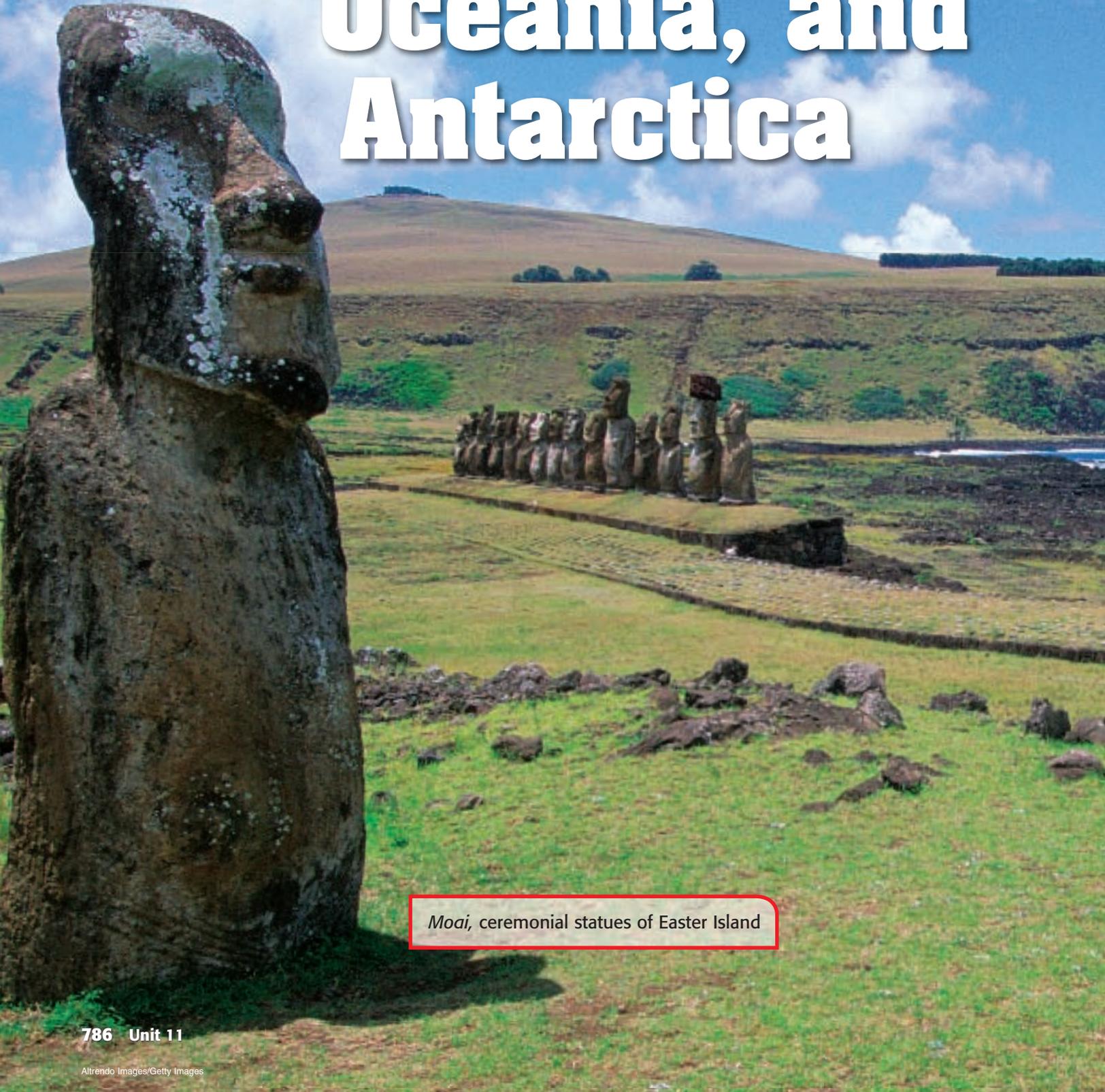


UNIT

11

Australia, Oceania, and Antarctica



Moai, ceremonial statues of Easter Island



- ▶ **What Makes This a Region?** 788–791
- ▶ **Regional Atlas** 792–799
- ▶ **Chapter 32:** Physical Geography 800–815
- ▶ **Chapter 33:** Cultural Geography 816–833
- ▶ **Chapter 34:** The Region Today 834–853

Why It Matters

Vast and sparsely populated, the region of Australia, Oceania, and Antarctica is perhaps the most diverse of the world's regions. Parts of the region—Australia and Oceania—are developing close economic ties to other countries in the Pacific Rim, the area bordering the Pacific Ocean. Such ties to prosperous Pacific Rim nations will influence global trade and trading networks for decades to come. Cold, icy Antarctica lacks a permanent human population, but the data being gathered there by scientists will broaden your understanding of the world's climates and resources in the years ahead.

Australia, Oceania, and Antarctica

PHYSICAL GEOGRAPHY The countries that make up the region of Australia, Oceania, and Antarctica have a variety of similarities and differences. All were isolated from each other and the rest of the world for millions of years. They range in size from tiny islands to entire continents. The climates include the tropic heat of Pacific islands and the year-round cold of Antarctica.



1 MOUNTAINS New Zealand's Southern Alps mountains arise on South Island, one of the two islands that form the country. The small chain has more than twenty mountains that rise higher than 10,000 feet (3048 m).

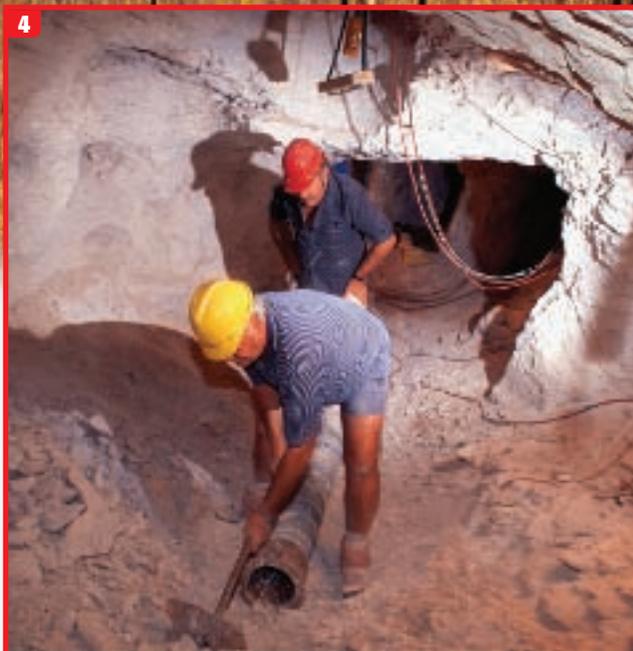
2 ISLANDS Marakei, one of the islands in Kiribati, has the classic shape of a Pacific Ocean atoll, with a low ring surrounding a central area of water called a lagoon.

3 PLAINS AND PLATEAUS The flat expanse of northwestern Australia stretches over a huge distance until stopped by the brilliantly colored rock formation called the Bungle Bungles Range.





AUSTRALIA, OCEANIA, AND ANTARCTICA



4 NATURAL RESOURCES Miners in southern Australia work in an opal mine. Australia's white and black opals are highly regarded gemstones, and the country is one of the world's leading producers of diamonds.

Australia, Oceania, and Antarctica

CULTURAL GEOGRAPHY The region's countries account for only a small share of the world's land area and population. In fact, Antarctica has no native human population at all. The population of Oceania consists largely of indigenous peoples. The cultures of these countries reflect these peoples traditional ways of life. The native peoples of Australia and New Zealand are now minorities, and people descended from European immigrants dominate the population. The culture of these countries is largely influenced by European colonization and a unique national identity.



1

REGIONAL TIME LINE

45,000 B.C. First archaeological evidence of Aborigines



Aboriginal cave art

A.D. 1642 Abel Tasman lands in what is now Tasmania

A.D. 1788 Botany Bay, Australia, used as penal colony by Great Britain

45,000 B.C.

A.D. 700

A.D. 1600

A.D. 1700

A.D. 1800

A.D. 700 Maori arrive in New Zealand from Polynesia

A.D. 1606 William Janz lands on west coast of Cape York, Australia



Captain James Cook

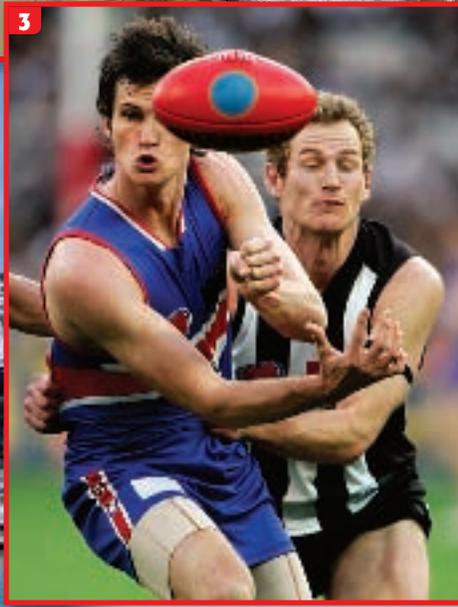
A.D. 1770 Captain James Cook charts much of the Australian shoreline, claiming it for Great Britain



1 ECONOMY Auckland, New Zealand, is a modern port, manufacturing, and business center.

2 PEOPLE The face ornament worn by this Aboriginal man shows that he is a senior member of his group and has higher status as a result.

3 CULTURE Two players contest for control of the ball in Australian rules football, a game invented in the mid-1800s that blends the international sport soccer and the British sport rugby.



