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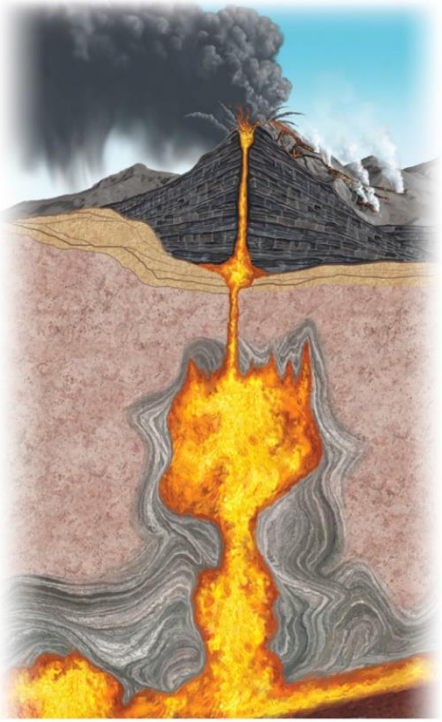
Chapter Wrap-Up



THE BIG IDEA

How can you describe Earth?

Get Ready

What do you think?

Before you begin, decide if you agree or disagree with each of these statements. As you view this presentation, see if you change your mind about any of the statements.

Get Ready

Do you agree or disagree?

1. Earth is a simple system made of rocks.
2. Most of Earth is covered by one large ocean.
3. Earth's interior is made of distinct layers.

Get Ready

Do you agree or disagree?

4. The water cycle begins in the ocean.
5. Earth's air contains solids, liquids, and gases.
6. Rocks are made of minerals.

Lesson 1

Earth Systems

Key Concepts

- What are the composition and the structure of the atmosphere?
- How is water distributed in the hydrosphere?
- What are Earth's systems?
- What are the composition and the structure of the geosphere?

Lesson 1

Earth Systems

Vocabulary

- biosphere
- atmosphere
- hydrosphere
- cryosphere
- groundwater
- geosphere
- mineral
- rock

What is Earth?

- Scientists divide Earth into systems to help them better understand the planet.
- The outermost Earth system is an invisible layer of gases that surrounds the planet.
- Below the layer of gases are the systems that contain Earth's water.

What is Earth? (cont.)

- The next system is the solid part of Earth, which contains a thin layer of soil covering a rocky center.
- The Earth system that contains all living things is the **biosphere**.

The Atmosphere

Earth's gravity pulls gases into a layer surrounding the planet. This layer is called the **atmosphere**.

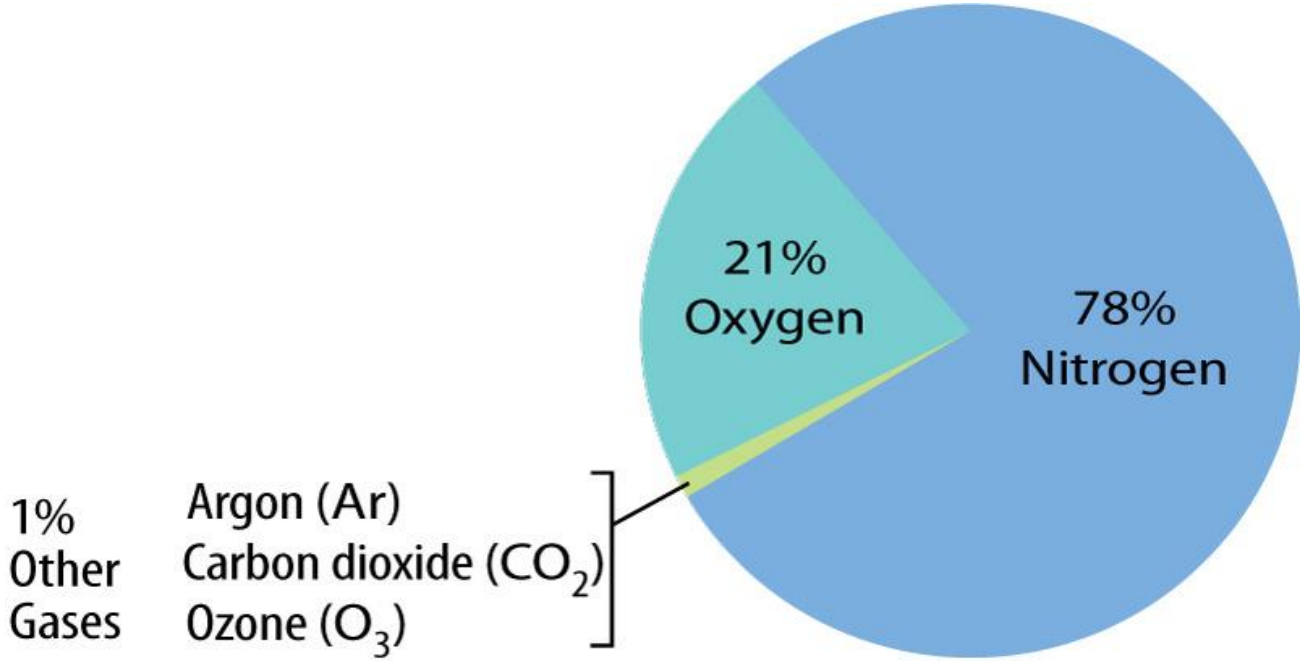
Word Origin

atmosphere

from Greek *atmos*-, means "vapor"; and Greek *spharia*, means "sphere"

The Atmosphere (cont.)

The atmosphere contains a mixture of nitrogen, oxygen, and smaller amounts of other gases.



