their community. You may choose to devote additional class time to the [Take Action for Nature and Your Community](#) Student Activity . Another idea is to visit the [S.O.S. Project—Save Our Shishmaref](#) Web site to learn how Alaska Native students are engaging the public to recognize the plight of their island village, which is disappearing due to coastal erosion, and determine ways to support their cause.

# Check for Understanding

- **Students will demonstrate their understanding of the lesson's objectives through their presentations. However, you may choose to lead a final class discussion on global warming in Alaska. You can use their responses to the following questions to assess their understanding:**
- **What is meant by the term "system" in science? What are some changes that have been observed in Alaska that will have repercussions throughout global systems?**
- **Discuss several contributing factors to global warming.**
- **Name at least one physical, economic, and social consequence of the loss of permafrost.**
- **What are some similarities and differences in the way in which the Alaska Native peoples and Western scientists view the natural world?**
- **Why do you think people might disagree about whether a coastal area affected by an oil spill is clean and safe or not?**
- **Will the effects of global warming impact Alaska Native peoples, and if so, how?**