AUSTRALIA, OCEANIA, AND ANTARCTICA

A.D. 1850 Australian Colonies Government Act passed, allowing colonies to establish legislatures and alter constitutions

A.D. 1962 Samoa becomes the first Polynesian country to gain independence

A.D. 2006 Australia sends troops to East Timor (Timor-Leste) to help stabilize the country

A.D. 1910

A.D. 1940

A.D. 1970

A.D. 2000

A.D. 1911 Roald Amundsen arrives at the South Pole, beating Robert F. Scott by a month



Roald Amundsen

A.D. 1941–1945 World War II: in the Pacific Theater

A.D. 1959 Twelve countries sign Antarctic Treaty to preserve Antarctica for peaceful scientific research and put all territorial claims on hold

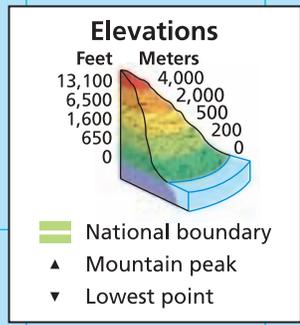
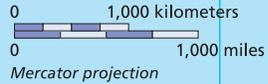
UNIT 11 REGIONAL ATLAS

PHYSICAL Australia, Oceania, and Antarctica



INDIAN OCEAN

PACIFIC OCEAN



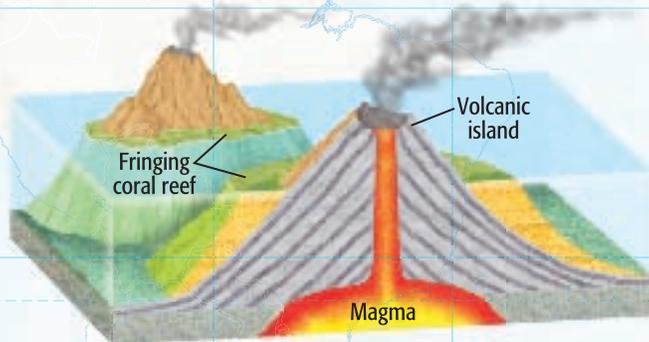


Low, Dry, and Isolated

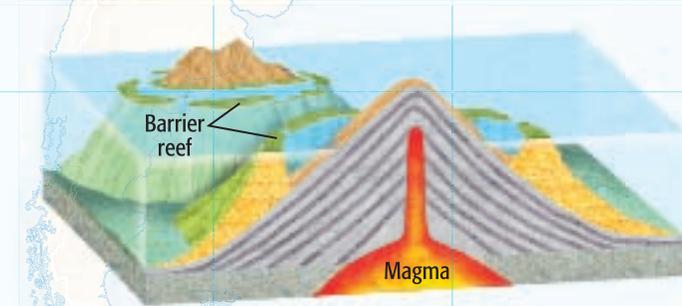
Each part of the region is isolated from other regions of the world, and Australia and Antarctica are the two driest continents. As you study the maps and graphics on these pages, look for the geographical features that make the region unique. Then answer the questions below on a separate sheet of paper.

1. What features on the map show that Australia has a dry climate? What parts of that continent might be less dry?
2. Use the drawings below to explain how many of the Pacific islands were formed.

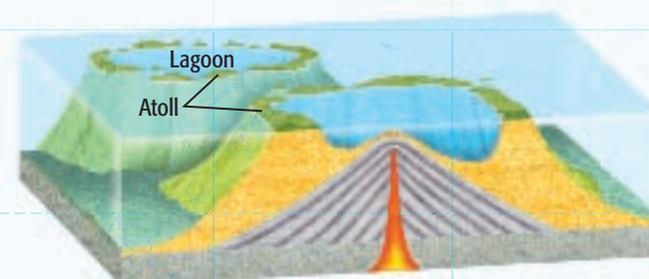
The Birth of an Island



1. Coral atolls begin as volcanoes surrounded by coral reefs.



2. The extinct volcano erodes away. The coral reef expands to become a larger barrier reef.



3. Eventually, all that remains is a coral atoll surrounding a lagoon.

UNIT 11 REGIONAL ATLAS

POLITICAL Australia, Oceania, and Antarctica



⊛ National capital
• Major city

0 1,000 kilometers
0 1,000 miles
Mercator projection

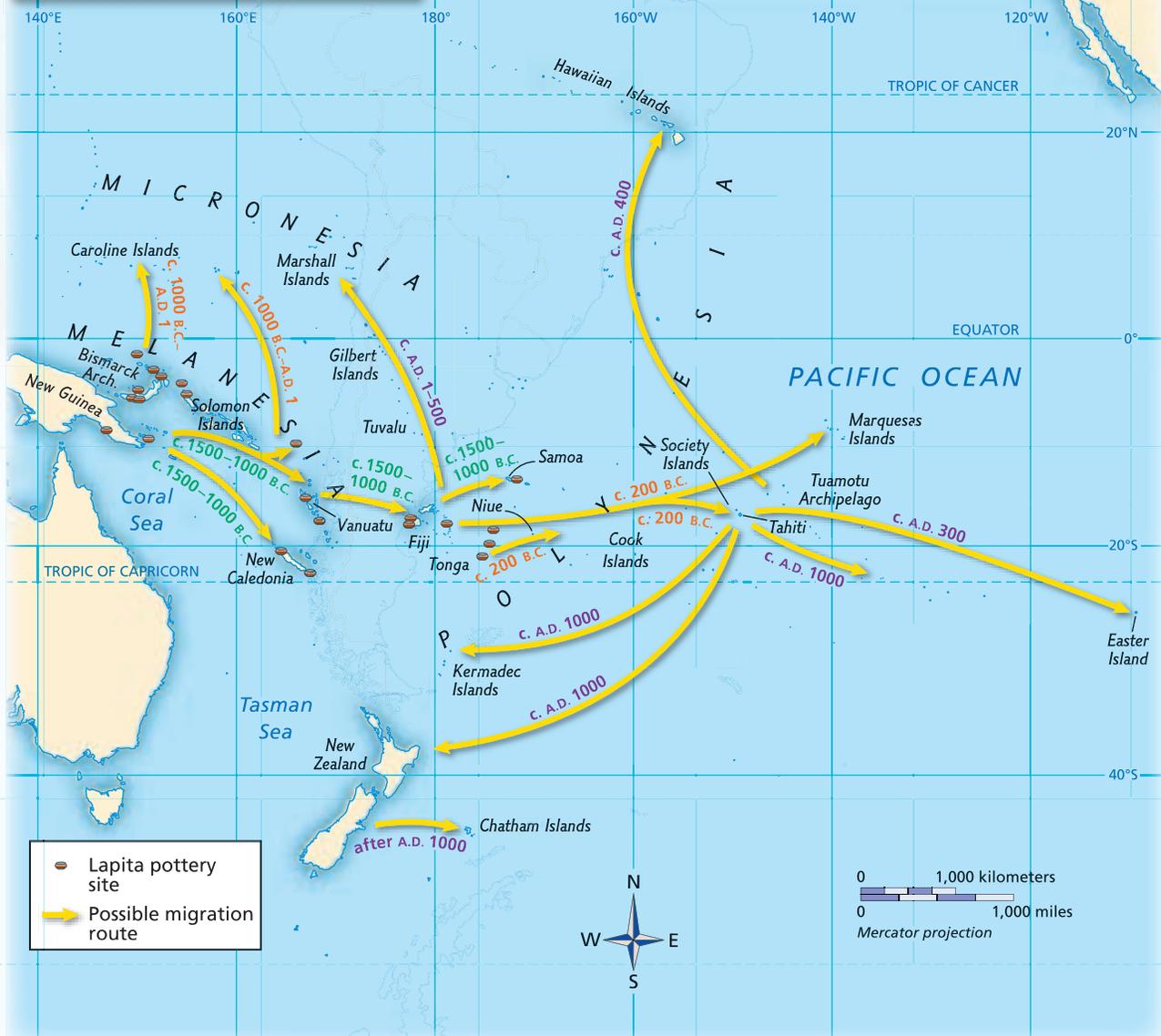


Linking Distant Islands

Though the islands of Oceania are distant from each other, they have not been entirely out of reach of human travelers. As you study the maps on these pages, look for features that make the region unique. Then answer the questions below on a separate sheet of paper.

1. Why do you think Lapita pottery sites are detailed on the map below? How might this be used to track Polynesian migration?
2. Study the map on page 794. In Oceania what are the colored borders and red type used to detail?
3. Where are most major cities in Australia found? What about the physical geography of the country explains these settlement patterns?

