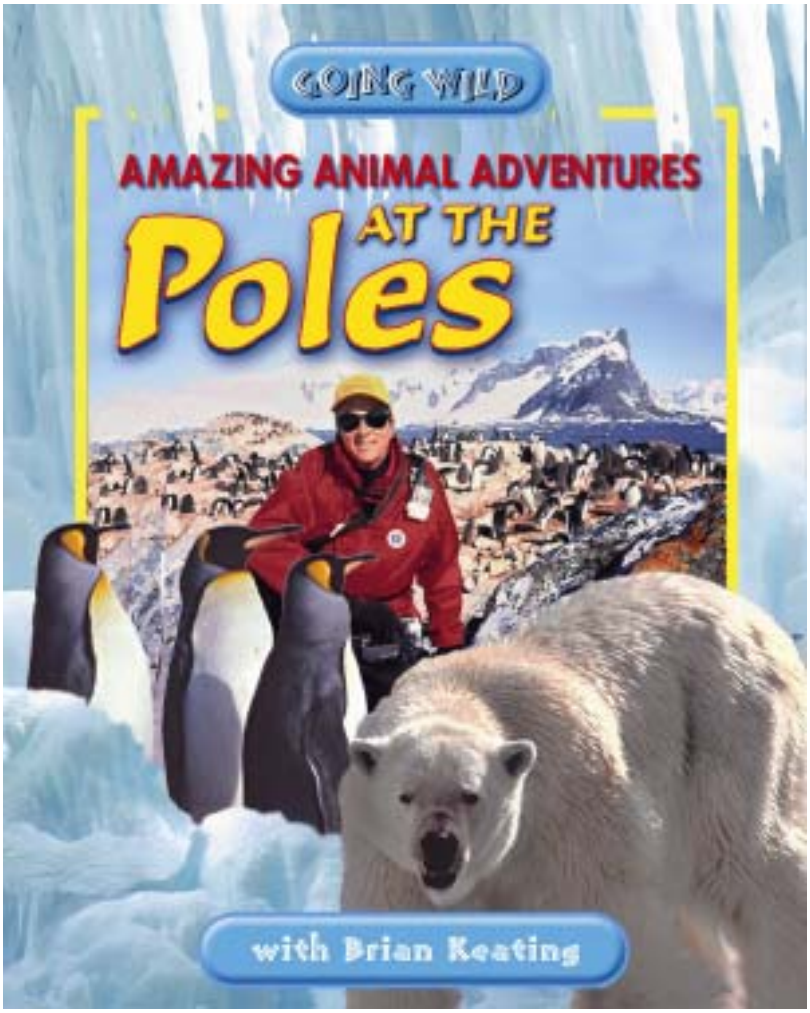

Going Wild:
Amazing Animal Adventures at the Poles

TEACHER'S GUIDE

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FIFTH HOUSE

GOING WILD: AMAZING ANIMAL ADVENTURES AT THE POLES

by Brian Keating

About the Book

Going Wild: Amazing Animal Adventures at the Poles offers children an exceptional and engaging view of two of the most rare and fragile regions on this planet—the Arctic and the Antarctic. Written by Brian Keating, one of Canada's foremost naturalists, this book teaches children about wildlife, the environment, and conservation efforts in the Arctic and Antarctic. Brian's own stunning photographs accompany his lively and entertaining stories, detailing some of his most exciting wildlife-watching escapades. In this book, Brian takes young readers on a journey as he discovers:

- young minke whales can be just as playful as children, performing barrel rolls and nudging chunks of ice for amazed onlookers
- three-thousand beluga whales making a giant, yearly migration to Cunningham Inlet to "disrobe," shedding all of their skin in a matter of weeks
- the winds in the High Arctic can be so forceful that your cheeks billow out from the gusts
- narwhals playing a dangerous game of joust with their big tusks, crashing and splashing in the water.

About the Author

Brian Keating is a keen naturalist, avid outdoorsman, world traveller, intrepid adventurer, and extraordinary spokesperson for the world's wild places and the creatures that inhabit them. His first job with the Calgary Zoo in 1981 was in their education program. Now Brian is head of the zoo's Conservation Outreach Department, and responsible for national and international conservation projects, such as the Wechiau Hippo Sanctuary in Ghana, West Africa, and the nature-based eco-tour program that he started in 1983.

Keating has been a weekly guest on local CBC Radio for nearly two decades and has been featured bi-weekly on the Discovery Channel for the past six years. In addition to his fulltime job at the zoo, Keating is an Adjunct Assistant Professor of Anthropology at the University of Calgary, a pilot, a scuba diver, and mountaineer.

