



Bodies of Water and Landforms

Main Ideas

- Water covers about three-fourths of the earth's surface.
- The earth's surface displays a variety of landforms.

Places & Terms

hydrologic cycle

drainage basin

ground water

water table

landform

continental shelf

relief

topography

A HUMAN PERSPECTIVE In July 1971, astronaut James Irwin was lifted into space on the Apollo 15 mission. As he circled the earth, he was deeply moved by the beauty of our planet. Later he wrote this:

Anyone passing through our solar system would be attracted to the blue planet. They would know that the blue color indicated water on Earth. They would know that where there is water there is probably life. They might try to meet us. We, the blue planet, stand out as a beacon to all.

The earth is unlike any other observable planet in our solar system. It is a living planet.

Bodies of Water

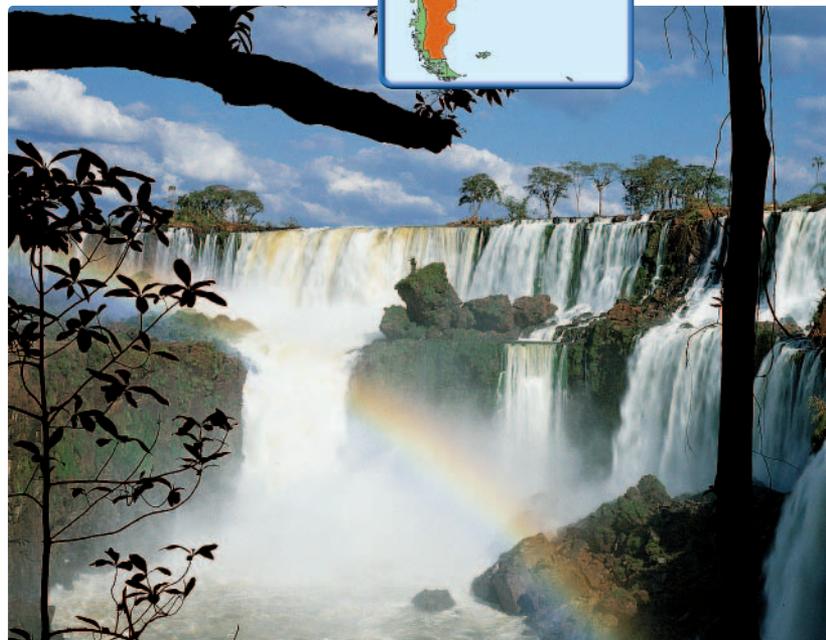
Without both freshwater and saltwater, life on this planet would be impossible. Water not only supports plants and animals, it helps distribute heat on the earth.

OCEANS AND SEAS The ocean is an interconnected body of salt water that covers about 71 percent of our planet. It covers a little more than 60 percent of the Northern Hemisphere and about 81 percent of the Southern Hemisphere. Even though it is one ocean, geographers divide it into four main parts: the Atlantic Ocean, the Pacific Ocean, the Indian Ocean, and the Arctic Ocean, which is sometimes considered part of the Atlantic. The largest of the oceans is the Pacific. The waters near Antarctica are sometimes called the Southern Ocean.

OCEAN MOTION The salty water of the ocean circulates through three basic motions: currents, waves, and tides. Currents act like rivers flowing through the ocean. Waves are swells or ridges produced by winds. Tides are the regular rises and falls of the ocean created by the gravitational pull of the moon or the sun. The motion of the ocean helps distribute heat on the planet. Winds blow over the ocean and are either heated or cooled by the water. When the winds eventually blow over the land, they moderate the temperature of the air over the land.

HYDROLOGIC CYCLE The **hydrologic cycle** is the continuous circulation of water between the atmosphere, the oceans, and the earth. As you can see in

PLACE Iguazu Falls at the Argentina-Brazil border has 275 separate waterfalls varying between 200 and 269 feet high. It is nearly three times wider than Niagara Falls in North America.



The Hydrologic Cycle

A total of approximately 119,000 cubic miles of water evaporates into the atmosphere every year and returns as precipitation—rain or snow.

Evaporation from the land pumps 17,000 cubic miles of water into the atmosphere every year. The water evaporates from the land itself and from plants.

Evaporation from the oceans and other bodies of water sends 102,000 cubic miles of water into the atmosphere.

Some water flows into the underground water table.

SKILLBUILDER: Interpreting Graphics

- 1 MOVEMENT** Does more water evaporate from the land or from the ocean?
- 2 MOVEMENT** How does precipitation falling on the land reach the ocean?

the diagram above, water evaporates into the atmosphere from the surface of the oceans, other bodies of water, and from plants. The water exists in the atmosphere as vapor. Eventually, the vapor cools, condenses, and falls to earth as precipitation—rain or snow. The water soaks into the ground, evaporates to the atmosphere, or flows into rivers to be recycled.