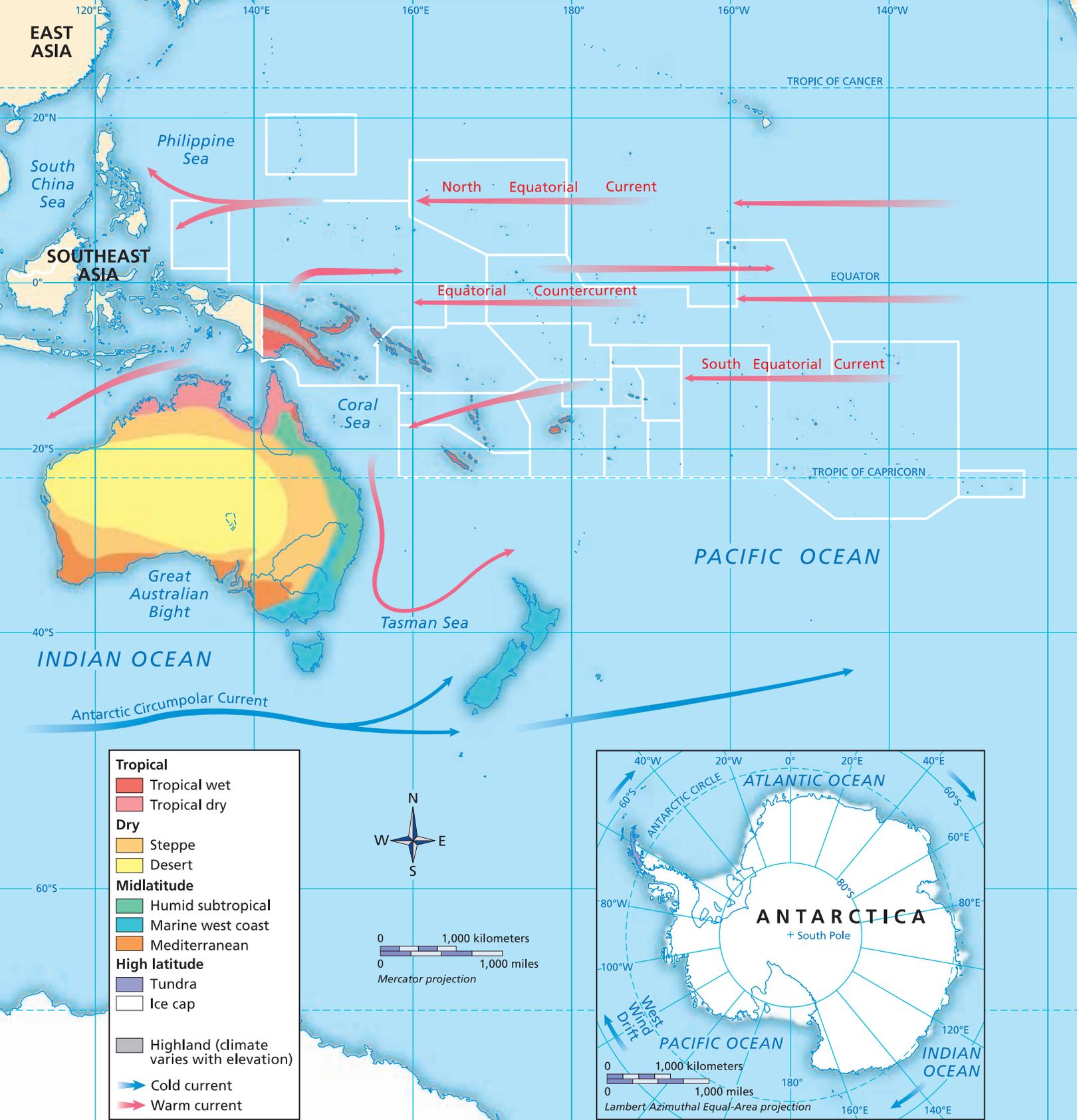
POLYNESIAN IMMIGRATION



AUSTRALIA, OCEANIA, AND ANTARCTICA

UNIT 11 REGIONAL ATLAS

VEGETATION Australia, Oceania, and Antarctica



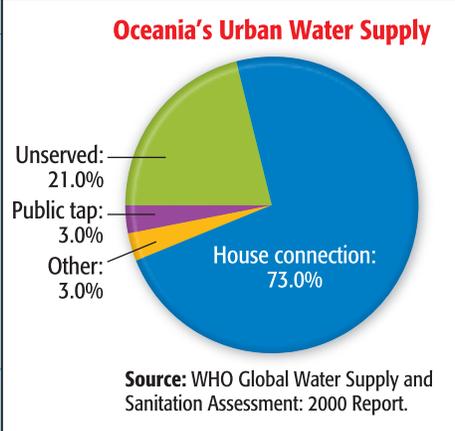
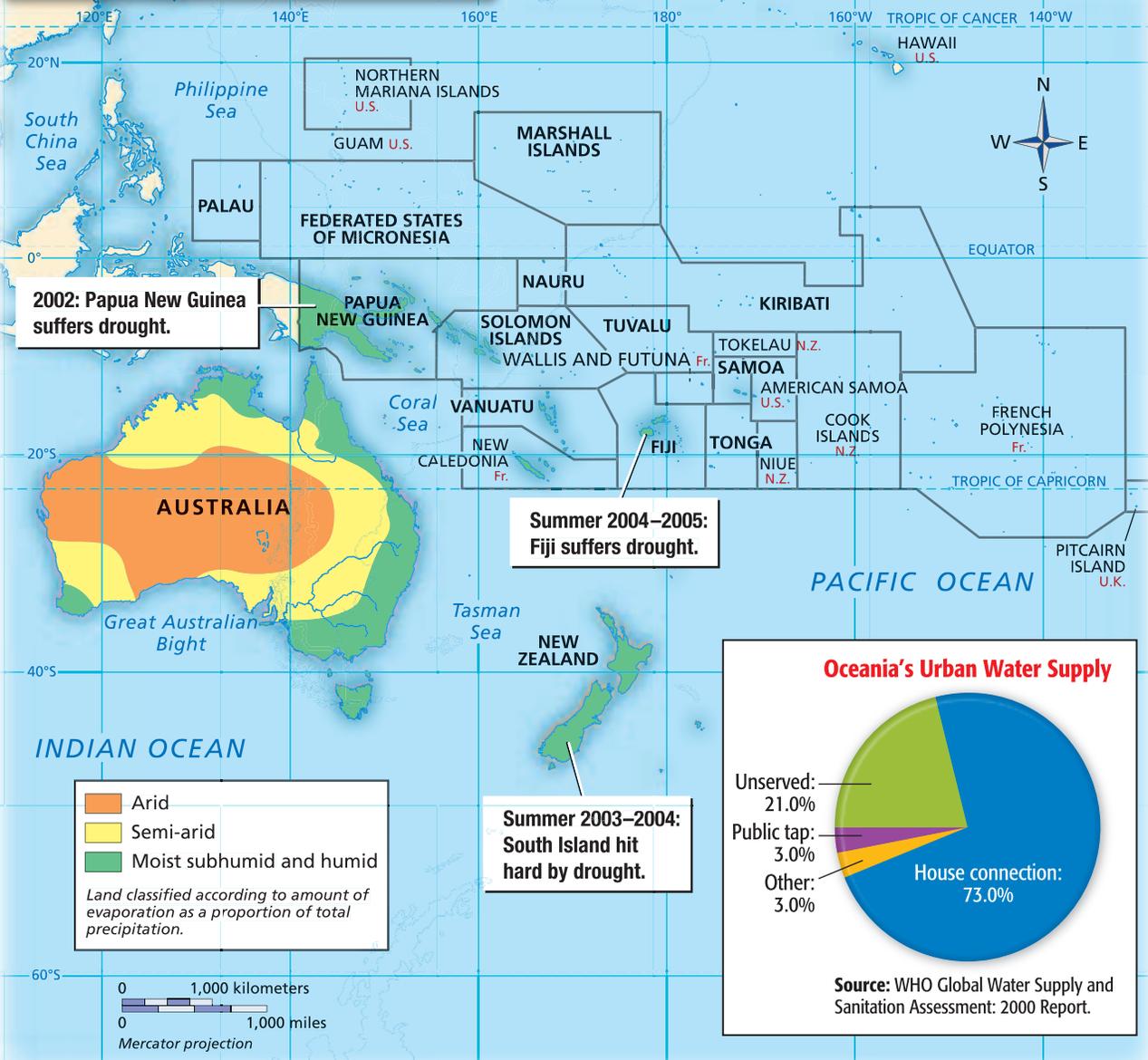


Water, Water Everywhere

As you study the maps and graphics on these pages, look for features that make the region unique. Then answer the questions below on a separate sheet of paper.

1. Which parts of the region would you expect to have ample rain? Which would you expect to be dry?
2. What impact would these conditions have on farming?
3. Despite being surrounded by water, a large percentage of Oceania's population does not have access to freshwater. What factors might contribute to this problem?

AUSTRALIA AND OCEANIA Drought



AUSTRALIA, OCEANIA, AND ANTARCTICA

COUNTRY PROFILES Australia, Oceania, and Antarctica

Country, Capital, & Area	Population & Density	Life Expectancy at Birth	GDP Per Capita*	% Urban	Literacy Rate (%)	Years of Compulsory Education	Phone Lines/Cell Phones (per 1,000 people)	Internet Users (per 1,000 people)	Flag & Language
AUSTRALIA 	20,400,000 7 per sq. mi. 3 per sq. km	80 yrs.	\$30,700	91	100.0	11	539/640	481.7	 English
FEDERATED STATES OF MICRONESIA 	100,000 370 per sq. mi. 143 per sq. km	67 yrs.	\$2,000	22	89.1	NA	NA	92.7 (2003)	 English
FIJI 	800,000 113 per sq. mi. 44 per sq. km	68 yrs.	\$5,900	46	93.7	10	119/110	61.0	 English
KIRIBATI 	100,000 355 per sq. mi. 136 per sq. km	63 yrs.	\$800	43	NA	10	NA	22.8 (2002)	 I-Kiribati, English
MARSHALL ISLANDS 	100,000 1,449 per sq. mi. 559 per sq. km	68 yrs.	\$1,600	68	93.7	NA	NA	25.9 (2003)	 Marshallese, English
NAURU 	10,000 1,111 per sq. mi. 435 per sq. km	61 yrs.	\$5,000	100	NA	NA	NA	25.9 (2001)	 Nauruan, English
NEW ZEALAND 	4,100,000 39 per sq. mi. 15 per sq. km	79 yrs.	\$23,200	86	99.0	12	448/622	484.4	 English, Maori
PALAU 	20,000 112 per sq. mi. 43 per sq. km	70 yrs.	\$9,000	70	92.0	9	NA	NA	 Palauan, English

*The CIA calculates per capita GDP in terms of purchasing power parity. This formula allows us to compare the figures among different countries.

