Antarctica in Maps

Preview

Most people know that Antarctica is at the "bottom of the world." In this activity, you’ll check out Antarctica’s place on the globe, then learn more about the continent by reading maps.

Prepare

Part 1 – The Globe

1. On the globe, find your own country and focus in on the place where you live. Think about the landscape around your community and how it changes through the year.

2. Next, find the continent of Antarctica. On it, look for the Ross Ice Shelf. McMurdo Station, the largest research base in Antarctica, is near the outer edge of the Ross Ice Shelf where it meets the Transantarctic Mountains (the station may not be labeled on your globe). What do you think the landscape looks like through the year in Antarctica?

3. From your home, what fraction of the globe (one-quarter? one-third?) would you need to travel across to get to Antarctica? Use a string and the distance scale on your globe to estimate the number of miles or kilometers from your home to the Ross Ice Shelf.

4. Look around the borders of your own country. Which countries are your neighbors? What kind of transportation would you need and how long would it take you to travel to one of them?

5. Look around the borders of Antarctica. Which countries are Antarctica’s neighbors? What kind of transportation and how much time do you think it would take to travel to one of them from Antarctica?

6. If you were going to travel to Antarctica, what route would you follow? Trace a route from your home through major airport cities that would take you to Christchurch, New Zealand and then on to McMurdo Station, Antarctica.

Time

≈ 1 hour

Tools & Materials

- Maps (pages 33-58)
- Scissors
- 3-ring binder
- Plastic sheet protectors (12)
- Globe
- String
- Index cards
- Colored markers
+ Large sheet of poster board or construction paper

No distance scale on your globe?

If your globe does not have a distance scale, here’s how you can make one.

- Wrap a string around Earth’s equator. This distance represents Earth’s circumference, approximately 25,000 miles or 40,000 kilometers.
- Fold the string in half and mark its length on a piece of paper and label the distance 12,500 miles or 20,000 kilometers.
- Fold the string in half two more times and mark and label the distance it represents on the paper each time.

You should be able to estimate distances on your globe using this scale.
Activity 1B - Antarctica in Maps

Unit 1 - Antarctica Today

Part 2 – Maps

1. Laminate the maps or place them inside clear plastic sheet protectors to keep them clean and readable.

2. With a partner or in a small group, check out one map at a time. Consider the question and text on each sheet and read the map to come up with an answer that you can explain in your own words.

3. After you’ve discussed each map, check your ideas by reading the text on the back of the map.

4. For any map that you’re not sure how to interpret, do some research in books or on the Internet.

5. You may want to make notes about individual maps on index cards. You can paper clip each index card to the back of the map it describes, or slip it into the back of the sheet protector.
How Large Is Antarctica?

Cutout of Europe to compare to Antarctica

Cut out the maps of Europe, Australia & New Zealand, and North America so you can compare their size to the size of Antarctica on page 39. All four maps are shown at the same scale.
Australia & New Zealand

1000 kilometers (620 miles)
Hold the cutouts of other continents up to this map to compare their size to the size of Antarctica. Look for some feature of the continent where you live that is about the same size as some part of Antarctica.
Antarctica is larger than most people realize. When the sea ice that surrounds the continent is included, Antarctica is even larger.
Which Way Is North in Antarctica?

To travel from the South Pole to South America, in which direction would you go?  
In which direction would you travel to go from the South Pole to Australia?  
How do directions across this map differ from directions on a map of your continent?
From the South Pole, all directions are north.

Unlike the rest of the continents, Antarctica doesn’t have an east coast and a west coast: every part of the coastline in Antarctica is its north coast.
How Thick Is the Ice on Antarctica?

The color at each location shows the thickness of the ice at that spot. About how thick is the thickest ice on Antarctica? Think of a distance you know of that is similar to the thickness of the thickest ice.
The thickest ice on the continent of Antarctica is over 4 km (2.5 miles) thick. This is thicker than the Grand Canyon is deep and higher than the Rocky Mountains stand above the Great Plains of the United States. Horizontally, this depth would cover a distance that would take almost an hour to walk at a steady pace.
How Would Antarctica Look Without Its Ice?

Using data collected over the past 50 years, scientists developed this model that shows the parts of Antarctica’s rock surface that are above sea level. How would the map be different if the ice sheets melted and the water was added to Earth’s oceans? If the weight of the ice sheets were removed from the land, scientists think that the land might spring back up. How would this “glacial rebound” change the map?
This map shows a visualization of areas where the rocky (land) surface of Antarctica is above (and below) sea level.

If all the ice on Antarctica melted and ran into the ocean, sea level would increase by tens of meters, so the lowest areas of the land shown in this map would be under water. The area above water would be smaller.

If glacial rebound were to occur, the land would be higher, so the area of land above water would be larger.

If both conditions were to occur, they could counteract one another and the map would not change.
Where Do Penguins Live in Antarctica?

Adelie
(Pygoscelis adeliae)
Population: ~ 4,900,000

Chinstrap
(Pygoscelis antarctica)
Population: ~ 15,000,000

Emperor
(Aptenodytes forsteri)
Population: ~ 400,000

Gentoo
(Pygoscelis papua)
Population: ~300,000

"I live along most of Antarctica’s coast.”

"I live mostly on the coasts of East Antarctica.”

"I live in the same places as Gentoo penguins, and also on another island.”

"I live only on the tip of the Antarctica peninsula.”

The red area on each map shows where one of these types of penguins lives. Read the clues under each penguin and look at the maps to match it to where it lives in Antarctica.