LAKES, RIVERS, AND STREAMS Lakes hold more than 95 percent of all the earth's fresh water supply. The largest freshwater lake is Lake Baikal in Russia. Its volume of water equals 18 percent of all freshwater on earth. Freshwater lakes like the Great Lakes of North America are the result of glacial action thousands of years ago. Saltwater lakes result from changes in the earth's surface that cut off outlets to the sea. Saltwater lakes are created when creeks and rivers carry salts into a lake, and there is no outlet to carry the salt away. The Great Salt Lake in Utah is the remnant of a large freshwater lake—Lake Bonneville. Its water outflows were cut off, causing the remaining water to become more salty as the water evaporated. The largest saltwater lake is the Caspian Sea in Western Asia.

Rivers and streams flow through channels and move water to or from larger bodies of water. Rivers and streams connect into drainage systems that work like the branches of a tree, with smaller branches, called tributaries, feeding into larger and larger ones. Geographers call an area drained by a major river and its tributaries a **drainage basin**.

GROUND WATER Some water on the surface of the earth is held by the soil, and some flows into the pores of the rock below the soil. The water held in the pores of rock is called **ground water**. The level at which the rock is saturated marks the rim of the **water table**. The water table can rise or fall depending on the amount of precipitation in the region and on the amount of water pumped out of the ground.