Note: Countries and flags are not drawn to scale.

Country, Capital, & Area	Population & Density	Life Expectancy at Birth	GDP Per Capita*	% Urban	Literacy Rate (%)	Years of Compulsory Education	Phone Lines/Cell Phones (per 1,000 people)	Internet Users (per 1,000 people)	Flag & Language
PAPUA NEW GUINEA  178,703 sq. mi. 462,839 sq. km Port Moresby	5,900,000 33 per sq. mi. 13 per sq. km	55 yrs.	\$2,200	13	64.6	9	11/3	13.7	 Melanesian Pidgin
SAMOA  Apia 1,097 sq. mi. 2,841 sq. km	200,000 182 per sq. mi. 70 per sq. km	73 yrs.	\$5,600	22	99.7	NA	57/15	22.2	 Samoan
SOLOMON ISLANDS  Honiara 11,158 sq. mi. 28,899 sq. km	500,000 45 per sq. mi. 17 per sq. km	62 yrs.	\$1,700	16	NA	NA	15/2	5.0	 Melanesian Pidgin, English
TONGA  Nuku'alofa 290 sq. mi. 751 sq. km	100,000 345 per sq. mi. 133 per sq. km	71 yrs.	\$2,300	33	98.5	NA	113/34	29.2	 Tongan, English
TUVALU  Funafuti 10 sq. mi. 26 sq. km	10,000 1,000 per sq. mi. 385 per sq. km	64 yrs.	\$1,100	47	NA	NA	NA	NA	 Tuvaluan
VANUATU  Port-Vila 4,707 sq. mi. 12,191 sq. km	200,000 42 per sq. mi. 16 per sq. km	67 yrs.	\$2,900	21	53.0	7	33/24	34.6	 Local Languages, Bislama
Comparing Lands: The region of Australia, Oceania, and Antarctica is about two and a half times the size of the continental United States.									
	296,500,000 80 per sq. mi. 31 per sq. km	78 yrs.	\$40,100	79	97.0	12	646/488	551.4	 English

Sources: Central Intelligence Agency, *World Factbook*, 2005; Population Reference Bureau, *World Population Data Sheet*, 2005; UNESCO Institute for Statistics; United Nations, *Human Development Report*, 2005.

Why It Matters

A study of the physical geography of Australia, Oceania, and Antarctica reveals a region of extreme differences—from the dry Australian Outback to the volcanic islands of the Pacific to the cold ice cap of Antarctica. Each of these subregions offers unique opportunities for economic growth, tourism, and scientific research.

Big Ideas

Section 1: The Land

The physical environment affects people and their activities.

Australians have adapted to life in a country with large expanses of dry, flat land. People in Oceania take advantage of the volcanic soil of many of the islands.

Section 2: Climate and Vegetation

The physical environment affects people and their activities.

Australia is characterized by several different climates, while most of Oceania has a tropical wet climate and New Zealand has a marine west coast climate. Each type of climate affects human activities.

Geography ONLINE

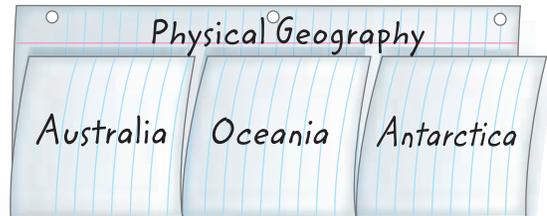
Chapter Overview Visit the *World Geography and Cultures* Web site at glencoe.com and click on Chapter Overviews—Chapter 32 to preview information about the physical geography of the region.

Australia, Oceania, and Antarctica

Palau's Rock Islands are limestone coral reefs lifted above sea level.

FOLDABLES™
Study Organizer

Summarizing Information Create a Three-Tab Book to summarize information about the physical geography of Australia, Oceania, and Antarctica. Write the name of a sub-region on each of the three tabs.



Reading and Writing As you read the chapter, write notes under the appropriate tab about the physical geography of the three subregions discussed in this chapter.



AUSTRALIA, OCEANIA, AND ANTARCTICA

The Land

Guide to Reading

Section Preview

Australians have adapted to life in a country with large expanses of dry, flat land. People in Oceania take advantage of the volcanic soil of many of the islands.

Content Vocabulary

- artesian well (p. 803)
- coral (p. 803)
- atoll (p. 804)
- lagoon (p. 804)

Academic Vocabulary

- virtually (p. 803)
- display (p. 805)

Places to Locate

- Australia (p. 803)
- Great Dividing Range (p. 803)
- Nullarbor Plain (p. 803)
- Murray River (p. 803)
- Darling River (p. 803)
- Oceania (p. 804)
- Melanesia (p. 804)
- Micronesia (p. 804)
- Polynesia (p. 804)
- New Zealand (p. 804)
- North Island (p. 805)
- South Island (p. 805)

Reading Strategy

Categorizing As you read, list features and resources for each sub-region in a graphic organizer like the one below.

Australia	Oceania

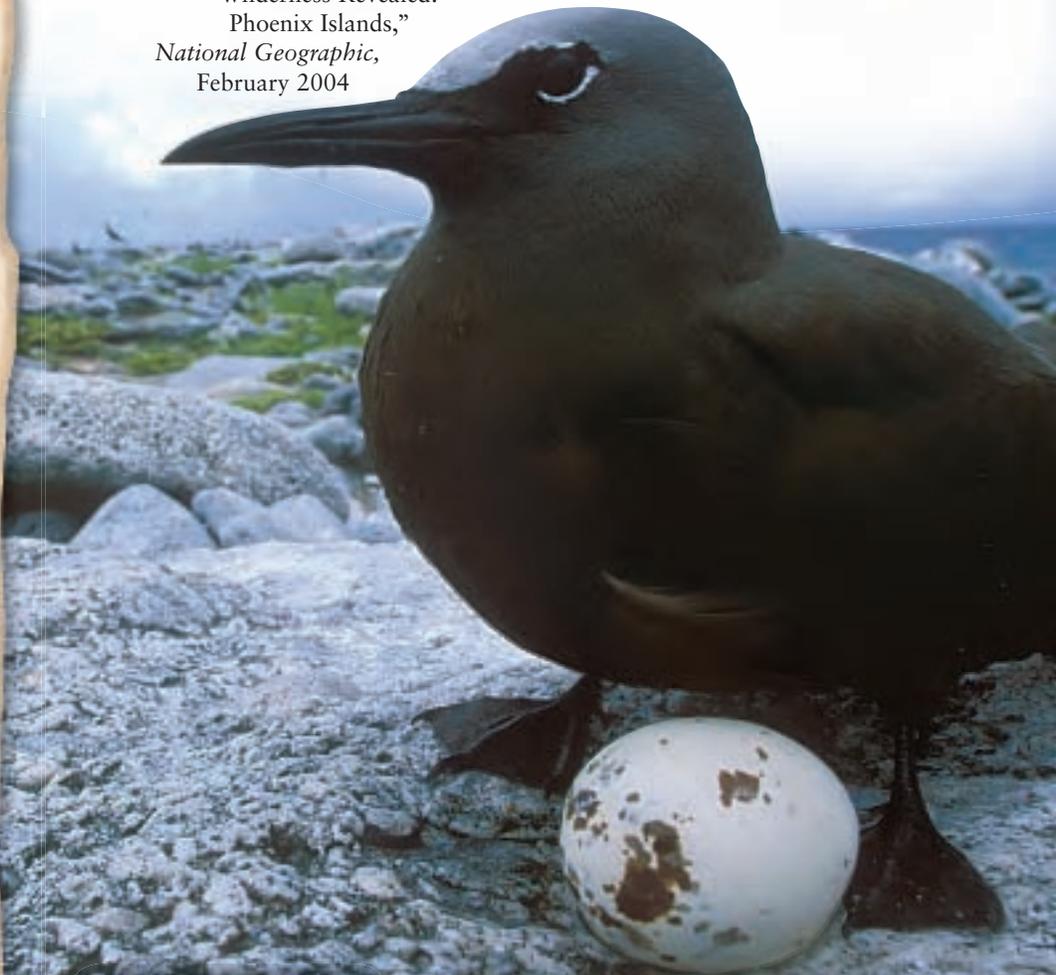
Oceania, as part of the diverse South Pacific region, includes stunning volcanic mountains, low atolls, and cool blue lagoons. Among these varied physical features are unique species of wildlife that attract tourists and scientists alike.

VOICES AROUND THE WORLD

“Three days later we stopped at tiny Rawaki (formerly known as Phoenix Island), which is little more than a pile of coral rock in the heaving ocean. But to a wildlife researcher . . . it was a paradise, with hundreds of thousands of birds laying their eggs there. It was her job to count this swarming mass of birdlife. . . .

The birds were all around us—large and small, light and dark, squawking and screeching. . . .”

—Gregory Stone, “A Coral Reef Wilderness Revealed: Phoenix Islands,”
National Geographic,
February 2004



A brown naddy on Rawaki, an atoll in Kiribati

Australia

MAIN Idea Australia's physical environment contributes in various ways to the country's economy.