About this Teacher's Guide

The Going Wild: Amazing Animal Adventures At the Poles Teacher's Guide is an instructor resource that correlates to *Going Wild: Amazing Animal Adventures at the Poles*. The activities in this guide can be used individually or as a series of lessons, depending on the requirements of the teacher. Activities are drawn from provincial and territorial Science curricula for grades five to eight, with particular emphasis on the units focusing on: Weather Systems (Grade 5), Diversity of Living Things (Grade 6), Interactions and Ecosystems (Grade 7), and Freshwater and Saltwater Ecosystems (Grade 8). Students will be encouraged to analyze and interpret, perform and record, initiate and plan, and practice communication and teamwork skills. They will create models; discuss; debate; research; plan; and execute presentations; and initiate, plan, and create examples of conservation organizations.

Humanities connections: While all activities draw from the Science curriculum, activities two, four, and six also have strong Social Studies and Language Arts connections. Activity two draws on the grade six curriculum, Meeting Human Needs—Local Government; activity four relates to the grade six curriculum, Meeting Human Needs—Local Government, and grade seven curriculum, Culture; and activity six draws on grade five curriculum, Canada's Links with Other Countries, and grade six curriculum, Meeting Human Needs—Local Government. The extended connections these activities have with Humanities curricula make the book an excellent cross-disciplinary tool in any classroom. At the beginning of each activity is a section outlining Skills, Science, and Humanities Focuses for the activity, which will help teachers to choose activities based on Humanities and Science curricula.

Activity 1: Arctic Plant Adaptations

Skills focus:

- Analyzing and interpreting
- Communication and teamwork

Science Focus: adaptations necessary for interaction and interdependence; benefits of adaptations to species in specific environments; factors causing adaptations to specific environments; the impact of human wants and needs on the environment

Brian Keating describes how plants are specially adapted to withstand the extreme climate in the Arctic. Have students read "Surviving Under the Midnight Sun" (pp. 22–25). How do an Arctic plant species' specific adaptations allow it to fit into its ecosystem? Focusing on the three plants mentioned in the chapter—the spider plant, the prickly saxifrage (*Saxifraga tricuspidata*), and the Arctic poppy—have students research and describe the characteristics of each plant (using the Internet and other sources) to learn more about how each plant's adaptations allow it to survive in its microclimate. For examples of plant adaptations within the story see pages 22 (spider plant and reproduction), 22–23 (*Saxifraga tricuspidata* and size), and 25 (Arctic poppy and pollination). Ask students to apply what they've learned through a group discussion of the following:

- Describe each plant's adaptations to its microclimate. List changes to the climate that would affect the ability of the plant to thrive. How many natural changes can you list? How many changes linked to human action and intervention can you list?

The Arctic poppy has a bowl-shaped flower that always faces the midnight sun.

Activity 2: Be a Marine Biologist

Skills Focus:

- performing and recording
- initiating and planning
- analyzing and interpreting
- communication and teamwork

Science Focus: adaptations necessary for interaction and independence; benefits of adaptations to species in specific environments; adaptations to fresh and salt water ecosystems; factors causing adaptations to specific environments; Aboriginal knowledge providing an alternative source of understanding the environment

Humanities Focus: Language Arts exercise in creating a research report; local governments; impact of the environment on human communities and cultures

Instruct students to read the stories “The Canaries of the Ocean” (focusing on beluga whales in the Arctic) (pp. 10–13) and “The Minke Served the Ice” (focusing on humpback whales in the Antarctic) (pp. 18–21). Direct their attention to the special adaptations and abilities of the whales described in the stories. With reference to beluga whales, Keating describes their molting and migration patterns (pp. 10–11) and their unique ability to echolocate (pp. 11–12). For humpback whales, Keating tells us about their specialized feeding adaptations (p. 20). Have students research these features and adaptations, along with others not covered in the book (using the Internet and other sources). Divide the class into two groups, telling them that each group will act as a team of marine biologists. Explain that as marine biologists they study marine life forms and their relationships and interactions with each other and their environment. Assign one team the role of researching beluga whales living in an Arctic ecosystem, and the other team the role of researching humpback whales living in an Antarctic ecosystem. As marine biologists, each team should research their respective whales with an emphasis on anatomy, special adaptations, development, and functions. Instruct each team to create a multi-media report and present it to the class. The report should highlight:

- the ecosystem of the team’s given area
- the whale’s special adaptations to its ecosystem
- how the population has changed over time, and why
- the main threats to the whale—including human and natural—suggesting ways in which those threats could be alleviated

After the two groups have presented their research, lead them in a discussion to compare and contrast their findings in terms of the two areas—the Arctic and the Antarctic.

