

**Focus Questions**

1. Who lives in the Arctic? What is the geography like? What is the only nonhuman creature that visits both poles?
2. What is the role of lemmings in the arctic food chain?
3. How are polar bears adapted for life in the Arctic?
4. Who was involved in the race for the North Pole?
5. Name the explorer who died on an expedition to the South Pole.
6. Which explorer reached the South Pole first?
7. Who lives in the Antarctic?
8. What is the geography of Antarctica like?
9. What significance did an albatross have to sailors?
10. What adaptation for survival does the ice-fish possess?
11. How do penguins rear their young?

**Activities**

- What do you need to go on a polar expedition? Using appropriate print and internet resources, have students create an equipment list for their own polar expedition. Challenge students to discuss the similarities and differences between the equipment needed for an expedition to the Arctic and one to the Antarctic.
- Have students experiment with lowering the freezing point of a substance, thus causing it to remain liquid at a temperature when it is normally solid. Then, direct them to compare their findings with facts about Antarctic ice-fish, which have bodily fluids that remain liquid at temperatures below freezing.
- Assign small groups of students different polar expeditions to research. Ask them to report back to the class with information about their teams and their success or failure.
- Have students research the myths associated with the Arctic and create one of their own that explains a natural event such as the aurora borealis.
- Direct students to begin research projects on topics such as the Antarctic ecosystem, Adelie penguins, krill, and the polar ozone hole.

**Internet Resources**

Periodically, Internet Resources are updated on our web site at [www.libraryvideo.com](http://www.libraryvideo.com)

- [www.mnh.si.edu/arctic/index.html](http://www.mnh.si.edu/arctic/index.html)  
Arctic Studies Center from the Smithsonian Museum of Natural History.

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- [www.south-pole.com](http://www.south-pole.com)  
This site is dedicated to the heroic explorers of polar regions.
- [www.civilization.ca/aborig/inuvial/indexe.html](http://www.civilization.ca/aborig/inuvial/indexe.html)  
This site tells the story of Inuit living in the western Canadian Arctic.
- [www.polarbearsalive.org](http://www.polarbearsalive.org)  
Great site serving as a central resource on polar bears.

**Suggested Print Resources**

- Airey, Len. *On Antarctica*. Highmount Books, Highmount, NY; 2001.
- Lambert, Katherine. *The Longest Winter: The Incredible Survival of Captain Scott's Lost Party*. Smithsonian Books, Washington, D.C.; 2004.
- Vollers, Maryanne. *Ice Bound: A Doctor's Incredible Battle for Survival at the South Pole*. Miramax Publishing, Los Angeles, CA; 2002.

**TEACHER'S GUIDE**

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**TITLES IN THIS SERIES**

- ARCTIC & ANTARCTIC
- DINOSAUR
- HUMAN MACHINE (BODYZONE)
- MONSTER
- NATURAL DISASTERS
- PLANETS
- PREHISTORIC LIFE
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**Arctic & Antarctic****Grades 4–8**

The *Eyewitness DVD Series* explores the natural world with fascinating film footage and nature photography fused with striking special effects and stunning graphics. The programs offer a unique “eyewitness” view of events that shape the Earth and the living things that inhabit it.

Interactive menus allow viewers to easily select and replay any section of a program. Other features include interactive assessment quizzes and “Hotspots” — video icons that appear throughout the program and allow students to further explore specific science content or areas of interest. Each title contains a segment that reveals all the behind-the-scenes wizardry that goes into the production of the *Eyewitness* series, along with recommended web sites for further research.

Included in this guide is a brief synopsis of the program, background on the science concepts presented in the show, discussion topics, activities, vocabulary and additional resources for students to explore.



## Background

The climate above the Arctic Circle and near the South Pole in Antarctica is harsh, creating extreme environments where temperatures range from -25 to 5 degrees Celsius (-13 to 41 degrees Fahrenheit). The Arctic is where polar bears live and where many indigenous people, like the Inuit, call home. The southern continent of Antarctica is where penguins can be found, and is much colder, windier and more remote than the Arctic. The polar regions received their names from the Greeks: the Arctic is so called for the Great Bear constellation, Arktus, in the northern sky while the opposite of that, Antarctic, means “no bear” and is a continent spanning the South Pole.

Tundra is called the “cold desert” because precipitation is at the same level as in deserts — less than 10 inches per year. In the arctic tundra, the amount of daily sunshine ranges from 0 to 24 hours per day. Winds are very strong, and the ground beneath the rocky topsoil remains frozen all year. This is called permafrost, and it extends from 600 to 2,000 feet deep. As a result, melting ice and snow are unable to soak far into the ground, and many spongy areas, bogs and ponds are formed on the surface.

The few plants and animals that inhabit the arctic tundra throughout the year are highly adapted to the extreme conditions. Plants do not grow tall because the strong winter winds would uproot them. Many tundra plants grow in tussocks or bunches, which is an adaptation for keeping warm and gaining protection from the wind. Some plants have hairy leaves and stems, and are dark in color, which also helps them to maintain warmth.

