NO PREP

Antarctica and the Arctic

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Name: Period: Date:

Antarctica and the Arctic

Geography and Climate

The polar regions—Antarctica in the south and the Arctic in the north—are among the most extreme environments on Earth. Antarctica is a continent covered almost entirely by ice, with some sheets over two miles thick. It contains about 70% of the world's freshwater, locked in ice, and is the coldest, driest, and windiest place on the planet. No permanent human population lives there, though scientists conduct research at international stations. The Arctic, by contrast, is not a continent but an ocean surrounded by landmasses, including parts of Russia, Canada, Greenland, Norway, and the United States (Alaska). Its climate is less harsh than Antarctica's, with tundra and seasonal ice cover. Indigenous peoples such as the Inuit, Saami, and

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Resources and Human Activity

Antarctica is protected by the Antarctic Treaty of 1959, which bans military activity, mineral mining, and permanent settlement while promoting scientific research and international cooperation. Its isolation and protection mean it remains one of the least disturbed environments on Earth. However, climate change threatens its ice sheets, raising global sea levels. The Arctic, on the other hand, is rich in oil, natural gas, and mineral resources. Melting ice has made these resources more accessible, sparking competition among nations. The Arctic Ocean also holds new shipping routes, such as the Northern Sea Route, which could shorten travel between Europe and Asia. While these opportunities bring economic potential, they also raise environmental concerns, especially for Indigenous communities whose ways of life depend on fragile ecosystems.

Wildlife and Ecosystems

Both regions are vital to global biodiversity. In Antarctica, unique species such as penguins, seals, and krill form the foundation of the ecosystem. The Arctic is home to polar bears, walruses, caribou, and Arctic foxes, along with migratory birds. These animals have adapted to extreme cold and rely on ice for survival. Melting ice and warming temperatures disrupt their habitats, threatening extinction for some species. Global climate systems are tied to the poles. Melting ice sheets in Antarctica and the Arctic contribute to rising sea levels, while shrinking Arctic sea ice reduces the Earth's ability to reflect sunlight, accelerating warming: a process called the albedo effect. This makes the poles not only unique ecosystems but also central to understanding and addressing global climate change.

Conclusion: The Future of the Poles

The polar regions are often portrayed as remote and untouched, but in reality, they are central to Earth's climate system and human future. Antarctica represents international cooperation through science and protection, while the Arctic highlights the tensions between resource development and environmental stewardship. Both face accelerating impacts from climate change, making their study critical for students of geography and global issues. The choices humanity makes about fossil fuels, conservation, and global cooperation will determine whether these fragile regions can endure.

Key Information: Table: Antarctica vs. Arctic

Feature	Antarctica	Arctic
Geography	Continent covered by ice	Ocean surrounded by land
Population	No permanent residents	Millions, including Indigenous peoples
Treaty	Antarctic Treaty (1959)	No single treaty, multiple nations involved
Resources	Protected from mining	Rich in oil, gas, minerals

Feature	Antarctica	Arctic
Wildlife	Penguins, seals, krill	Polar bears, walrus, caribou

Case Study Excerpt: Melting Ice in Greenland

Greenland, though technically part of North America, lies within the Arctic and provides one of the clearest examples of climate change's impact. Its vast ice sheet, second only to Antarctica's, has been melting at alarming rates. Scientists estimate that Greenland has lost billions of tons of ice over the past few decades, contributing significantly to global sea level rise. The melting is not only due to rising air temperatures but also warmer ocean currents eroding ice from below. Entire glaciers have retreated, and massive icebergs regularly break off into the sea. This process threatens coastal cities worldwide, from New York to Dhaka, as sea levels continue to rise. For Greenland's population, which relies on fishing and hunting, the changes disrupt traditional livelihoods. At the same time, new shipping routes and potential mining opportunities attract global interest, placing Greenland at the center of debates over development versus environmental protection. Greenland's case shows how the Arctic's local changes have global consequences. What happens in the polar regions is not isolated—it directly affects the entire world through rising seas, weather shifts, and ecosystem loss.

1. Why does Greenland's melting ice have consequences for countries far beyond the Arctic?

_____

_____

2. What are some opportunities and challenges created by the melting Arctic?

_____

_____

Multiple Choice

1. What is the main difference between Antarctica and the Arctic?

    a) Antarctica is a continent of ice; the Arctic is an ocean surrounded by land

    b) Antarctica has Indigenous peoples while the Arctic has no permanent residents

    c) Antarctica is an ocean; the Arctic is a continent

    d) The Arctic is colder than Antarctica

2. Which treaty protects Antarctica from mining and military use?

    a) Geneva Convention

    b) Kyoto Protocol

    c) Paris Agreement

    d) Antarctic Treaty

3. What is the albedo effect?

    a) The process of melting glaciers forming lakes

    b) The treaty system governing the poles

    c) The reflection of sunlight by ice and snow surfaces

    d) The migration of polar bears across the Arctic

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Penguins	A) Arctic island losing ice rapidly
2. ___ Albedo Effect	B) Ocean passage opened by melting Arctic ice
3. ___ Greenland	C) Shrinking ice reflects less sunlight, warming Earth
4. ___ Northern Sea Route	D) Agreement banning mining and military in Antarctica
5. ___ Antarctic Treaty	E) Central polar species in Antarctica

Fill-in-the-Blank

1. The Arctic is home to Indigenous peoples such as the Inuit, Saami, and _____.

2. The _____ contains about 70% of Earth's freshwater.

3. The Northern Sea Route could shorten travel between _____ and Asia.

Short Answer

Answer each question in 2-4 complete sentences.

1. Why are the polar regions considered "global issues" even though few people live there permanently?

_____

_____

_____

2. How do wildlife species in Antarctica and the Arctic adapt to their extreme environments?

3. What role should international cooperation play in protecting the polar regions?