GEOGRAPHY AND YOU How does the Mississippi River contribute to the U.S. economy? Read to learn how Australia's rivers contribute to its agriculture.

As the only place on the Earth that is both a continent and a country, **Australia** is unique. Although water surrounds Australia in the same way as an island, geographers classify it as a continent because of its tremendous size.

Mountains and Plateaus

As shown on the elevation profile below, a chain of hills and mountains known as the **Great Dividing Range** interrupts Australia's otherwise level landscape. The peaks stretch along Australia's eastern coast from the Cape York Peninsula to the island of Tasmania. Most of Australia's rivers begin in the range, and they water the most fertile land in the country.

The Western Plateau, a low area of flat land in central and western Australia, covers almost two-thirds of the continent. This area where few people live is called the Outback. Across the plateau spread the sands of the Great Sandy, Great Victoria, and Gibson Deserts.

South of the Great Victoria Desert lies the **Nullarbor Plain**. The name comes from the Latin *nullus arbor*, meaning "no tree." This dry, **virtually** treeless land ends abruptly in giant cliffs. Hundreds of feet below the cliffs lies the churning Great Australian Bight, a part of the Indian Ocean.

Central Lowlands

The Great Dividing Range and the Western Plateau are separated by the Central Lowlands. This arid expanse of grassland and desert stretches across the east central part of Australia. After heavy rainfall, rivers and lakes in the area fill with water, but because rains are infrequent, most rivers and lakes remain dry much of the year. In the southeast, however, the **Murray River** and the **Darling River** supply water that supports irrigated farming. A vast treasure of pressurized underground water, known as the Great Artesian Basin, lies beneath the lowlands. Although the water that gushes from **artesian**

wells, or wells from which pressurized water flows to the surface, is too salty for humans or crops, ranchers use it to water livestock.

Great Barrier Reef

Along Australia's northeastern coast lies the Great Barrier Reef—the world's largest coral reef. Because of its unique beauty and the habitat it provides for multitudes of creatures, Australia has designated the reef a national park, and the United Nations has named it a World Heritage Site.

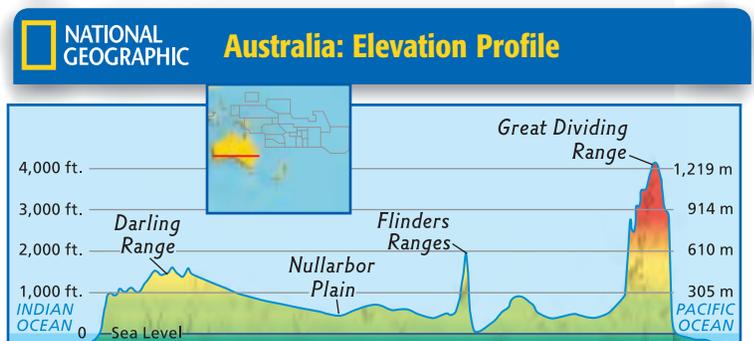
Its name suggests a single reef, but the Great Barrier Reef is actually a string of more than 2,500 small reefs. Formed from **coral**, the limestone skeletons of a tiny sea animal, it extends 1,250 miles (2,012 km).

Natural Resources

Although only 10 percent of Australia's land can be farmed, agriculture is important to the country. Australian farmers, especially near the Murray and Darling Rivers, grow wheat, barley, fruit, and sugarcane. In the arid areas of the Outback, ranchers raise cattle, sheep, and chickens.

Australia also yields rich mineral resources, including one-fourth of the world's bauxite—the raw material for aluminum production—and most of the world's high-quality opals. Deposits of coal, iron ore, lead, zinc, gold, nickel, and petroleum also make the country one of the world's major mining areas.

READING Check **Human-Environment Interaction** Why does the central region of Australia have conditions suitable for farming?



MAP STUDY

- Place** What are the highest points in Australia?
- Regions** Compare this profile to the physical map on page 792 in the Regional Atlas. How does the information presented on each map differ?

Oceania

MAIN Idea Life on the islands of Oceania is influenced by the type of island and the physical process by which it was formed.

GEOGRAPHY AND YOU What other islands around the world have been formed as a result of tectonic activity? Read to learn which islands in Oceania were formed through similar processes.

Thousands of islands, differing in size and extending across millions of square miles of the Pacific Ocean, form the region called **Oceania** (OH•shee•A•nee•uh). Some islands were created by colliding tectonic plates millions of years ago. Other islands were created by volcanic hot spots.

Island Groups

Oceania's islands are classified into three groups, based on location, how the islands formed, and the inhabitants' cultures. **Melanesia**, meaning "black islands," lies north and east of Australia. The "little islands" of **Micronesia** extend north of Melanesia. **Polynesia**, or "many islands," spans an area larger than either Melanesia or Micronesia, ranging from Midway Island in the north to **New Zealand** in the south.

Island Types

Earthquakes and volcanic eruptions still occur on many high islands, one of three island types in Oceania. The landscapes of high islands, such as Tahiti, feature mountain ranges split by valleys that fan out into coastal plains. Bodies of freshwater dot the land, and the volcanic soil on high islands supports some agriculture.

Volcanoes also shaped Oceania's low islands. Low islands, such as many of the Marshall Islands, are ring-shaped islands, known as **atolls**, formed by the buildup of coral reefs on the rim of submerged volcanoes. Atolls encircle **lagoons**, shallow pools of clear water, and usually rise only a few feet above sea level. Low islands have little soil and few natural resources.

Continental islands are formed by the rising and folding of ancient rock from the ocean floor. Most of Oceania's large islands, such as New Guinea and New Caledonia, are continental islands. Coastal areas consist of plains, swamps, and rivers. Interior areas include volcanoes, mountains, plateaus, and valleys. Continental islands have a variety of rocks and soil and so contain most of Oceania's mineral deposits. Their mining industries produce oil, gold, nickel, and copper. Some larger forested islands support timber processing.

READING Check **Place** What is the relationship between atolls and lagoons?



Oceania includes 3 types of islands: high islands such as Tahiti (left), low islands like Palau (top right), and continental islands like New Guinea (bottom right).

Regions How do high islands and low islands differ?



New Zealand

MAIN Idea People in New Zealand utilize elements of the physical environment to make a living.

GEOGRAPHY AND YOU What advantages do areas of volcanic activity offer people? Read to learn how New Zealanders take advantage of living in an area of tectonic activity.

Located southeast of Australia, New Zealand's **North Island** and **South Island** display sandy beaches, emerald hillsides, and snow-tipped mountains. North Island's northern region includes golden beaches, ancient forests, and rich soil. A central plateau of volcanic stone features hot springs and several active volcanoes. Chief among them is Mount Ruapehu (ROO•uh•PAY•hoo), North Island's highest point. Shining freshwater lakes appear throughout the plateau. East of the plateau, a band of hills runs north and south.

The towering, snowy peaks of the Southern Alps run along South Island's western edge. New Zealand's earliest inhabitants, the Maori, named the highest peak on South Island *Aorangi* (ow•RAHNG•ee), which means "cloud piercer."

Today, Aorangi is known as Mount Cook and rises to 12,316 feet (3,754 m). This high country also features sparkling lakes, carved by glaciers, and tumbling rivers. The Canterbury Plains, New Zealand's flattest and most fertile land, lie on the eastern coast. Rugged cliffs, deep fjords, and coastal caves dot the western coast.

New Zealand's fertile volcanic soil, perhaps its most important resource, greatly benefits the country's economy. About half of the land supports crops and livestock. New Zealand's sheep and wool products dominate exports, and its forests yield valuable timber. The country's rivers and dams produce abundant hydroelectric power. New Zealand also uses geothermal energy, here provided by water heated underground by volcanoes, to generate power.

READING Check **Place** What natural resources does New Zealand's physical environment provide?

Geography ONLINE

Student Web Activity Visit the *World Geography and Cultures* Web site at glencoe.com and click on Student Web Activities—Chapter 32 for an activity about the Ring of Fire.

SECTION I REVIEW

Vocabulary

1. Explain the significance of: artesian well, coral, atoll, lagoon.

Main Ideas

2. How does Australia's physical environment contribute to the country's economy? Give examples.
3. Describe examples of how people in New Zealand utilize elements of the physical environment to make a living.
4. Complete a table like the one below by describing the three types of islands in Oceania and how human activity on the island is influenced by the type of island and the process by which it was formed.

Island	Description	Life
Low island		
High island		
Continental island		

Critical Thinking

5. **Comparing and Contrasting** Identify similarities and differences between New Zealand's two main islands and a high island such as Tahiti.
6. **Making Decisions** Of the three types of islands found in Oceania, which type would you choose for a home? Why?
7. **Analyzing Visuals** Study the physical map on page 792 of the Regional Atlas. Which parts of Australia have the highest elevation?

Writing About Geography

8. **Expository Writing** Consider the location of Oceania's islands in relation to other parts of the world. Write a paragraph explaining how this location might affect the development of natural resources, including plants and animals.