Source: http://www.seaworld.org/animal-info/info-books/penguin/appendix-species.htm
Adelie
(Pygoscelis adeliae)
Population: ~ 4,900,000
“I live along most of Antarctica’s coast.”

Chinstrap
(Pygoscelis antarctica)
Population: ~ 15,000,000
“I live in the same places as Gentoo penguins, and also on another island”

Emperor
(Aptenodytes forsteri)
Population: ~ 400,000
“I live mostly on the coasts of East Antarctica.”

Gentoo
(Pygoscelis papua)
Population: ~300,000
“I live only on the tip of the Antarctica peninsula.”
Would You Risk Your Life to Be the First Person to Reach the South Pole?

Roald Amundsen of Norway led one expedition: it took his group 57 days to make the 1400 km (900 mi) round trip. Another expedition, led by Robert Scott of Great Britain, encountered horrible weather. They reached the pole in 77 days, but Scott died on his return trip. Calculate the average distance each expedition traveled per day.
Amundsen’s group traveled an average of 25 kilometers, or 16 miles, per day. Scott’s group averaged around 18 kilometers, or 12 miles, per day.

Calculations: $1400 \text{ km} / 57 \text{ days} = \sim 25 \text{ km/day}$

$900 \text{ mi} / 57 \text{ days} = \sim 16 \text{ mi/day}$

$1400 \text{ km} / 77 \text{ days} = \sim 18 \text{ km/day}$

$900 \text{ mi} / 77 \text{ days} = \sim 12 \text{ mi/day}$
Why Is Antarctica Missing On Old Maps?

Compare this chart of the Southern Hemisphere with a globe. What differences do you notice? Drawn in France in 1785, this map shows the routes of early explorers. Why do you think they missed discovering Antarctica until 1820?
The maps show fairly accurate outlines of Africa and South America, but it shows the southeastern tip of Australia (Tasmania) connected to the continent instead of as an island.

Early explorers may have missed discovering Antarctica because the sea ice that surrounds the continent kept them from getting close enough to the continent to see land.
Seven countries once claimed parts of Antarctica, but all territorial claims were suspended by the Antarctic Treaty in 1961. Which countries had claimed some of the land? Many countries have research stations on the continent today. Can you find stations from at least ten different countries?
Countries that made claims to land in Antarctica were Australia, New Zealand, France, Norway, Britain (U.K), Argentina, and Chile.

The map shows research stations established by 15 different nations: Argentina, Australia, China, France, Germany, India, Italy, Japan, New Zealand, Russia, South Africa, South Georgia, United Kingdom, United States, and Ukraine.

The primary purpose of the Antarctic Treaty is to ensure “in the interests of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord.” To this end, the treaty prohibits military activity, except in support of science; prohibits nuclear explosions and the disposal of nuclear waste; promotes scientific research and the exchange of data; and suspends all territorial claims. The Treaty applies to the area south of 60° South Latitude, including all ice shelves and islands.
Does Antarctica Need a Flag?

These designs have been proposed as flags for Antarctica, or used for Antarctic Territories claimed by other countries. Use a blank piece of paper to make your own design for a flag for Antarctica.

This design by was inspired by the United Nations flag. The plain white continent on the blue background symbolizes the neutrality of Antarctica.

This flag, used by Chile’s Magallanes Region, shows the Southern Cross, a prominent constellation in the Antarctic sky, over a mountain range.

This flag, used by the Argentine province of Tierra del Fuego, shows an Antarctic bird and the Southern Cross.

This design uses “rescue” orange for the background, and the white represents snow and ice. A is for Antarctica, the “bowl” is Antarctica’s position on Earth, and the hands represent peaceful cooperation.
There is no official flag for Antarctica.
Why Do Some Maps Show Antarctica As a Strip Across the Bottom?

Look at Antarctica on the picture of the globe and on the map. Where was the continent you see on the globe cut and how was it stretched to get the shape that you see along the bottom of the map? Why do you think people use this type of map, given that it distorts the shape of Antarctica so badly?
The bottom center of the continent pictured on the globe is the location of the “cut” into Antarctica. The point that represents the South Pole was stretched out into a line the same length as the Equator to produce the shape at the bottom of the map.

The flat map you see is called a Mercator projection. All flat maps of our round planet give inaccurate representations of either shapes or sizes. Though this type of map distorts and enlarges Antarctica (and the Arctic), it shows the mid-latitudes and equatorial regions (where human populations are concentrated) fairly accurately.
Unit 1 - Antarctica Today

Activity 1B - Antarctica in Maps

Ponder...

After looking at Antarctica on the globe and in the maps, make a list of 15 to 20 words and phrases that describe the continent.
Activity 1B - Antarctica in Maps

Unit 1 - Antarctica Today

Practice

Got the big idea?
Maps help us understand a place, especially a place that is so large and unfamiliar as Antarctica. Viewing a range of different maps helps people build their understanding of the place by considering one thing about it at a time.

Get ready to present
Come up with an introductory question or comment you’ll use to invite visitors to look at the globe or some of your favorite maps. Make sure that you can give a clear description of each map that explains your answer to the question.

You may want to prepare a large sheet of posterboard or construction paper with an outline of Antarctica on it. A whiteboard or chalkboard would work too. You can encourage visitors to record words and phrases that describe the continent.

Present
Display the open binder on a tabletop or post the maps on a bulletin board. Encourage visitors to find a map that interests them, then answer the question posed on the map. Be ready to answer questions or explain the message of each map. If you need help explaining what a map shows, read the description on the back of the map.