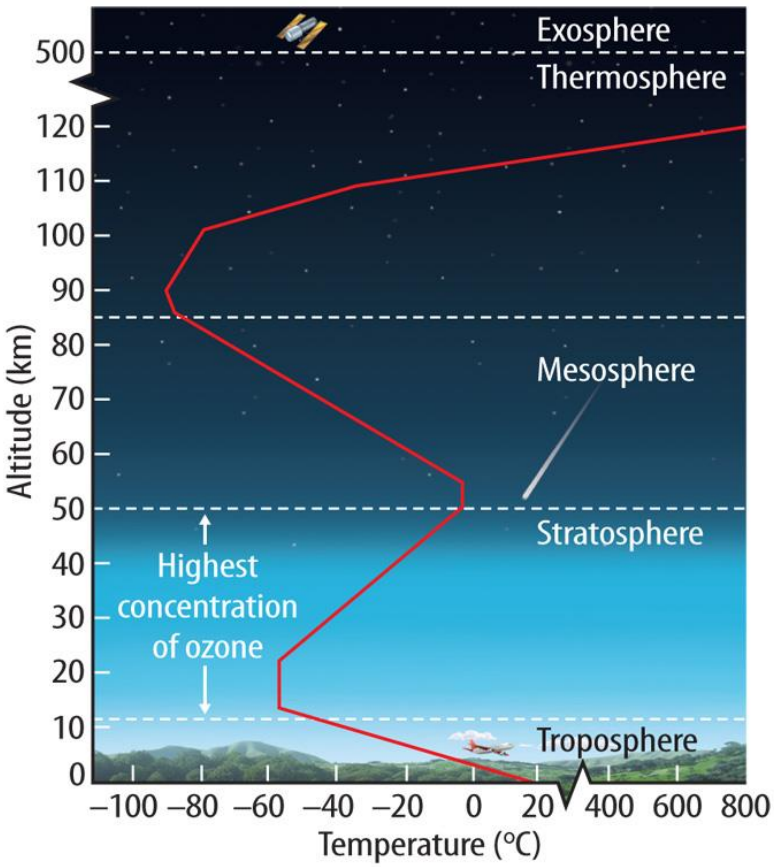
The Atmosphere (cont.)

Key Concept Check

What is the composition of the atmosphere?

The Atmosphere (cont.)

Thermal energy from the Sun heats the atmosphere; however, different parts of the atmosphere absorb or reflect this heat in different ways.



Get Animated

The Atmosphere (cont.)

- In the bottom layer of the atmosphere, called the troposphere, temperature decreases as you move upward from Earth's surface. Gases flow and swirl in the troposphere, causing weather.
- The stratosphere is above the troposphere. In the stratosphere, gases are more stable and form flat layers.

The Atmosphere (cont.)

- The mesosphere is above the stratosphere. In the mesosphere, the air temperature decreases with increasing altitude.
- Temperatures increase again as you move further from Earth's surface through the next layer, the thermosphere.
- The outer layer of Earth's atmosphere is the exosphere.

The Atmosphere (cont.)

Key Concept Check

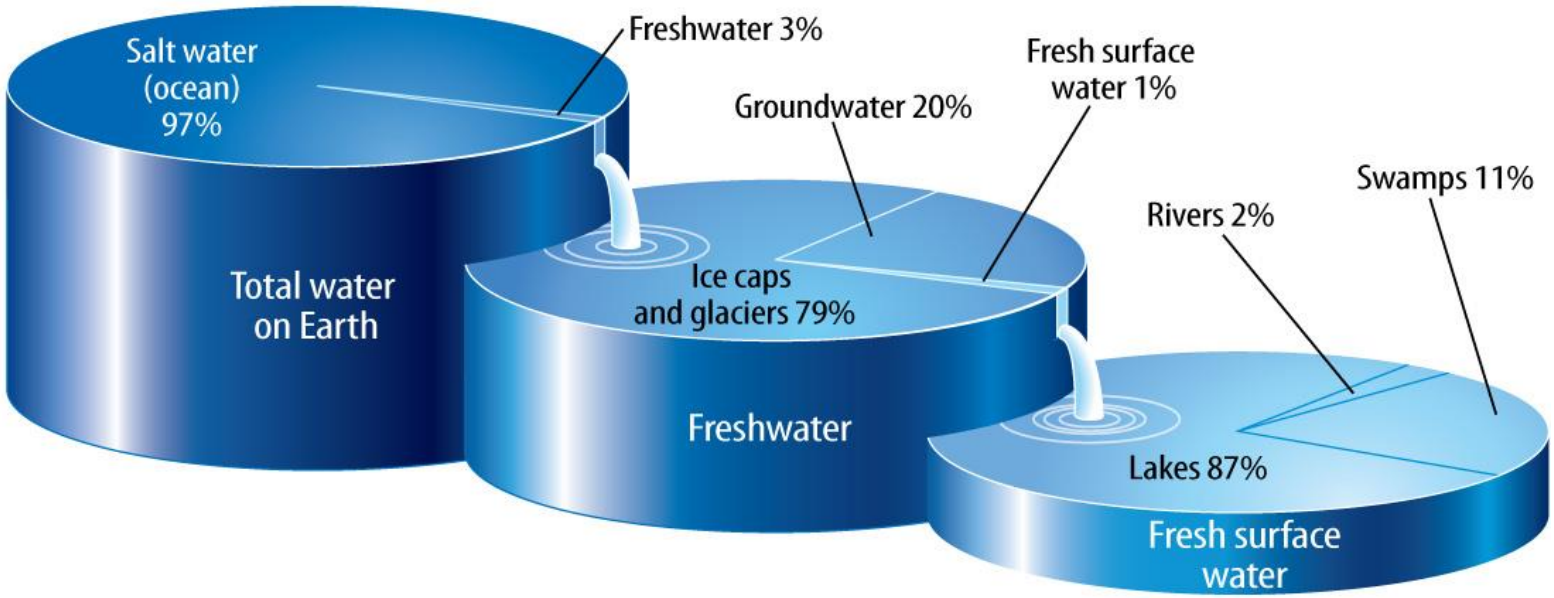
What are the layers of the atmosphere?

The Hydrosphere

- The system containing all Earth's water is called the **hydrosphere**.
- The water in the hydrosphere changes state and is found as a liquid, a solid, and a gas on Earth.