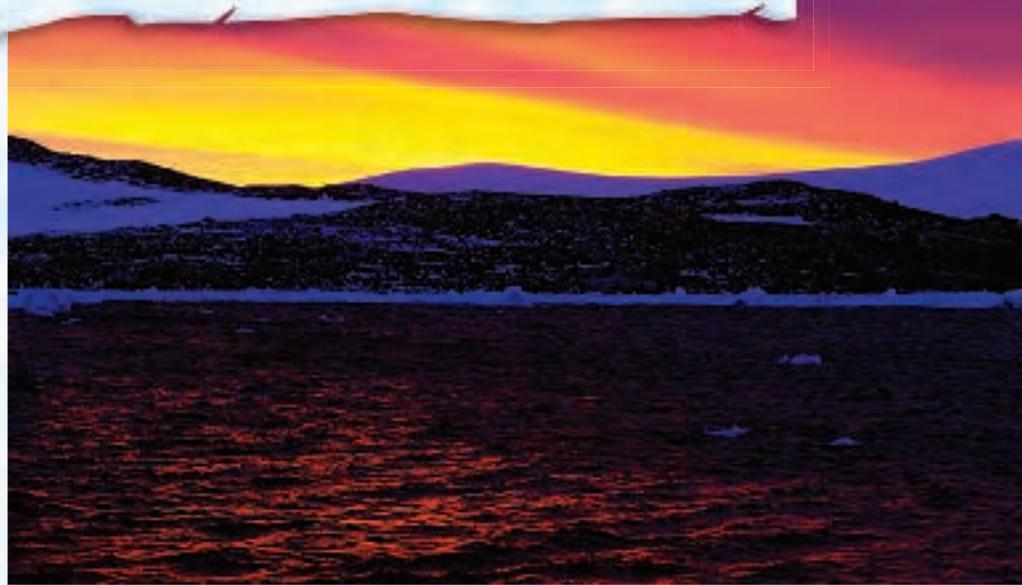
Geography ONLINE

Study Central™ To review this section, go to glencoe.com and click on Study Central.

ANTARCTICA

THE LAND OF ICE

Antarctica is located at the southernmost point of Earth, surrounded by the Antarctic Ocean. At 5.4 million square miles (14 million sq. km), Antarctica is Earth's fifth-largest continent. Almost completely covered by ice, it has no indigenous people and very limited plant and animal life. Since 1820, when the land of Antarctica was first seen by human eyes, it has fascinated explorers and scientists.

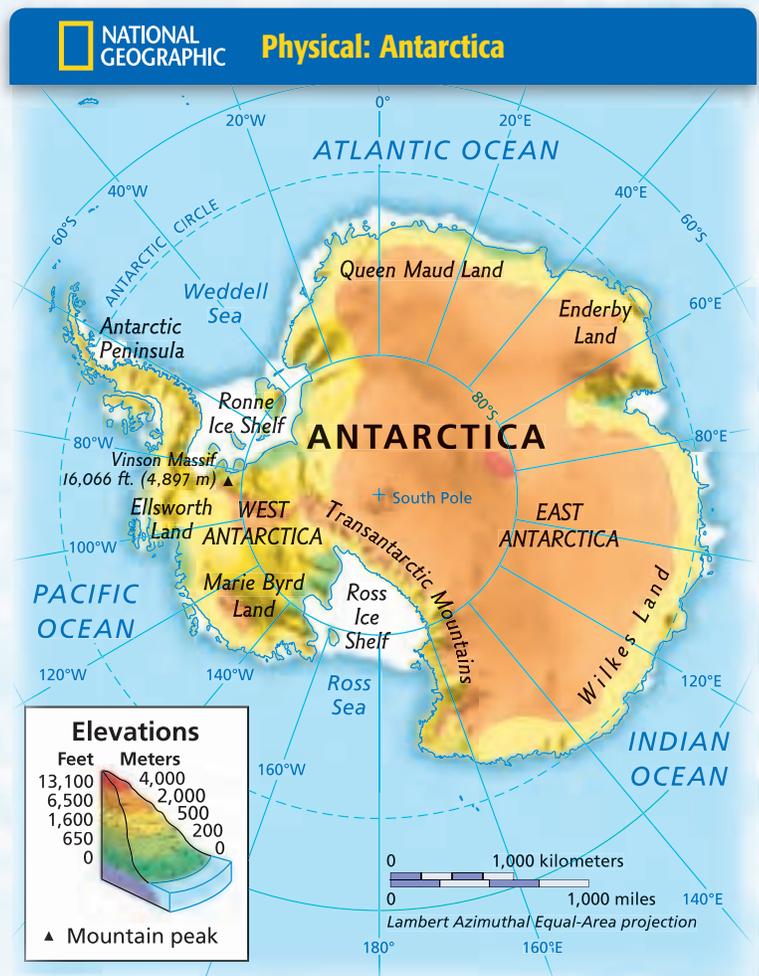


Antarctica at twilight

The Land and Climate

The Transantarctic Mountains separate this vast, ice-covered land into East Antarctica, a landmass about the size of Australia, and West Antarctica, a collection of islands. East Antarctica, which contains the South Pole, is covered by a huge ice dome rising from coastal plains to high plateau. Geographically younger, West Antarctica is mountainous and contains several active volcanoes. It is home to the highest point in Antarctica, Vinson Massif, which has an elevation of 16,066 feet (4,897 m).

The climate of Antarctica is cold, but the severity depends upon location. East Antarctica with its higher elevation is the coldest. The lowest yearly temperature is about -126°F (-88°C). The Antarctic Peninsula and the surrounding islands of West Antarctica have the mildest temperatures. The average temperature during January, the heart of the Antarctic summer, is above freezing.



Plant and Animal Life

The frigid temperatures and isolation of Antarctica make sustaining plant and animal life difficult. Most plant life is concentrated in the milder climate of West Antarctica, particularly the Antarctic Peninsula. There are no trees. Most of the vegetation consists of algae, lichens, and mosses.

The majority of animal life is found in and around the waters of the Antarctic Ocean. These animals, including penguins, whales, and seals, survive on a variety of food sources such as krill, larger fish, and squid.



Whales like this Antarctic minke whale—hunted for their blubber, meat, and oil—have faced significant threats from hunters since the early nineteenth century. International treaties prohibiting hunting have been signed to protect the remaining population.



Antarctic pearlwort and Antarctic hair grass are the only two flowering plants found on Antarctica. They bloom and set seeds very quickly during the Antarctic spring.

Natural Resources

Although only 1 percent of Antarctica's land has been surveyed for minerals, scientific evidence shows that the continent is rich in mineral resources including coal, copper, lead, zinc, silver, gold, oil, and natural gas. The harsh conditions of Antarctica make extracting these resources difficult. Many fear the environmental and political impacts of mining these natural resources. For this reason, restrictions on mining were established in 1991 as part of the Protocol on Environmental Protection.



This emperor penguin family is particularly well adapted to the Antarctic environment. They swim and catch their food in the water, but lay their eggs and hatch their young on land.



This elephant seal survives on a diet of fish, squid, and penguins. Seals come ashore to rest and to breed.

Exploration and Scientific Research

In the 1770s Captain James Cook became the first person to cross the Antarctic Circle. Cook never saw land, but land discoveries were made throughout the 1800s by scientists, explorers, and whalers. As interests grew, several nations and individuals sponsored scientific explorations. Eventually seven countries—Argentina, Australia, Great Britain, Chile, France, New Zealand, and Norway—laid claim to sections of the continent.

In 1957 and 1958 the International Geophysical Year, a period of global geophysical research, focused the world's attention on Antarctica. New bases were established, and a great many research projects were carried out. Furthermore, in 1959 the 12 countries that were involved in the projects negotiated the Antarctic Treaty to preserve Antarctica for peaceful scientific research and to put all territorial claims on hold.

Since then, other countries have established research programs in Antarctica, and 26 new countries have signed on as consultative members. There are 43 stations operated by 27 countries. Today the population of these stations ranges from about 4,000 in the summer to about 1,000 in the winter.

One issue currently threatening the Antarctic environment is global warming. As global temperatures have risen, so has the temperature of the ocean water. The increase in water temperature around Antarctica has caused some of the ice to melt. In March 2000 an iceberg twice the size of Delaware broke free from Antarctica's Ross Ice Shelf, part of the West Antarctica ice sheet. Also in 2000, the ozone hole over Antarctica reached its largest average area, covering approximately 10.2 million square miles (26.5 million sq. km).



Important Antarctic Discoveries	
1821	American seal hunters make first known landing on Antarctica
1901	British explorer Robert F. Scott begins first inland exploration
1911	Norwegian Roald Amundsen is first to reach South Pole
1929	Admiral Richard E. Byrd makes first flight over South Pole
1959	Twelve countries sign Antarctic Treaty, preserving Antarctica for peaceful endeavors



Although the United States makes no territorial claims in Antarctica, the country does have research bases on the continent, like this one located at the South Pole. The United States also has more scientists and researchers on Antarctica than any other nation.

Tourism

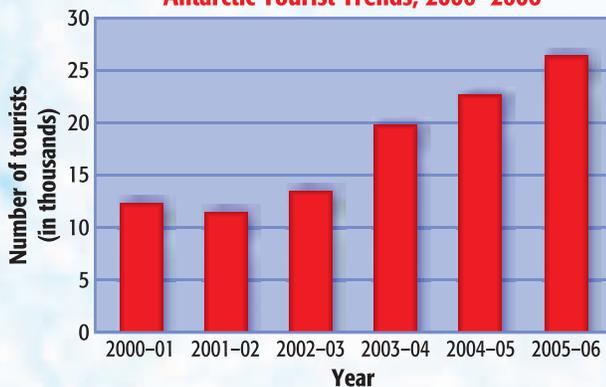
In 1958 the first tourists visited Antarctica, and tourism in the region is slowly growing. During the 1990s approximately 10,000 tourists visited Antarctica. Most of these visitors took cruises, making only short excursions onto the mainland. In 2005 and 2006, this number grew to almost 30,000. While some are concerned about increased human effects on Antarctica, most believe that tourism will further increase interest in Antarctica and what it has to offer.