Arctic animals are also well-adapted to the harsh conditions, with thick fur, dense feathers and fatty blubber. Year-round residents of the tundra include musk oxen, polar bears, brown bears and squirrels, as well as some hardy birds. Other animals, like caribou and many species of birds, migrate thousands of miles to the Arctic during the spring and summer months to take advantage of the plants and insects that grow in and around the many bogs in large numbers.

The animals of the Antarctic are fewer in number than in the Arctic and are uniquely adapted to survive in the coldest, harshest place on Earth. Antarctic fish have something like “antifreeze” for blood! Weddell seals spend most of their time in the freezing waters of the Antarctic, sheltered by the ice above from even harsher temperatures on land. Small, shrimp-like krill are the basis of the Antarctic food chain. These creatures are eaten in great numbers by squid, birds, seals and whales.

## Vocabulary

**adaptations** — Changes in the structure or responses of a living thing, occurring over long periods of time that make the organism more fit for living in its environment.

**Roald Amundsen (1872-1928)** — Norwegian polar explorer who was the first to reach the South Pole in 1911.

**Arctic** — (name from Greek *arktos* — Great Bear constellation) The northernmost region of the Earth, centered on the North Pole and characterized by distinctively polar conditions of climate, plant and animal life, and other physical features. Animals of the Arctic include caribou, musk ox, huskies, lemmings, foxes, owls, wolves, bears, terns and walrus.

**Antarctica** — (name from Greek “no bear,” meaning “opposite the arctic”). The icy, desolate continent surrounding the South Pole. Near Antarctica, sea ice retreats during summer, but grows to cover 19 million square kilometers (about 7,336,000 square miles) during winter. As the air temperature begins to drop in March, the ocean temperature drops and starts to freeze at the incredible rate of 5.75 square kilometers (about 2.2 square miles) per minute. This thin ice coating covers an area nearly twice the size of the United States and the ice grows to more than a meter thick as winter progresses. Antarctic animals include albatross, plankton, krill, Weddell seals and penguins.

**Aurora borealis** — Moving streams or curtains of light, caused by the interaction of charged particles from the sun with the outer fringes of the Earth’s atmosphere occurring in the northern hemisphere (comparable to the Aurora australis in the southern hemisphere).

**biodiversity** — The number of different plant and animal species in an ecosystem; an indicator of the richness of the environment.

**blubber** — The thick layer of fat on whales, walrus and seals that helps to insulate them from the cold. Used by people as a food source, as well as for oil and fuel, it was a major product of whaling economy.

**camouflage** — Markings or coloration that help to disguise an animal so it is less visible to predators or prey.

**glaciers** — Accumulations of snow, ice, air pockets, water and rock debris. They can fill valleys or entire continents (as in the case of Antarctica). They have enough mass to flow across a landscape, moving from as little as a few feet per year, up to thousands of feet per year. Glaciers are found throughout the world in such places as Africa, New Zealand and Chile.

**iceberg** — Freshwater ice that has broken off a glacier or an ice sheet or shelf. Icebergs float in the water because they are less dense than the water they are immersed in. Only 1/10 of their mass is visible above water and they come in various sizes. The largest iceberg sighted was approximately the same size as Belgium!

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**Inuit** — Translated roughly as “true men” or “the real people,” this is the preferred term for Eskimo in Northern Canada and Greenland.

**lichens** — The most dominant life forms of the Arctic; crusty-looking clumps that do not require soil and can survive for hundreds of years. Lichens are not plants — they are algae and fungi growing together in a cooperative relationship. Algae produce food from photosynthesis, while the fungi protect the algae, anchoring them to rocks and to bare ground.

**migration** — The movement of animals, fish and birds in search of food or shelter, often on an annual basis according to the seasons.

**permafrost** — A thick layer of permanently frozen ground under a thin layer of topsoil, which can be 600 meters (about 2,000 ft.) thick.

**polar zone** — The frigid areas found in bands around the North and South Poles, characterized by freezing conditions, minimal sunlight and low diversity of plant and animal life.

**predators** — Animals who live by hunting and preying on other animals for their own food supply.

**Robert Falcon Scott (1868-1912)** — British naval explorer who died after reaching the South Pole in 1912.

**rookery** — A colony of penguins.

**shaman** — (from the Siberian Evenk language, meaning an ‘excited, frenzied person’) A person who presided over spiritual life in the nomadic tribes of the Siberian Evenki people. Shamans often shared close relationships with nature, and their duties included such tasks as curing the sick, protecting the community and influencing the weather.

## Discussion Topics

- Discuss the similarities and differences between the Arctic and Antarctic regions of the world.
- Polar environments are especially sensitive to the effects of global climate change. Why is this the case?
- Discuss what motivation explorers might have to risk their lives in the quest to reach the poles.