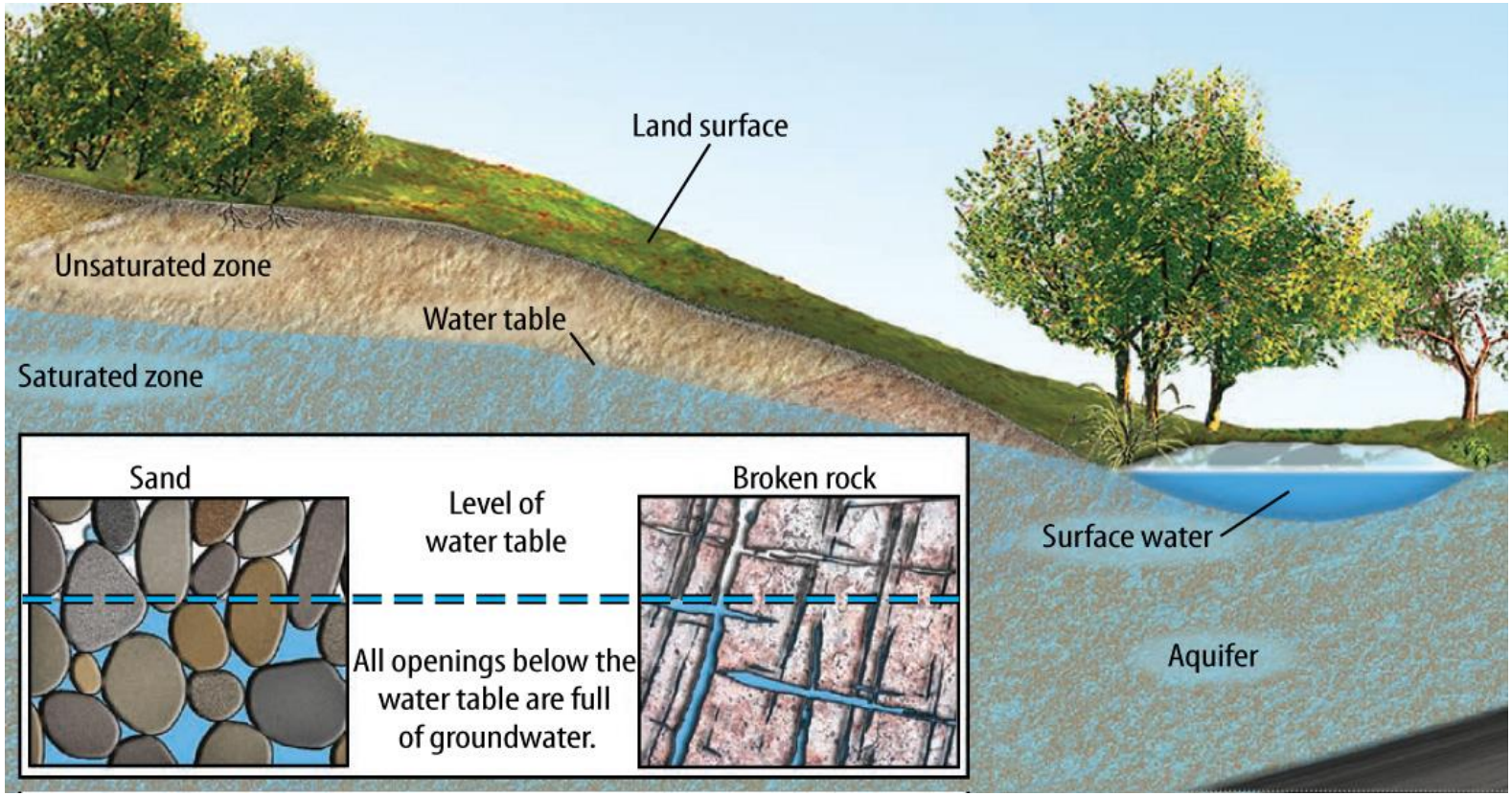
The Hydrosphere (cont.)

About 97 percent of Earth's water is in the ocean.



The Hydrosphere (cont.)

Groundwater is water that is stored in cracks and pores beneath Earth's surface.



The Hydrosphere (cont.)

KEY CONCEPT CHECK

How is water distributed in the hydrosphere?

The Cryosphere

- The frozen portion of water on Earth's surface is called the **cryosphere**.
- The cryosphere consists of snow, glaciers, and icebergs.
- About 79 percent of the planet's freshwater is in the cryosphere.

The Geosphere

- The **geosphere** is the solid part of Earth, which includes a thin layer of soil and broken rock material along with the underlying layers of rock.
- **Minerals** are naturally occurring, inorganic solids that have crystal structures and definite chemical compositions.

The Geosphere (cont.)

KEY CONCEPT CHECK

What are Earth systems?

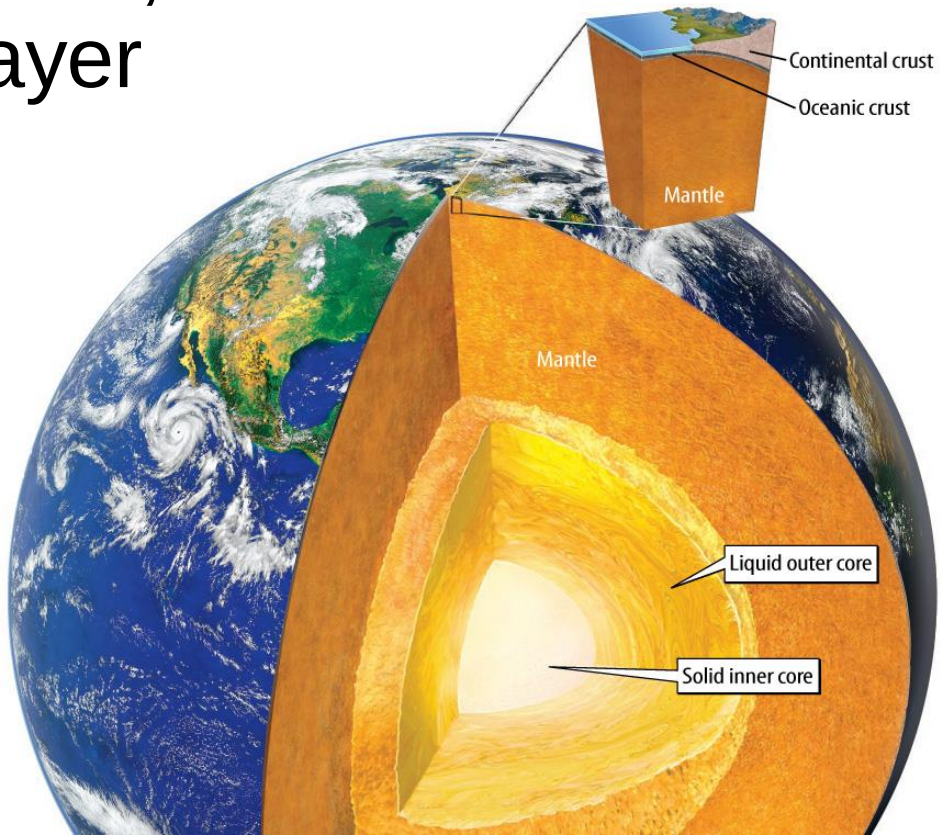
- A **rock** is a naturally occurring solid composed of minerals and sometimes other materials such as organic matter.
- There are three major rock types: igneous, sedimentary, and metamorphic.