The tourism season in Antarctica is relatively short due to the cold temperatures. Most tourism takes place during the Antarctic summer, which runs from October through February.



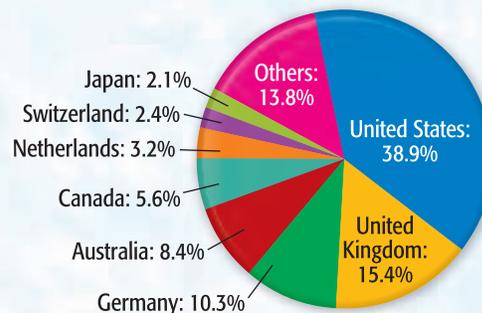
Tourists often take the opportunity to investigate features such as icebergs more closely from small boats. The harsh temperatures make wearing heavily insulated clothing a necessity. Eye protection and sunscreen must also be worn. The sunlight reflected off the snow and ice exposes humans to the sun's potentially harmful ultraviolet rays.

Antarctic Tourist Trends, 2000–2006



Note: Figures are ship and land-based passenger numbers.
Source: www.iaato.org, International Association of Antarctica Tour Operators.

Tourists in Antarctica by Nationality, 2005–2006



Source: International Association of Antarctica Tour Operators.

THINKING GEOGRAPHICALLY

- Analyzing Information** What characteristics of Antarctica's land and climate make sustaining life difficult?
- Drawing Conclusions** What potential problems could result from nations making territorial claims in Antarctica?
- Making Predictions** Why do you think the 1991 Protocol of Environmental Protection put

a stop to mining in Antarctica? What negative effects could result from the mining of natural resources there?

- Writing About Geography** Research the type of work being done by scientists at one of the Antarctic stations. How could the work of these scientists impact your life? Write an essay detailing your findings.

Climate and Vegetation

Guide to Reading

Section Preview

Australia is characterized by several different climates, while most of Oceania has a tropical wet climate and New Zealand has a marine west coast climate. Each type of climate affects human activities.

Content Vocabulary

- wattle (p. 811)
- typhoon (p. 812)
- doldrums (p. 812)
- manuka (p. 812)

Academic Vocabulary

- framework (p. 811)
- occupy (p. 812)

Places to Locate

- Western Plateau (p. 811)
- Southern Alps (p. 812)

Reading Strategy

Organizing As you read, use an outline like the one below to take notes about the climate and vegetation of Australia, Oceania, and New Zealand.

Climate and Vegetation

- I. Australia
 - A. Mountains and Plateaus
 - B. Central Lowlands
- II. Oceania and New Zealand

Like many other places located in the Tropics, Australia and Oceania experience wet and dry monsoons each year. These seasonal weather patterns impact not only the natural vegetation of the region, but also the lives of the its people.

NATIONAL GEOGRAPHIC VOICES AROUND THE WORLD

“The wet, with its transforming rains and spectacular electrical storms, is the defining event of the year to those who live above the Tropic of Capricorn, while it tugs at the imaginations of those of us (and that’s most Australians) who live below it. . . .

In my mind’s eye, I was already picturing hard tropical rains coming down like a beaded glass curtain, sizzling on the pavement of the town’s main street and making the palm fronds glisten.”

—Roff Smith,
“The Wet Down Under,”
National Geographic,
November 2004

Battling strong winds and rain in Sydney, Australia

Australia

MAIN Idea Variations in rainfall affect Australia's climate and vegetation.

GEOGRAPHY AND YOU Does the region in which you live receive little or much rainfall? Read to learn how rainfall influences climate in Australia.

In Australia, climate and vegetation vary greatly. The country's climate and vegetation regions include tropical climates in the northeast, deserts in the interior, and midlatitude temperate areas of grasslands, scrub, and mixed forests along the eastern, southern, and southwestern coasts. Differences in rainfall cause these significant changes in climate and vegetation.

From December to March, subtropical high-pressure air masses block moisture-laden Pacific Ocean winds from reaching the **Western Plateau**, Australia's large interior desert area. The sun scorches the land, but nighttime temperatures drop dramatically.

An area of milder steppe climate encircles Australia's desert region. Here, more regular

rainfall brings vegetation to life, such as eucalyptus and acacia trees and small shrubs. Saplings of the acacia tree were used by early settlers to make **wattle**, a strong, interwoven wooden **framework** used for building homes. Rains fall only during the wet season, however, and the amount can vary greatly. Annual rainfall ranges from 10 to 20 inches (25 to 51 cm). Short grasses and irrigated crops grow here.

Australia's coastal areas have a variety of moister climates. The humid subtropical northeastern coast averages more than 80 inches (200 cm) of rain annually. Less rain falls in the Mediterranean climate area of the southern coasts and in the marine west coast climate area along the southeastern coast. These coastal areas support most of Australia's agriculture.

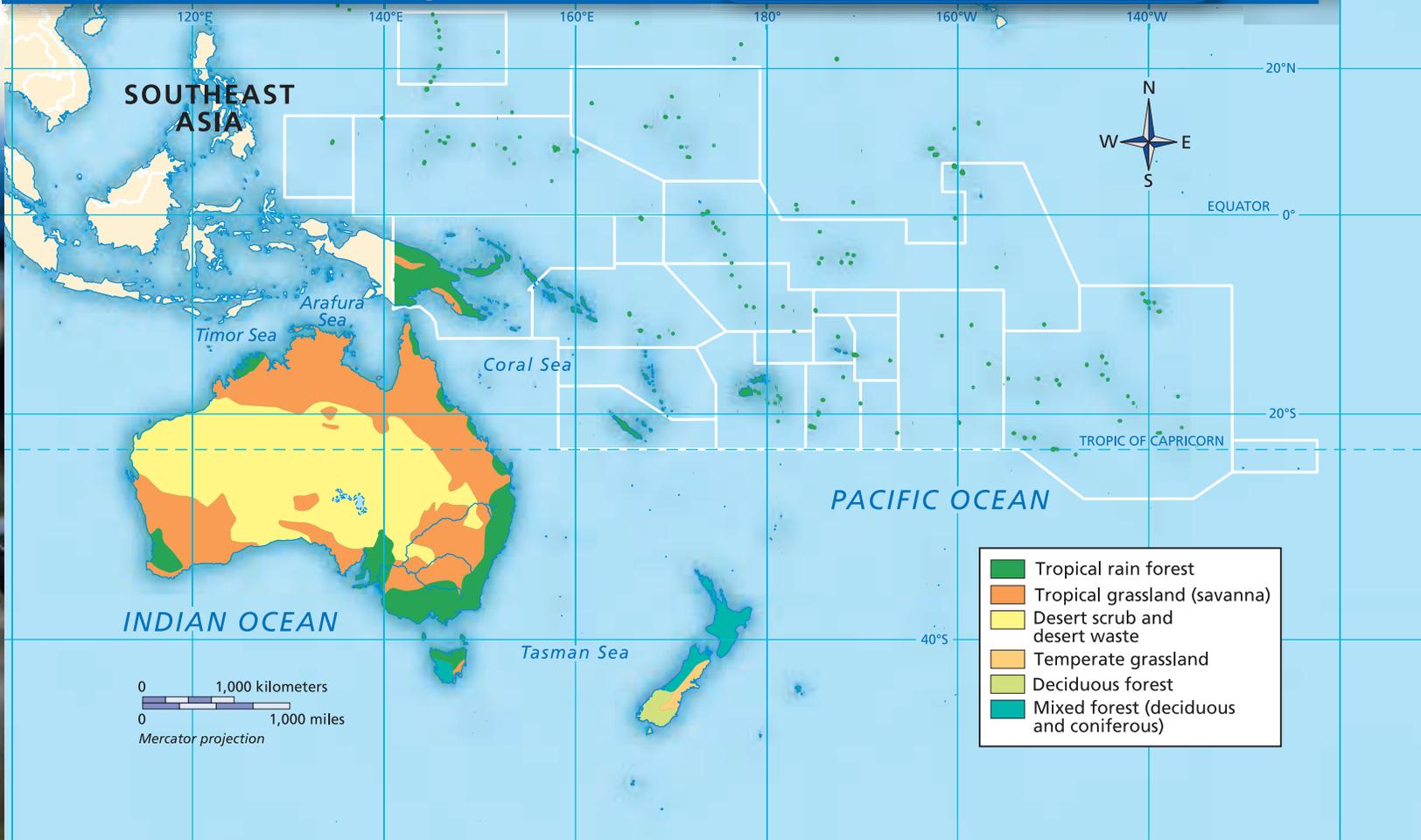
READING Check Regions How does climate along Australia's northern and southern coasts differ?

MAP STUDY

- Place** What types of vegetation are found in western Australia?
- Place** How does vegetation on New Zealand's North Island differ from that of South Island?

maps in **ACTION** Use **StudentWorks™ Plus** or **glencoe.com**.

NATIONAL GEOGRAPHIC Australia and Oceania: Natural Vegetation



Oceania and New Zealand

MAIN Idea Oceania is characterized by a tropical wet climate, while New Zealand experiences a more temperate marine west coast climate.

GEOGRAPHY AND YOU What parts of the world have tropical climates? Read to learn why Oceania and New Zealand have different climates.

Much of Oceania lies between the Equator and the Tropic of Capricorn, so many islands have a tropical wet climate. Most days are warm year-round, ranging from 70°F (21°C) to 80°F (27°C). Seasons throughout most of Oceania alternate between wet and dry. The dry season features cloudless blue skies, but the wet season brings constant rain and high humidity. Low islands get little rainfall, but the larger landmasses of high islands give off warm, moisture-laden air. When this air rises and mixes with cool ocean breezes, heavy rains fall.

