

Antarctica

What You Will Learn...

Main Ideas

1. Freezing temperatures, ice, and snow dominate Antarctica's physical geography.
2. Explorations in the 1800s and 1900s led to Antarctica's use for scientific research.
3. Research and protecting the environment are key issues in Antarctica today.

The Big Idea

Antarctica's unique environment has made it an important site for research.

Key Terms and Places

ice shelf, p. 659

icebergs, p. 659

Antarctic Peninsula, p. 659

polar desert, p. 659

ozone layer, p. 660

TAKING NOTES As you read, take notes on Antarctica's physical geography, early exploration, and issues today. Record your notes in a graphic organizer like the one below.

Physical Geography	Early Explorers	Antarctica Today

If YOU lived there...

You are a scientist working at a research laboratory in Antarctica. One day you receive an e-mail message from a friend. She wants to open a company that will lead public tours through Antarctica so people can see its spectacular icy landscapes and wildlife. Some of your fellow scientists think that tours are a good idea, while others think that they could ruin the local environment.

What will you tell your friend?

BUILDING BACKGROUND Antarctica, the continent surrounding the South Pole, has no permanent residents. The only people there are scientists who research the frozen land. For many years, people around the world have debated the best way to use this frozen land.

Physical Geography

In the southernmost part of the world is the continent of Antarctica. This frozen land is very different from any other place on Earth.

The Land

Ice covers about 98 percent of Antarctica's 5.4 million square miles (14 million square km). This ice sheet contains more than 90 percent of the world's ice. On average the ice sheet is more than 1 mile (1.6 km) thick.

Penguins live in the icy waters around Antarctica, a continent almost completely covered in ice.



The weight of Antarctica's ice sheet causes ice to flow slowly off the continent. As the ice reaches the coast, it forms a ledge over the surrounding seas. **This ledge of ice that extends over the water is called an ice shelf.** Antarctica's ice shelves are huge. In fact, the Ross Ice Shelf, Antarctica's largest, is about the size of France.

Sometimes parts of the ice shelf break off into the surrounding water. **Floating masses of ice that have broken off a glacier are icebergs.** When one iceberg recently formed, it was approximately the size of the country of Luxembourg.

In western Antarctica, the **Antarctic Peninsula** extends north of the Antarctic Circle. As a result, temperatures there are often warmer than in other parts of the continent.

Climate and Resources

Most of Antarctica's interior is dominated by a freezing ice-cap climate. Temperatures can drop below -120°F (-84°C), and very little precipitation falls. As a result, much of Antarctica is considered a **polar desert**, a **high-latitude region that receives very little precipitation.** The precipitation that does fall does not melt due to the cold temperatures. Instead, it remains as ice.

Because of Antarctica's high latitude, the continent is in almost total darkness during winter months. Seas clog with ice as a result of the extreme temperatures.

In the summer, the sun shines around the clock and temperatures rise to near freezing.

Plant life only survives in the ice-free tundra areas. Insects are the frozen land's only land animals. Penguins, seals, and whales live in Antarctica's waters. Antarctica has many mineral resources, including iron ore, gold, copper, and coal.

READING CHECK Summarizing What are the physical features and resources of Antarctica?

Primary Source

BOOK

Crossing Antarctica

In 1989 a six-person team set off to cross Antarctica on foot. The 3,700-mile journey took seven months to complete. Team member Will Steger describes his first view of the continent.

Now, flying over the iceberg-laden Weddell Sea, the biggest adventure of my life was about to begin . . .

To the south I could barely pick out the peaks of mountains, mountains I knew jutted three thousand feet into the air. They lined the peninsula's coast for hundreds of miles. Leading up to them was a two-mile-wide sheet of snow and ice, preceded by the blue of the sea. It was a picture of purity, similar to many I had seen in the picture books . . .

—from *Crossing Antarctica*, by Will Steger and John Bowermaster

ANALYSIS SKILL

ANALYZING PRIMARY SOURCES

What physical features does the author notice on his trip over Antarctica?



Antarctic Exploration



BIOGRAPHY



Sir Ernest Shackleton

(1874–1922)

Irish-born Ernest Shackleton was one of several early explorers of Antarctica. Shackleton led a British expedition in 1907–1909 that

climbed Mt. Erebus, an active volcano, discovered the Beardmore Glacier, and came within 97 miles of the South Pole—the farthest south anyone had ever been.

In the early 1900s several expeditions set out to find the South Pole. The first to reach the pole were members of a Norwegian expedition led by Roald Amundsen. In this photo a member of the Norwegian expedition poses with his team of dogs near the flag that marks the South Pole.

Early Explorations

The discovery of Antarctica is a fairly recent one. Although explorers long believed there was a southern continent, it was not until 1775 that James Cook first sighted the Antarctic Peninsula. In the 1800s explorers first investigated Antarctica. One motive of many explorers was to discover the South Pole and other new lands. In 1911 a team of Norwegian explorers became the first people to reach the South Pole.