The Geosphere (cont.)

- Igneous rocks form when molten material, called magma, cools and then hardens.
- Sedimentary rocks form when forces such as water, wind, and ice break down rocks into small pieces called sediment.
- Metamorphic rocks form when extreme temperatures and pressure within Earth change existing rocks into new rocks.

The Geosphere (cont.)

The three basic layers of the geosphere are the crust, mantle, and core. Each layer has a different composition.



The Geosphere (cont.)

- The crust is the brittle outer layer of the geosphere. It is much thinner than the inner layers and is made of rock.
- The middle and largest layer of the geosphere is the mantle, made of rocks that are hotter and denser than those in the crust.
- The center of Earth is the core, made mostly of metal iron and small amounts of nickel.

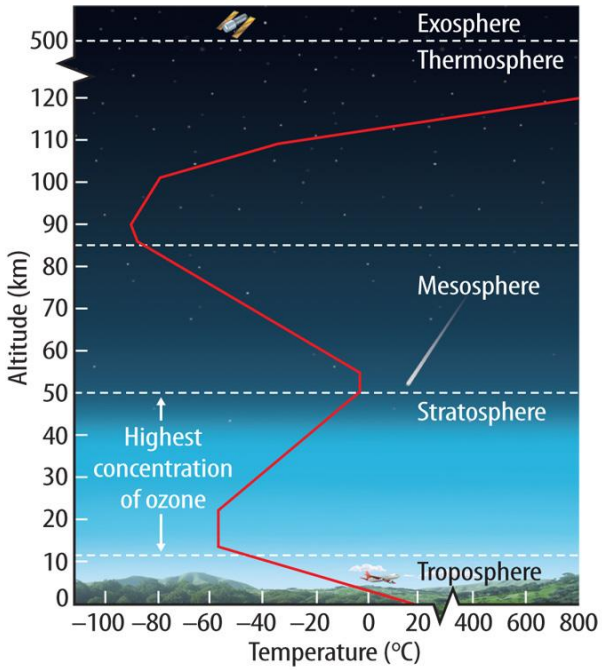
The Geosphere (cont.)

Key Concept Check

What are the composition and the structure of the geosphere?

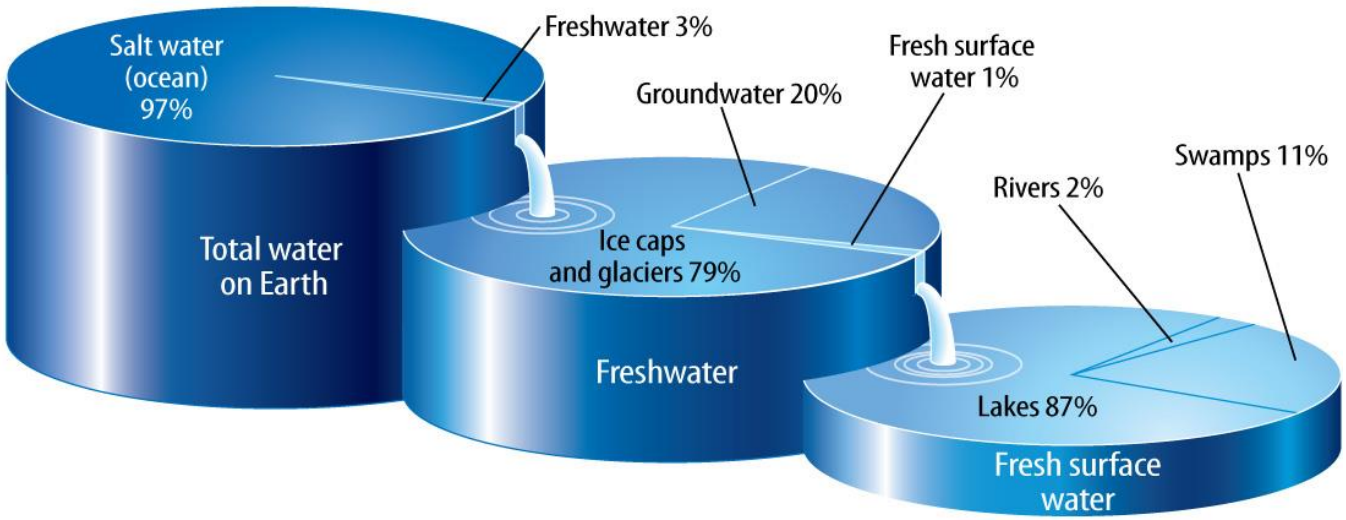
Summary

- Earth is made of four interacting systems: the atmosphere, the hydrosphere, the geosphere, and the biosphere.
- The atmosphere is made mainly of gases and has a layered structure. The geosphere is made of rock, soil, and metal and also has a layered structure.



Summary

- Most water in the hydrosphere is in the world ocean.



Lesson Review

What is the name for the mixture of gases that form a layer around Earth?

A. biosphere

B. atmosphere

C. hydrosphere

D. thermosphere

Lesson Review

What term refers to the water that is stored in cracks and pores beneath Earth's surface?

A. groundwater

B. hydrosphere

C. minerals

D. none of the above

Lesson Review

Which of these describes a naturally occurring solid composed of minerals and sometimes other materials such as organic matter?