Only shrubs and grasses grow on dry, low islands, but coconut palms and other trees appear on islands with more rainfall. Hot, steamy rain forests thrive where heavy rains drench island interiors. A generally windless area called the **doldrums** occupies a narrow band near the Equator where opposing ocean

currents meet. The calm within the doldrums can change to violent storms called **typhoons**.

A marine west coast climate is found in most of New Zealand. Ocean winds warm the land in winter and cool it in summer, preventing temperature extremes. Temperatures hover between 65°F (18°C) and 85°F (29°C) in summer and between 35°F (2°C) and 55°F (13°C) in winter.

Geographic differences also cause climatic variations. North Island's central plateau is warm and sunny during summer, but mountaintops may have snow year-round. Mountainous areas exposed to western winds generally have more rainfall than do other areas. Although the country as a whole averages 25 to 60 inches (64 to 152 cm) of rain annually, the **Southern Alps** on South Island have an average annual rainfall of 315 inches (800 cm).

New Zealand's geographic isolation gives rise to unique plant life. Almost 90 percent of the country's indigenous plants are native only to New Zealand. **Manuka**, a small shrub, carpets land where prehistoric volcanic eruptions destroyed ancient forests. Early settlers from Great Britain cut down almost all of the pinelike kauri trees, but some still grow among thriving evergreen forests. To address erosion in deforested areas, several tree species have been imported from Europe and North America.

READING Check Place How does rainfall vary from low islands to high islands?

SECTION 2 REVIEW

Vocabulary

1. Explain the significance of: wattle, doldrums, typhoon, manuka.

Main Ideas

2. Why is Oceania characterized by a tropical wet climate?
3. Describe New Zealand's marine west coast climate. What does it provide?
4. Complete a table like the one below to explain how variations in rainfall affect Australia's climate and vegetation.

Climate Region	Rainfall	Vegetation
Tropical wet		

Critical Thinking

5. **Making Inferences** How does elevation affect climate patterns in New Zealand?
6. **Identifying Cause and Effect** How do Pacific ocean currents and winds affect the climate and vegetation of Oceania?
7. **Analyzing Visuals** Study the vegetation map on page 811. What type of vegetation is suitable for raising livestock?

Writing About Geography

8. **Expository Writing** Write a paragraph explaining how climate relates to the way farmers operate in New Zealand and Australia.

Geography ONLINE

Study Central™ To review this section, go to glencoe.com and click on Study Central.



A GREAT DIVIDING RANGE

- Chain of hills and mountains stretching from Cape York Peninsula to Tasmania
- Interrupts Australia's otherwise flat landscape
- Most of Australia's rivers begin in this range.
- Extends through several climate regions

B OCEANIA

- Three island clusters: Melanesia, Micronesia, and Polynesia
- Tropical wet climate
- High islands were formed by volcanoes.
- Low islands are atolls formed by the buildup of coral on the rim of submerged volcanoes.
- Continental islands were formed by rising and folding of the ocean floor and contain most of Oceania's mineral resources.

C GREAT BARRIER REEF

- Located along Australia's northeastern coast
- World's largest coral reef
- Home to multitudes of fish and other marine life



D CENTRAL LOWLANDS

- Located between Great Dividing Range and Western Plateau
- Murray and Darling Rivers supply water that supports farming
- Great Artesian Basin provides vast amounts of underground water

E WESTERN PLATEAU

- Also known as the Outback, an expanse of flat land in central and western Australia
- Sparsely populated, but large ranches raise livestock here
- Includes Great Sandy, Great Victoria, and Gibson Deserts



E NEW ZEALAND

- North Island and South Island make up 90 percent of the country's landmass.
- North Island has central plateau with volcanoes and hot springs; South Island has Southern Alps and lakes carved by glaciers
- Marine west coast climate

STANDARDIZED TEST PRACTICE

TEST-TAKING TIP

Read all the choices before you select your answer. You can often eliminate one choice immediately. For example, if the choice has nothing to do with Australia, Oceania, and Antarctica, you can be sure it is not the correct answer.

Reviewing Vocabulary

Directions: Choose the word or words that best complete the sentence.

1. Pressurized water reaches Earth's surface through _____.
A oases
B canyons
C ditches
D artesian wells
2. Ring-shaped islands that are made up of coral attached to submerged volcanoes are _____.
A artesian wells
B high islands
C atolls
D seamounts
3. Early settlers in Australia used acacia trees to make _____, a strong, woven framework for houses.
A posts
B logs
C thatch
D wattle
4. _____ is a small shrub that grows on land where prehistoric volcanoes destroyed ancient forests in New Zealand.
A Kauri
B Teak
C Kiwi
D Manuka

Reviewing Main Ideas

Directions: Choose the best answers to the following questions.

Section 1 (pp. 802–805)

5. Australia produces one-quarter of the world's _____, the raw material of aluminum.
A nickel
B iron ore
C manganese
D bauxite
6. In Oceania, which islands have the most mineral resources?
A atolls
B high islands
C Polynesia
D continental islands

Section 2 (pp. 810–812)

7. In Australia the climates with the most rainfall are found in _____.
A coastal areas
B the west
C the center of the country
D the south central area
8. Most of New Zealand has a _____ climate.
A tropical wet
B marine west coast
C humid continental
D steppe

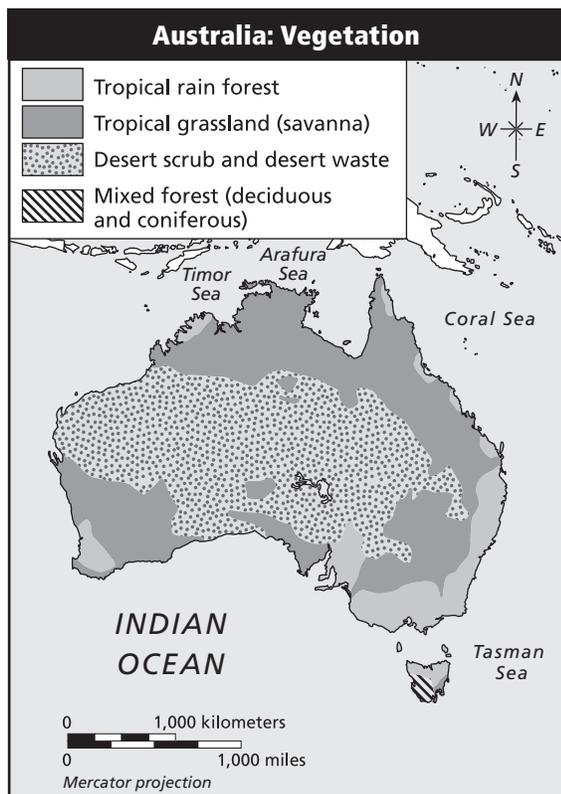
GO ON 

Critical Thinking

Directions: Choose the best answers to the following questions.

9. Why did early European explorers regard Australia as uninviting for settlement?
- A The coasts that they saw were mostly desert and steppe.
 - B They did not know how to use mineral ores.
 - C They saw thick forests, and they were uncomfortable in forests.
 - D The native people attacked them with sophisticated weapons.

Base your answer to question 10 on the map and on your knowledge of Chapter 32.



10. What kind of vegetation dominates central Australia?
- A tropical rain forest
 - B midlatitude coniferous forest
 - C desert
 - D tropical savanna

Document-Based Questions

Directions: Analyze the document and answer the short-answer questions that follow the document.

On April 4, 1769, while exploring in the Pacific Ocean, Captain James Cook arrived at Tahiti. Later, Captain Cook wrote a description of the island.

April 4. A steady fresh Trade [wind] and clear weather. At half past ten a.m. saw land bearing south, distance three or four leagues. Hauled up for it, and soon found it to be an island of about two leagues in circuit and of an oval form, with a lagoon in the middle, for which I named it Lagoon Island. The border of land circumscribing this lagoon is in many places very low and narrow, particularly on the south side, where it is mostly a beach or reef of rocks; it is the same on the N. side in three places, and these disjoin the firm land and make it appear like so many islands covered with wood. On the W. end of the island is a large tree which looks like a large tower, and about the middle of the island are two coconut trees that appear above all the other wood, which as we approached the island looked very much like a flag.

DESCRIPTION OF TAHITI. The produce of this island is bread fruit, coconuts, bananas, plantains, a fruit like an apple, sweet potatoes, yams, a fruit known by the name of Eag Melloa, and reckoned most delicious; sugar cane which the inhabitants eat raw; a root of the salop kind, called by the inhabitants pea; the root also of a plant called ether; and a fruit in a pod like a kidney bean, which when roasted eats like a chestnut, and is called ahee; the fruit of a tree which they call wharra, something like a pineapple; the fruit of a tree called by them nano; the roots of a fern and the roots of a plant called thive. . . .

—The Voyages of Captain James Cook Round the World

11. How does Captain Cook describe Tahiti?
12. What were some of the plant resources available to the Tahitians?

Extended Response

13. Compare the landforms, climate, and vegetation of Australia and New Zealand.

STOP

Geography ONLINE

For additional test practice, use Self-Check Quizzes—Chapter 32 on glencoe.com.

Need Extra Help?

If you missed questions. . .	1	2	3	4	5	6	7	8	9	10	11	12	13
Go to page. . .	803	804	811	812	803	804	811	812	811	815	815	815	803, 805, 811, 813