Since then, several countries—including the United States, Australia, and Chile—have claimed parts of Antarctica. In 1959 the International Antarctic Treaty was signed to preserve the continent “for science and peace.” This treaty banned military activity in Antarctica and set aside the entire continent for research.

READING CHECK Making Inferences Why do you think Antarctica is set aside for research?

Antarctica Today

Today Antarctica is the only continent without a permanent human population. Scientists use the continent to conduct research and to monitor the environment.

Scientific Research

While they are conducting research in Antarctica, researchers live in bases, or stations. Several countries, including the United States, the United Kingdom, and Russia, have bases in Antarctica.

Antarctic research covers a wide range of topics. Some scientists concentrate on the continent’s plant and animal life. Others examine weather conditions. One group of researchers is studying Earth’s ozone layer.

The **ozone layer** is a layer of Earth’s atmosphere that protects living things from the harmful effects of the sun’s ultraviolet rays. Scientists have found a thinning in the ozone layer above Antarctica.

ACADEMIC VOCABULARY

motive
a reason for doing something

FOCUS ON READING

What conclusions can you draw about why some countries wanted to preserve Antarctica for research?

Environmental Threats

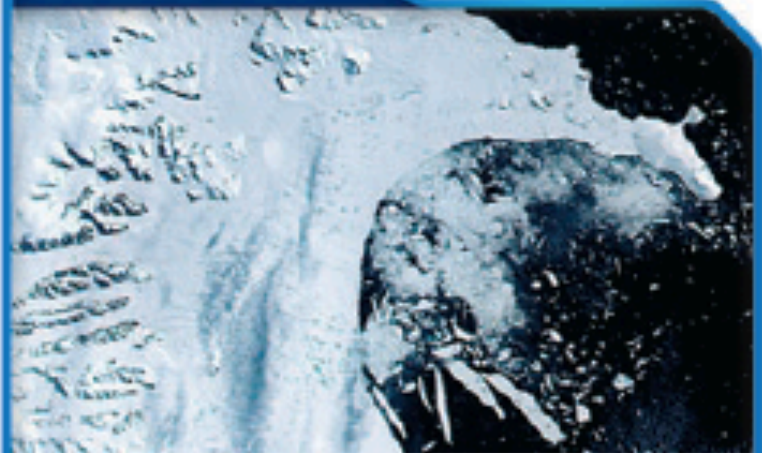
Many people today are concerned about Antarctica's environment. Over the years, researchers and tourists have left behind trash and sewage, polluting the environment. Oil spills have damaged surrounding seas. In addition, companies have hoped to exploit Antarctica's valuable resources.

Some people fear that any mining of the resources in Antarctica will result in more environmental problems. To prevent this, a new international agreement was reached in 1991. This agreement forbids most activities that do not have a scientific purpose. It bans mining and drilling and limits tourism.

READING CHECK Finding Main Ideas What are some issues that affect Antarctica today?

SUMMARY In this section, you have learned about Antarctica's unusual physical geography and harsh climates. Despite the difficulty of living in such harsh conditions, Antarctica remains an important place for scientific research.

Satellite View



Antarctica's Ice Shelves

Antarctica is home to many large ice shelves. An ice shelf is a piece of a glacier that extends over the surrounding seas. In recent years, scientists have become concerned that rising temperatures on the planet are causing the rapid disintegration of some of Antarctica's ice shelves. This satellite image from 2002 shows the breakup of a huge portion of Antarctica's Larsen B Ice Shelf, located on the Antarctic Peninsula. The breakup of this ice shelf released some 720 billion tons of ice into the Weddell Sea.

Identifying Cause and Effect What do scientists believe has led to growing disintegration of Antarctica's ice shelves?

Section 3 Assessment

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Online Quiz

KEYWORD: S17 HP25

Reviewing Ideas, Terms, and Places

- Define** What are ice shelves and icebergs?
 - Contrast** How does Antarctica differ from most other continents?
 - Elaborate** What aspects of Antarctica's physical geography would you most like to see? Why?
- Identify** What was the Antarctic Treaty of 1959?
 - Predict** What might have happened if countries had not agreed to preserve Antarctica for research?
- Recall** What is Antarctica used for today?
 - Analyze** How has Antarctic research benefited science?
 - Elaborate** Do you agree with bans on tourism and mining in Antarctica? Why or why not?

Critical Thinking

- Summarizing** Draw a diagram like the one here. Use your notes to list three facts about each aspect of Antarctica's physical geography.



FOCUS ON WRITING

- Describing Antarctica** In your notebook, describe the natural resources of Antarctica. Decide which to include in your brochure. What illustrations might you include?