A. geosphere

B. minerals

C. crust

D. rocks

Lesson Review

What do you think NOW?

Do you agree or disagree?

1. Earth is a simple system made of rocks.
2. Most of Earth is covered by one large ocean.
3. Earth's interior is made of distinct layers.

Lesson 2

Interactions of Earth Systems

Key Concepts

- How does the water cycle show interactions of Earth systems?
- How does weather show interactions of Earth systems?
- How does the rock cycle show interaction of Earth systems?

Lesson 2

Interactions of Earth Systems

Vocabulary

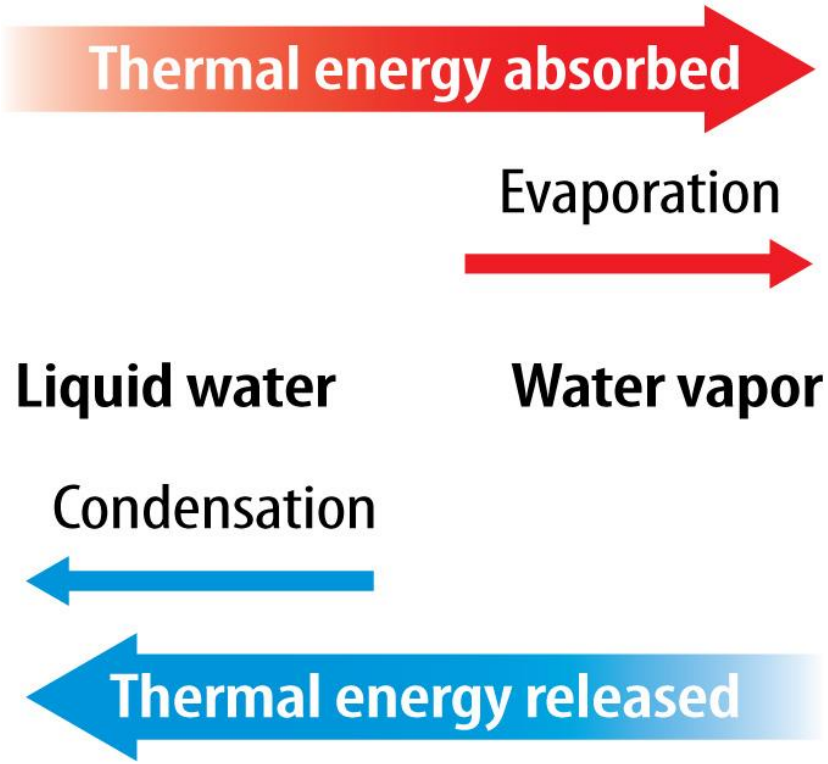
- water cycle
- evaporation
- transpiration
- condensation
- precipitation
- weather
- climate
- rock cycle
- uplift

The Water Cycle

- The **water cycle** is the continuous movement of water on, above, and below Earth's surface.
- The Sun provides the energy that drives the water cycle and moves water from place to place.
- Water can change state to a gas or a solid and then back again to a liquid.

The Water Cycle (cont.)

Thermal energy is released or absorbed when water changes state.

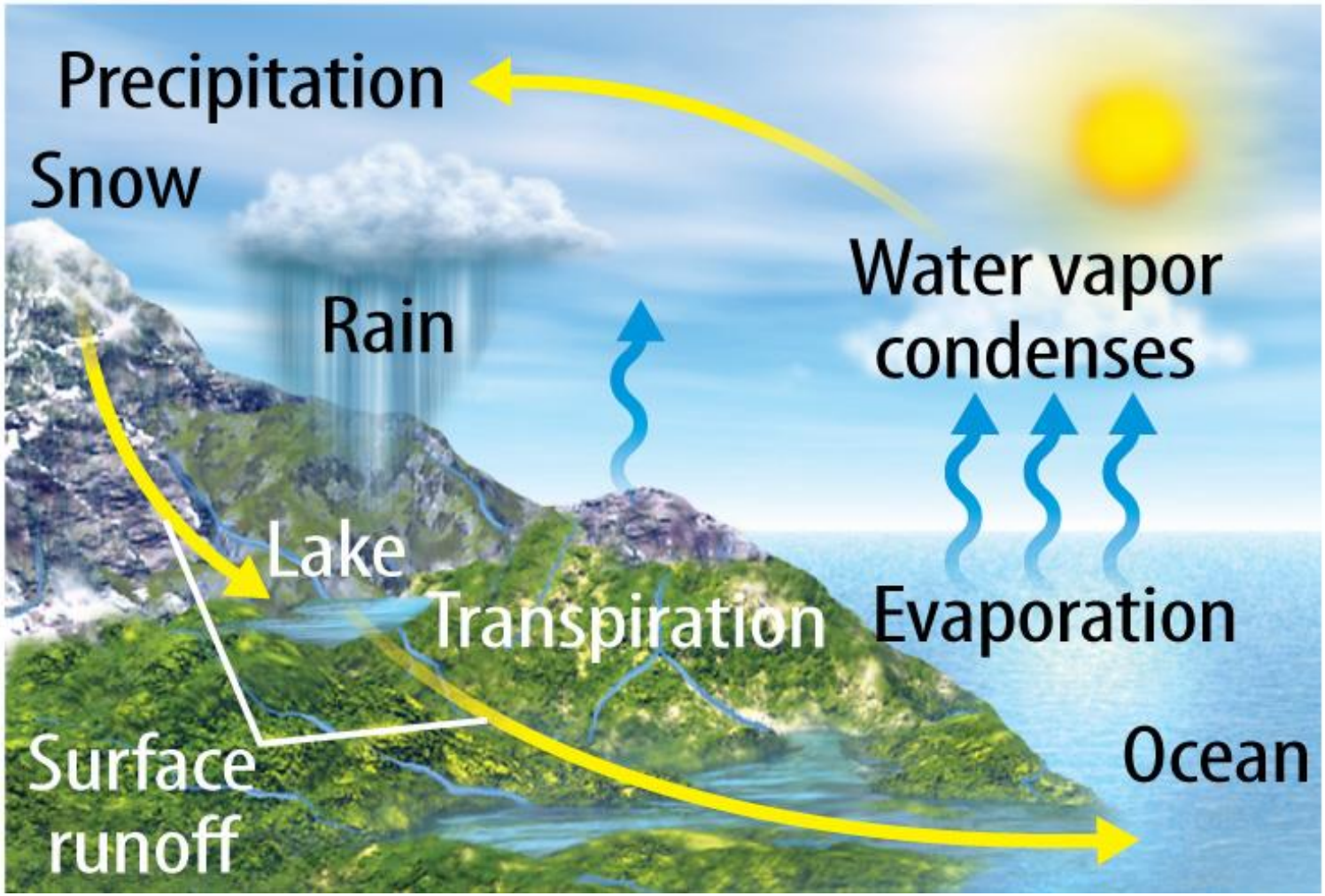


The Water Cycle (cont.)