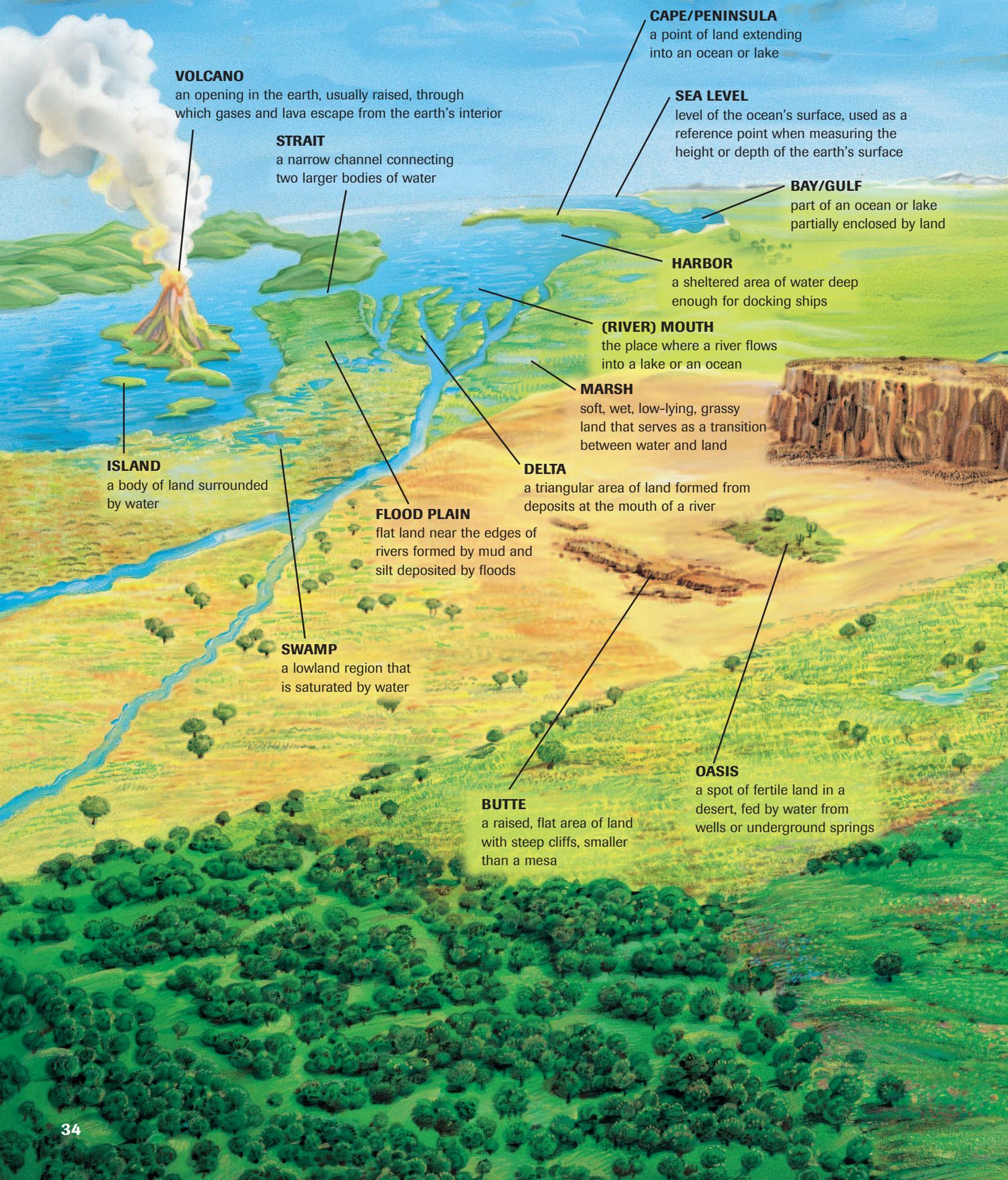
BACKGROUND

Rock layers that store water are called aquifers. The largest U.S. aquifer is the Ogallala Aquifer, which runs from South Dakota south to Texas.

Landforms

Landforms are naturally formed features on the surface of the earth. The diagram on pages 34–35 shows the different kinds of landforms.

Landforms at a Glance



VOLCANO

an opening in the earth, usually raised, through which gases and lava escape from the earth's interior

STRAIT

a narrow channel connecting two larger bodies of water

CAPE/PENINSULA

a point of land extending into an ocean or lake

SEA LEVEL

level of the ocean's surface, used as a reference point when measuring the height or depth of the earth's surface

BAY/GULF

part of an ocean or lake partially enclosed by land

HARBOR

a sheltered area of water deep enough for docking ships

(RIVER) MOUTH

the place where a river flows into a lake or an ocean

MARSH

soft, wet, low-lying, grassy land that serves as a transition between water and land

ISLAND

a body of land surrounded by water

DELTA

a triangular area of land formed from deposits at the mouth of a river

FLOOD PLAIN

flat land near the edges of rivers formed by mud and silt deposited by floods

SWAMP

a lowland region that is saturated by water

OASIS

a spot of fertile land in a desert, fed by water from wells or underground springs

BUTTE

a raised, flat area of land with steep cliffs, smaller than a mesa

PRAIRIE

a large, level area of grassland with few or no trees

MOUNTAIN

natural elevation of the earth's surface with steep sides and greater height than a hill