Dee has climbed to the top rung to view the many belugas in the water below.
We had to carry the ladder a few kilometers from Arctic Watch, the lodge where we were staying.

Extending the Exercise: Brian Keating tells us that whale watching has led him and others to appreciate and defend the conservation of whales. He also reminds us that right whales (among others) are slowly recovering from near extinction due to whaling (p. 21). Lead a classroom discussion on the topic of Indigenous vs. large-scale whale hunting practices. Until the late 1960s, members of the whaling industry actively harvested whales for a living. How do the two types of whaling differ? If whaling was how you and your family made your living for generations, how would you explain your actions?

Activity 3: Booms and Busts

Skills Focus:

- performing and recording
- initiating and planning
- communication and teamwork
- analyzing and interpreting

Science Focus: food chains and food webs; ecosystem connections; declines and growth in species population; producers, consumers, decomposers; biodiversity

In "Getting to it All" (pp. 6–9) Keating recounts his experience on the Fosheim Peninsula of Ellesmere Island during an Arctic hare population boom. Then, in "The Canaries of the Ocean" (pp. 10–12), the population of beluga whales is reported to be at a healthy number. Later, in "Surviving Under the Midnight Sun" (pp. 22–25), Keating describes how a lingering winter caused a significant decline in the population of the migratory ruddy turnstone. Ask students to read the aforementioned passages, and then divide them into three groups. Have each group research and draw a food web featuring, within its ecosystem, one of the three Arctic animals identified in these passages (Arctic hare, beluga whale, ruddy turnstone). Ask students to list at least five species ordinarily connected to the food chain of the species they are studying, identifying producers, consumers, and decomposers. Next, ask groups to assess the impact of the sudden population change on the food web in terms of their specific animal (in the case of the beluga whale, the population factor is healthy, or constant).

Extending the Exercise: Appoint a representative from each group to share their findings with the class. Then, lead the students into a discussion about the effects a population boom and bust can have on an ecosystem.

Activity 4: A Warmer Arctic

Skills Focus:

- performing and recording
- initiating and planning
- analyzing and interpreting
- communication and teamwork

Science Focus: human wants and needs impacting the environment; human impacts on marine environments; personal and public decisions that impact the environment; biotic and abiotic elements within ecosystems; group actions that can serve to preserve ecosystems; Aboriginal knowledge providing an alternative source of understanding the environment

Humanities Focus: Language Arts exercise in creating an action plan; impact of the environment on human communities and cultures; local governments

Have students read the story, "Surviving Under the Midnight Sun" (pp. 22–25). To focus students on the issue of global warming, read the following paragraph aloud:

> Sometimes—and more often now with global warming—the seasons in the Arctic don't come on schedule. When this happens, all life suffers. If the winter doesn't come overnight but arrives as freezing rain, the caribou can't paw through the ice to graze. And if winter lingers into spring, migrating birds, like the ruddy turnstone and the red knot, arrive on Ellesmere after their long migration from South America, Europe, and Africa to find nothing to eat. (p. 23)

This passage relates to the effects of global warming on the Arctic environment, with particular emphasis on scarcity of food due to a change in the seasons caused by global warming trends. To prepare students to create an action plan aimed at curbing the trend of global warming, ask them to research the effects of global warming in the Arctic (using the Internet and other sources). To focus their research, ask them to keep the following questions in mind:

1. How have the Arctic region's average temperatures changed since the 1970s?
2. List the known causes of global warming.
3. How has this change affected plant and animal life in the region?
4. How are Indigenous communities in the Arctic affected by this warming trend?

Divide the class into groups. Instruct each group to draft an action plan aimed at curbing the growing trend of global warming. Half of the groups will draft this plan from a different perspective. The first half will be asked to write their action plan as members of an Indigenous community living in the Arctic. Remind this group of students that their way of life and means of sustaining their livelihood is directly affected by climate change. Encourage them to visit the website: www.cicero.uio.no/fulltext.asp?id=3250&lang=en to understand the value of Indigenous perspectives in relation to Arctic climate change. Ask the other group to write their action plan as a party of concerned citizens not living in the Arctic. The two groups should address the following concepts in their plan: the contribution to global warming of greenhouse gases and fossil fuels, affects on the atmosphere and environment, changes in climate/seasons, impacts on the availability of food, economic impacts, cultural impacts, and conservation. Ask each group to present their action plan to the class.

Extending the Exercise: To ensure that students have gleaned the potential differences between these two perspectives, have the groups compare their plans in a class discussion.