- **Evaporation** is the process by which a liquid, such as water, changes into a gas.
- **Transpiration** is the process by which plants release water vapor through their leaves.
- Some water vapor also comes from organisms through cellular respiration.

The Water Cycle (cont.)

Get Animated



The Water Cycle (cont.)

- The process by which a gas changes to a liquid is **condensation**.
- Moisture that falls from clouds to Earth's surface is **precipitation**.

The Water Cycle (cont.)

WORD ORIGIN

precipitation

from Latin *praecipitationem*, means “act or fact of falling headlong”

The Water Cycle (cont.)

Key Concept Check

How do Earth systems interact in the water cycle?

Changes in the Atmosphere

- **Weather** is the state of the atmosphere at a certain time and place.
- Weather is influenced by conditions in the geosphere and the hydrosphere.

Changes in the Atmosphere (cont.)

Scientists describe weather using air temperature and pressure, wind speed and direction, and humidity.

Day		Night	
High 54°F		Low 37°F	
Partly cloudy	Chance of precipitation 40%	Rain	Chance of precipitation 80%
Wind:	N 11 mph	Wind:	NE 10 mph
Humidity:	69%	Humidity:	90%
UV index:	3 Moderate		

Changes in the Atmosphere (cont.)

SCIENCE USE V. COMMON USE

pressure

Science Use the force exerted over an area

Common Use the burden of physical or mental distress

Changes in the Atmosphere (cont.)

KEY CONCEPT CHECK

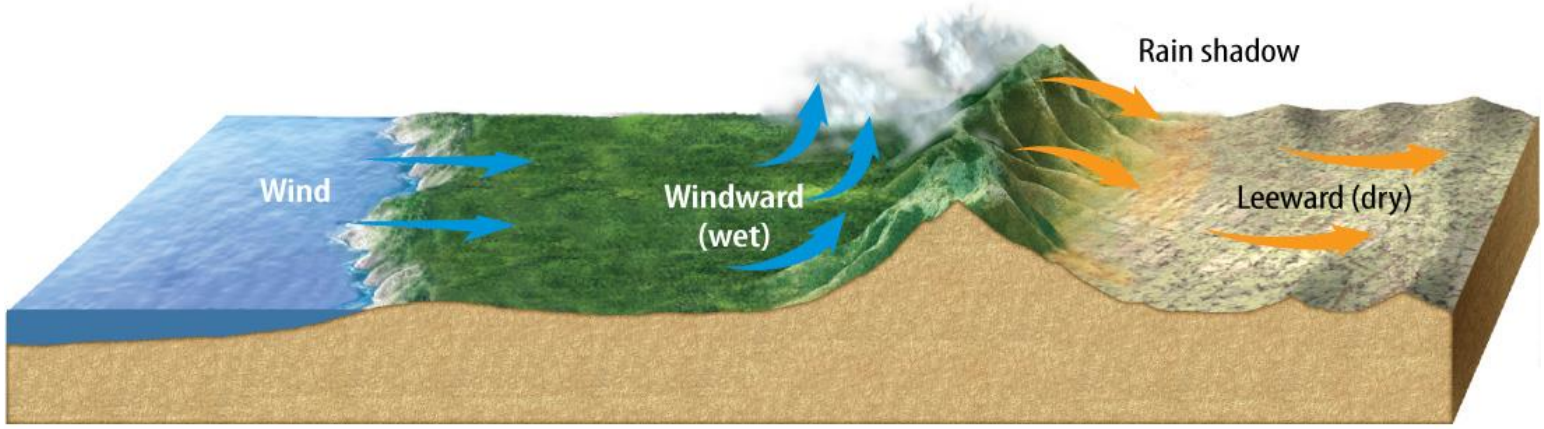
How does weather show interactions of Earth systems?

Changes in the Atmosphere (cont.)

- **Climate** is the average weather pattern for a region over a long period of time.
- As wind blows over an ocean, it creates surface currents that transport the thermal energy in water from place to place.

Changes in the Atmosphere (cont.)