GLACIER

a large ice mass that moves slowly down a mountain or over land

STEPPE

a wide, treeless grassy plain

VALLEY

low land between hills or mountains

MESA

a wide, flat-topped mountain with steep sides, larger than a butte

PLATEAU

a broad, flat area of land higher than the surrounding land

CATARACT

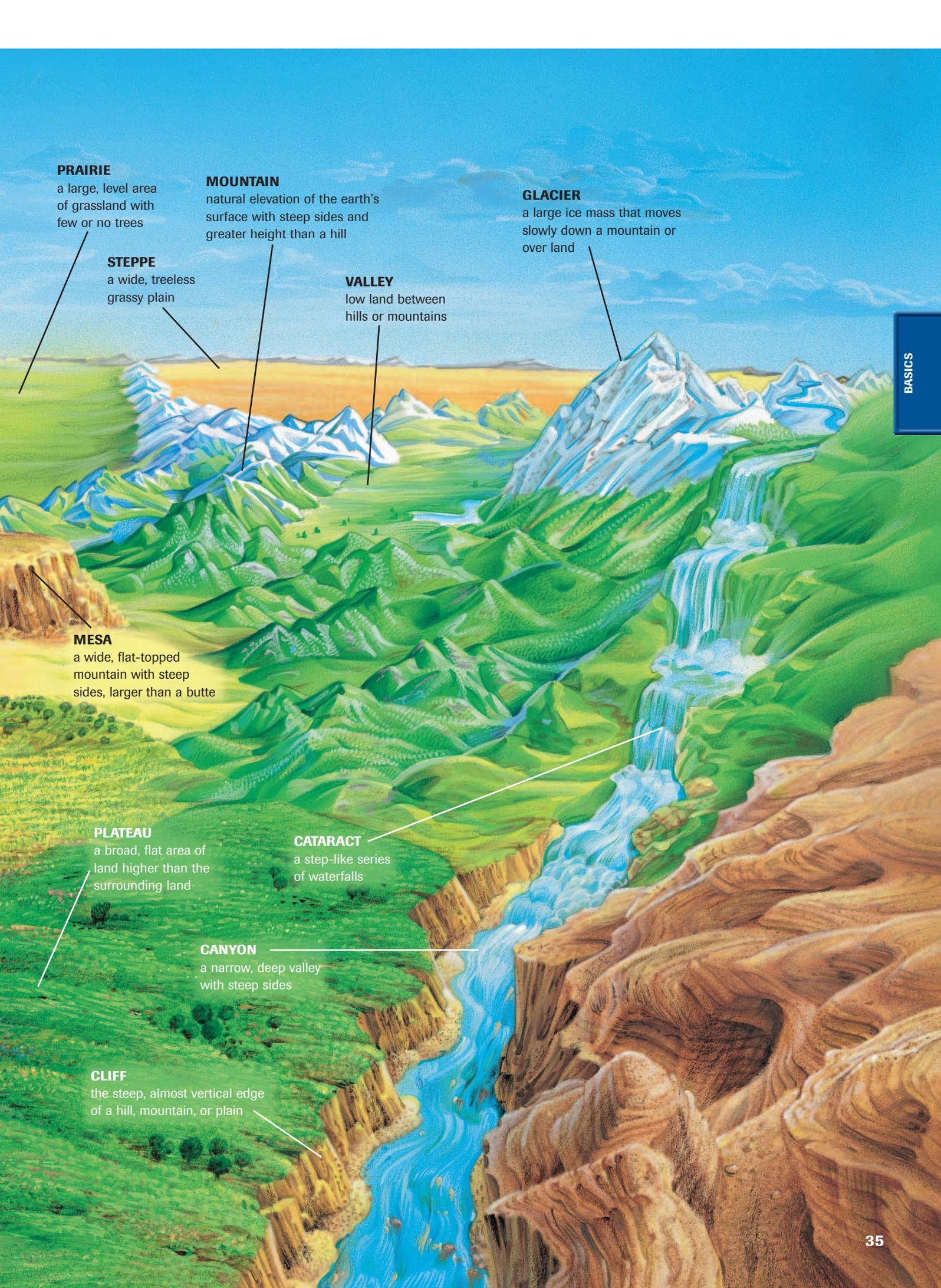
a step-like series of waterfalls

CANYON

a narrow, deep valley with steep sides

CLIFF

the steep, almost vertical edge of a hill, mountain, or plain



5 THEMES

REGION

The Everglades

Native Americans called it Pa-May-Okee (“Grassy Water”). Today, we call it the Everglades. It is a region of wetlands, a marshy landform, that covers 4,000 square miles of Florida. Live oak, palms, and pines cover the region. Saw grass with tiny sharp teeth stands over 10 feet high among cypress. Swampy waters hide snakes, alligators, and turtles. Huge numbers of birds call the Everglades home.

Drainage projects have met with protest because they threaten the plants and animals that flourish there. Plans are now under way to restore the Everglades to its natural habitat.



Everglades National Park

OCEANIC LANDFORMS The sea floor has landforms similar to those above water. The earth’s surface from the edge of a continent to the deep part of the ocean is called the **continental shelf**. The floor of the ocean has ridges, valleys, canyons, and plains. Ridges mark places where new crust is being formed on the edges of the tectonic plates. Mountain chains similar to those on the continents themselves cover parts of the ocean floor. The longest continuous range is the Mid-Atlantic Ridge, which extends for thousands of miles north to south through the middle of the Atlantic Ocean. Islands dot the ocean surface. Islands can be formed by volcanic action, deposits of sand, or deposits of coral skeletons.

CONTINENTAL LANDFORMS To understand the types of landforms, study the illustration on pages 34–35. The major geographic feature that separates one type of landform from another is relief. **Relief** is the difference in elevation of a landform from its lowest point to its highest point. There are four categories of relief: mountains, hills, plains, and plateaus. A mountain, for instance, has great relief compared with a plain, which displays very little difference between its high and low points. **A**

Topography is the combination of the surface shape and composition of the landforms and their distribution in a region. A topographic map shows the landforms with their vertical dimensions and their relationship to other landforms.

In the next section, you will learn how internal forces of the earth help to build and change the landforms on the earth—and how those forces affect humans.



Using the Atlas

A Use the map on page A10 to determine the relief of your state.

SECTION 2 Assessment

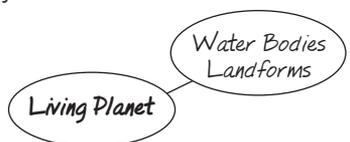
1 Places & Terms

Explain the meaning of each of the following terms.

- hydrologic cycle
- ground water
- continental shelf
- relief
- topography

2 Taking Notes

MOVEMENT Review the notes you took for this section.



- How does the hydrologic cycle circulate water?
- How does ocean water circulate?

3 Main Ideas

- How do the winds and the ocean distribute heat on the earth’s surface?
- How are relief and topography related?
- How are islands formed?

4 Geographic Thinking

Making Comparisons How is the floor of the ocean similar to land above sea level? **Think about:**

- mountain chains
- other landforms

S See Skillbuilder Handbook, page R3.



SEEING PATTERNS Study the Landforms at a Glance diagram on pages 34–35. Choose a part of it to reproduce in a three-dimensional **relief map**. Be sure to label the landforms clearly.