- How do the two action plans differ and how are they the same?
- How could Indigenous knowledge serve to provide a better understanding of the impacts of global warming on the Arctic ecosystem?
- On a global scale, how have human wants and needs contributed to global warming?

If an adult human were to pick up an albatross by its neck, its tail feathers would kiss the ground. The head of a wandering albatross is as big as your head, with a beak on it!

Activity 5: Krill is Key

Skills Focus:
- performing and recording
- initiating and planning

Science Focus: food chains and food webs; ecosystem connections; producers, consumers, decomposers; biodiversity

Krill can be used as the basis for research into two distinct food webs, as it is an integral part of both Arctic and Antarctic ecosystems (they are a source of nutrition for whales, fish, seabirds, seal, and squid). Have students research and draw two distinct food webs: one that includes krill in an Arctic ecosystem and one that includes krill in an Antarctic ecosystem. In an Antarctic ecosystem, krill is mentioned in the following stories: "The Minke Served the Ice" (pp. 18–21) and "Living on the Edge" (pp. 34–37). In an Arctic ecosystem, krill is included as part of the food chain in "Superbears of the North" (pp.38–41). For each of the two food webs, ask students to include at least five species present in the ecosystem (with krill as one of the five), identifying producers, consumers, and decomposers. With reference to the ecological role of krill and other zooplankton in both ecosystems, instruct students to visit the following website, which outlines the depletion of the krill population due to global warming: www.eco-action.org/dt/krill.html

In light of this new information, ask students to analyze their food chains with the following question in mind: How would the depletion of krill affect each of their two food chains?

Activity 6: Scientific Research Stations and Ecotourism Companies

Skills Focus:
- performing and recording
- initiating and planning
- communication and teamwork
- analyzing and interpreting

Science Focus: human wants and needs impacting the environment; human impacts on marine environments; personal and public decisions that impact the environment; human action that can threaten living things' abundance and survival; group actions that can serve to preserve ecosystems

Humanities Focus: Language Arts exercise in creating a research report; impact of the environment on human communities and cultures; local governments; communities; meeting human needs

This activity focuses on the Antarctic ecosystem and human interaction within that ecosystem. Students will be asked to create a research report that analyzes the benefits and impacts of two distinct kinds of human presence in Antarctica: scientific research stations and ecotourism. Have students read the stories "The Minke Served the Ice" (pp. 18–21), "Living on the Edge" (pp. 34–37), and "Wandering South" (pp. 42–45). In all of these stories, Keating shares his experiences watching and studying animals in the Antarctic. He also touches on the important study at scientific research stations in "The Minke Served the Ice" (p. 20). Next, refer students to "Brian's Notes," outlining the aims of the Antarctic Treaty:

> The Antarctic Treaty was first signed by 12 nations in 1959. By 2005 there have been 45 nations that agree to its conditions, one of which is that the Antarctic Continent will only be occupied for peaceful scientific research and tourism (p. 19).

With the aims of the Antarctic Treaty in mind, ask students to create a research report that compares the practices of scientific research stations and ecotourism companies in Antarctica (using the Internet and other sources). Their report should focus on the benefits and impacts of scientific research stations and ecotourism.

For examples of scientific research station, students can learn about the Vostok research station by visiting: www.earthinstitute.columbia.edu/news/story3_2_01.html and www.earthinstitute.columbia.edu/news/story3_2_01c.html. To learn about the McMurdo research station, students can visit: http://www.theice.org/mcmstay.html. Ecotourism companies can be located by using the words “ecotourism” and “Antarctica” in a search engine, but the class can start with: www.wildland.com/trips/antarctica/antarctica.aspx.

Have students present their findings to the class. They may highlight the following concepts brought forward by the Antarctic Treaty: restricted use for peaceful purposes, freedom of scientific investigation, international scientific cooperation, prohibition of nuclear explosions, conservation and appreciation. Lead a class discussion about how both forms of human interaction comply with and/or breach the rules of the Antarctic Treaty.

Extending the Exercise: Based on their research reports, students should now have an understanding of ecotourism practices in the Antarctic. Split the class into groups to form their own ecotourism companies. They will need to create a company proposal, which outlines the mandate and a list of rules for the ecotourists who may choose to hire them as guides. The proposal should include:

- Company name and mandate
- Services offered
- Rules for ecotourists in the Antarctic, with an emphasis on conservation

Many Antarctic outposts like this one are used for important scientific study on anything from climate change to penguin behaviour. Called “Bahia Paraiso,” this station is surrounded by a large gentoo penguin colony.