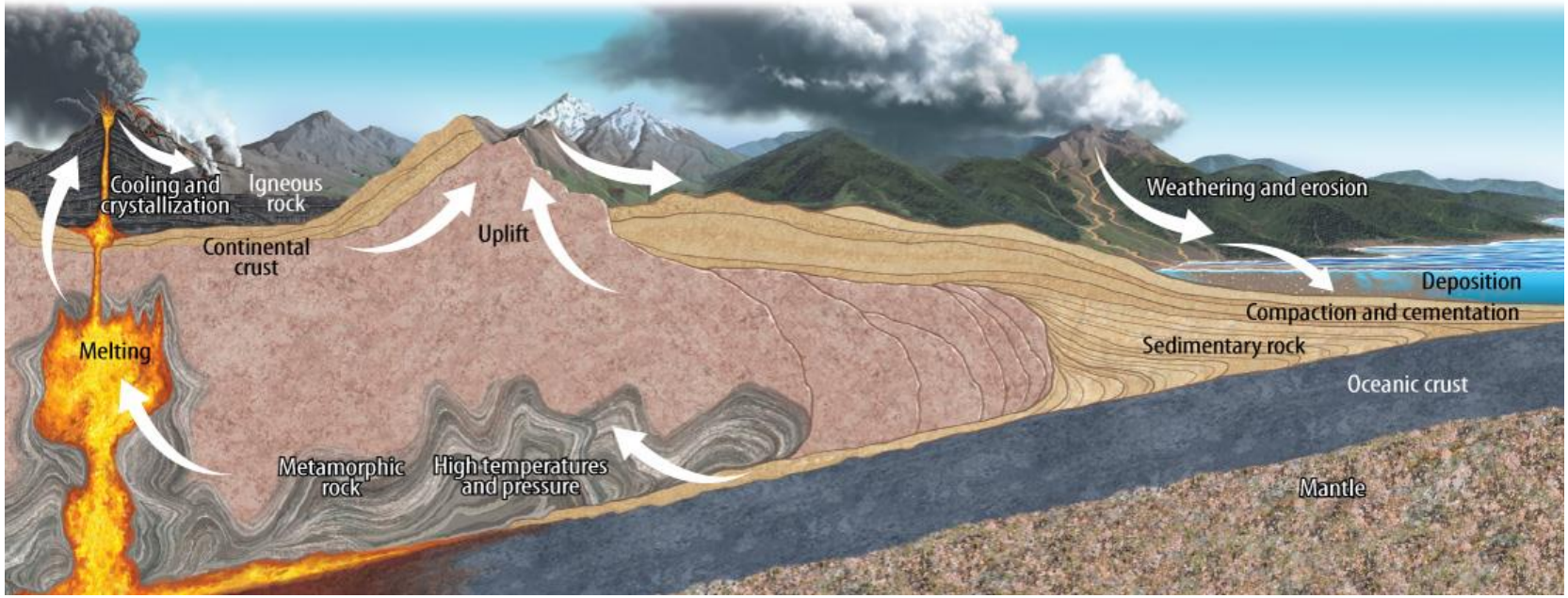
Mountains can affect the amount of precipitation an area receives—a phenomenon known as the rain-shadow effect.



The Rock Cycle

- The **rock cycle** is the series of processes that transport and continually change rocks into different forms.
- As rocks move through the rock cycle, they might become igneous rocks, sedimentary rocks, or metamorphic rocks.
- **Uplift** is the process that moves large bodies of earth materials to higher elevations.

The Rock Cycle (cont.)



Get Animated

The Rock Cycle (cont.)

- Rocks on earth's surface are exposed to the atmosphere, the hydrosphere, the cryosphere, and the biosphere.
- Glaciers, wind, and rain break down rocks into sediment through a process called weathering.
- Eroded sediments are deposited, forming layers of sediment.

The Rock Cycle (cont.)

- As more layers of sediment are deposited, compaction and cementation produces sedimentary rocks.
- Metamorphic rocks form when rocks are subjected to high temperatures and pressure, usually far beneath Earth's surface.

The Rock Cycle (cont.)

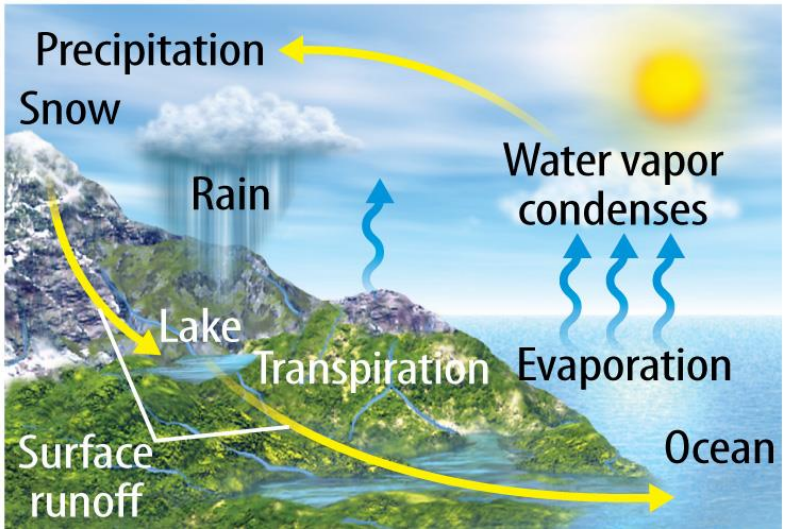
Earth's systems interact and function together as one unified system—planet Earth.

Key Concept Check

How do Earth systems interact in the rock cycle?

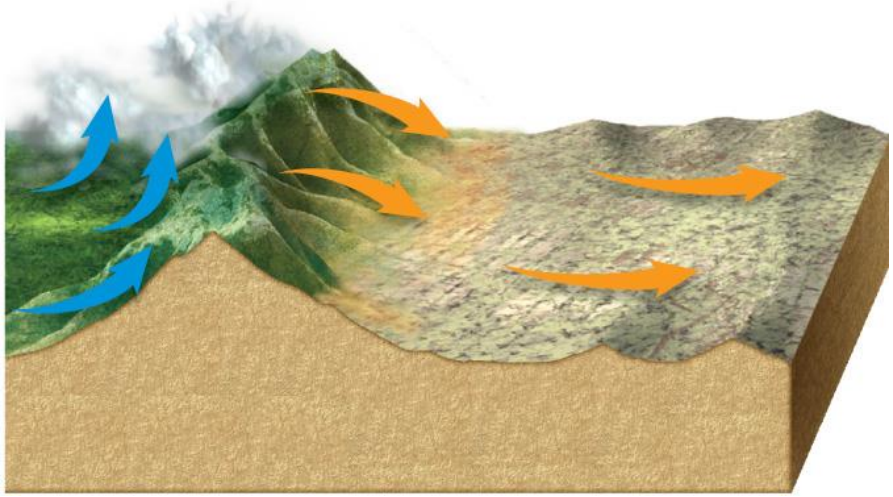
Summary

- In the water cycle, water continually moves through the hydrosphere, the cryosphere, the atmosphere, the geosphere, and the biosphere.



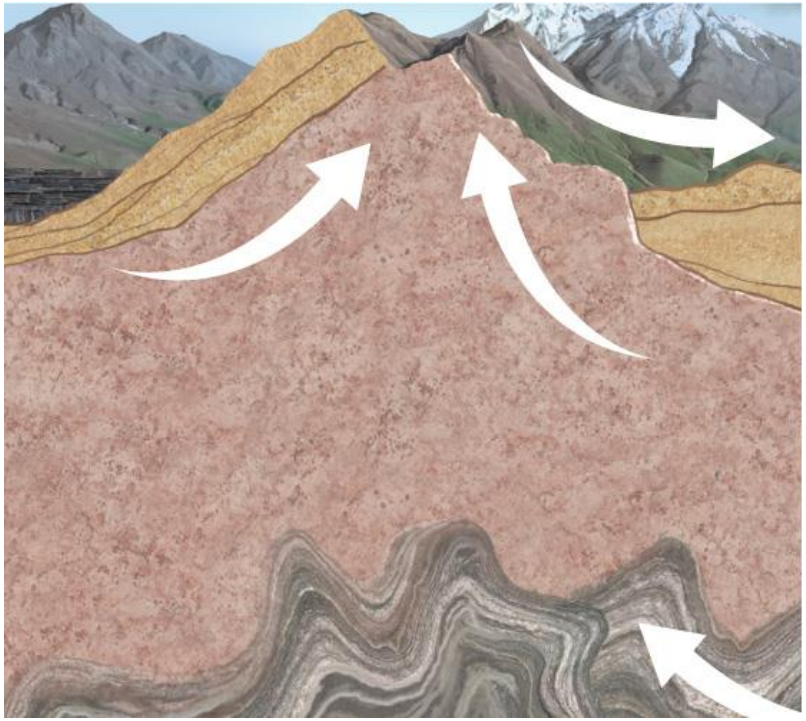
Summary

- Weather and climate are influenced by interactions between the atmosphere and the other Earth systems.



Summary

- In the rock cycle, rocks continually change from one form to another.



Lesson Review

What is the term for moisture that falls from clouds to Earth's surface?

A. condensation

B. evaporation

C. precipitation

D. transpiration

Lesson Review

Which of these is the term for the average weather pattern for a region over a long period of time?

A. climate

B. precipitation

C. rain shadow

D. weather

Lesson Review

Which of these is the series of processes that transport and continually change rocks into different forms?

A. rock cycle

B. uplift

C. transpiration

D. water cycle

Lesson Review

What do you think NOW?

Do you agree or disagree?

4. The water cycle begins in the ocean.
5. Earth's air contains solids, liquids, and gases.
6. Rocks are made of minerals.

Menu

Key Concept Summary

Interactive Concept Map

Chapter Review

Standardized Test Practice

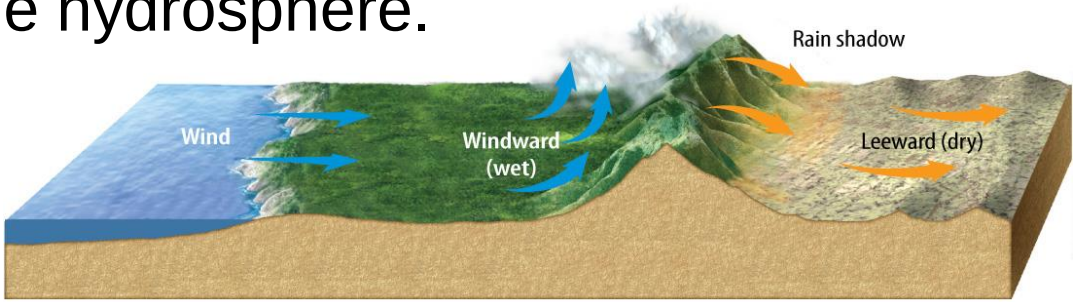
Earth is a constantly evolving system with dynamic interactions between the biosphere, atmosphere, hydrosphere, cryosphere, and geosphere that are driven by internal and external energy processes.

Lesson 1: Earth Systems

- Earth is made of the biosphere, the atmosphere, the hydrosphere, the cryosphere, and the geosphere.
- The atmosphere has a layered structure that includes the troposphere, the stratosphere, the mesosphere, the thermosphere, and the exosphere. It is made of nitrogen, oxygen, and trace gases.
- Water is found on Earth in oceans, lakes, and rivers and as ice and groundwater.
- The geosphere is made of soil, metal, and rock. It has a layered structure that includes the crust, the mantle, and the core.

Lesson 2: Interactions of Earth Systems

- The water cycle shows how water moves between reservoirs of the hydrosphere, the atmosphere, the geosphere, and the biosphere.
- Weather and climate are influenced by transfers of water and energy among the atmosphere, the geosphere, and the hydrosphere.



- Rocks continually change form as they move through the rock cycle. Processes such as weathering and erosion are examples of interactions among Earth systems.

Chapter Review

What type of rocks form when extreme temperatures and pressure within Earth change existing rocks into new rocks?

A. glacial

B. igneous

C. metamorphic

D. sedimentary

Chapter Review

Which is the solid part of Earth that includes a thin layer of soil and broken rock over underlying rock layers?

A. atmosphere

B. geosphere

C. hydrosphere

D. minerals

Chapter Review

About what percent of Earth's water is in the ocean?

A. 5 percent

B. 20 percent

C. 75 percent

D. 97 percent

Chapter Review

What term describes the continuous movement of water on, above, and below Earth's surface?

A. evaporation

B. water cycle

C. transpiration

D. weather

Chapter Review

By which process does a gas change to a liquid?

A. evaporation

B. transpiration

C. condensation

D. precipitation

Standardized Test Practice

Which of these is the bottom layer of the atmosphere?

A. exosphere

B. stratosphere

C. thermosphere

D. troposphere

Standardized Test Practice

What term refers to the system containing all Earth's water?

A. groundwater

B. geosphere

C. hydrosphere

D. atmosphere

Standardized Test Practice

Which Earth system contains all living things?

A. atmosphere

B. biosphere

C. hydrosphere

D. geosphere

Standardized Test Practice

Which of these refers to the state of the atmosphere at a certain time and place?

A. climate

B. weather

C. water cycle

D. precipitation

Standardized Test Practice

By which process do large bodies of earth materials move to higher elevations?

A. rock cycle

B. transpiration

C. uplift

D. water cycle