



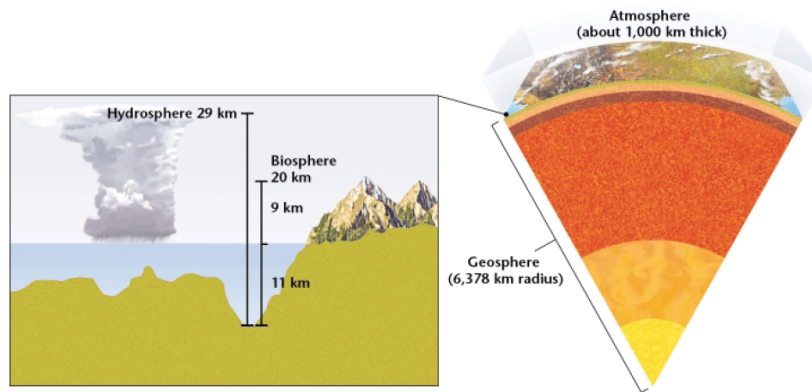
The Dynamic Earth



Section 1: The Geosphere

The Earth as a System

- The Earth is an integrated system that consists of _____, _____, _____, and _____ that all interact with each other.
- Scientists divided this system into four parts:
 - The _____ (*rock*)
 - The _____ (*air*)
 - The _____ (*water*)
 - The _____ (*living things*)

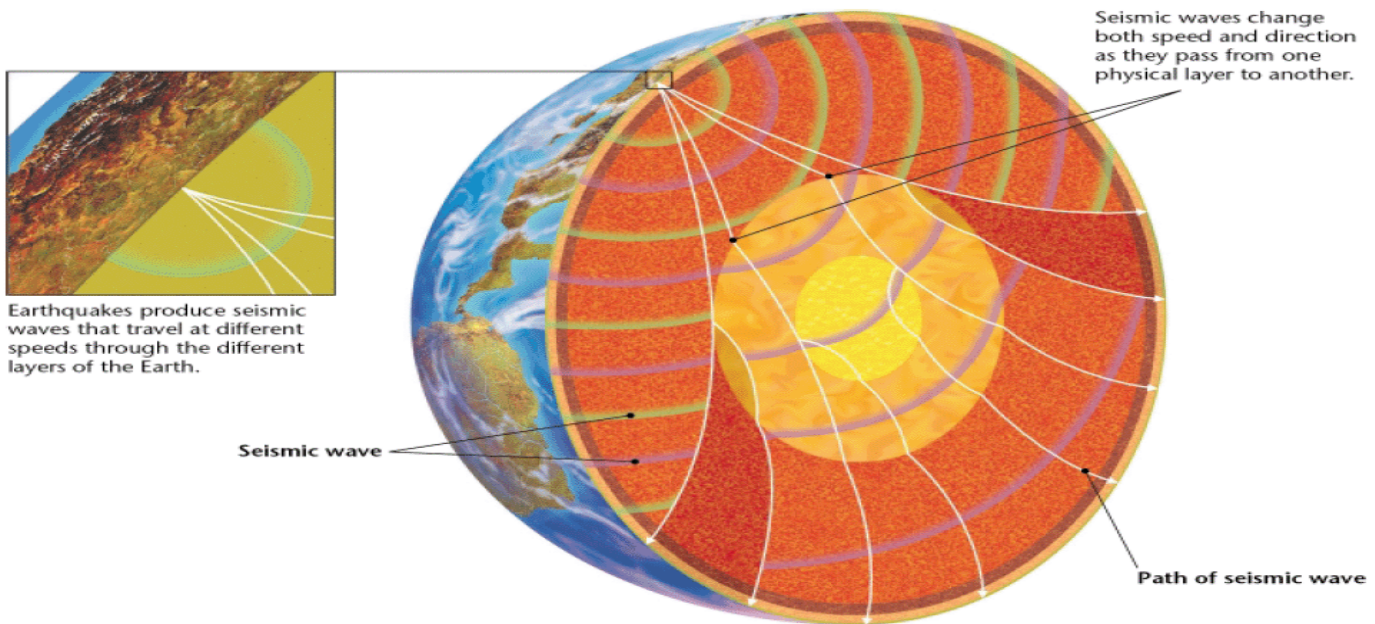


- The **geosphere** is _____ of the Earth that extends from the center of the core to the surface of the crust.
- The atmosphere is the _____.
- Nearly all of these gases are found in the first 30 km above the Earth's surface.
- The hydrosphere makes up _____.
- Much of this water is in the _____, which cover nearly _____ of the globe.
- However, water is also found in the atmosphere, on land, and in the soil.

- The biosphere is the _____.
- It is a _____ at the Earth's surface that extends from about 9 km above the Earth's surface down to the bottom of the ocean.
- The biosphere is therefore made up of parts of the geosphere, the atmosphere, and the hydrosphere.

Discovering Earth's Interior

- Scientists use _____ to learn about Earth's interior.
- Seismic waves are the same waves that travel through Earth's interior during an _____.
- A similar process would be you _____.



The Composition of the Earth

- Scientists divide the Earth into three layers:
 - The _____
 - The _____
 - The _____
- The **crust** is the _____ of the Earth above the mantle.
- It is the _____, and makes up less than 1 percent of the planet's mass.
- It is 5 km to 8 km thick beneath the oceans and is 20 km to 70 km thick beneath the continents.

- The **mantle** is the _____ between the Earth's crust and core. It makes up 64 percent of the mass of the Earth.
- The **core** is the _____ of the Earth below the mantle, and is composed of the densest elements.

Plate Tectonics

- **Tectonic plates** are _____ that consist of the crust and the rigid, outermost part of the mantle and glide across the underlying asthenosphere.
- The _____ and move around with them.
- The major tectonic plates include the _____, _____, _____, _____, and _____.

Plate Boundaries

- Tectonic plates may _____, _____, or _____ past one another.
- Enormous forces are generated with these actions causing _____, _____, and _____ along the plate boundaries.

Plate Tectonics and Mountain Building

- Where plates collide, the crust becomes _____ and eventually forms _____, such as the _____ Mountains.

Earthquakes

- A fault is a _____ along which blocks of the crust slide relative to one another.
- When _____ that are under stress _____ along a fault, a series of _____, known as _____, is set off.
- Earthquakes are _____. Many are so small that we cannot feel them, but some are enormous movements of the Earth's crust that cause widespread damage.

Where do Earthquakes Occur?

- The majority of earthquakes take place at or near _____ because of the enormous stresses that are generated when tectonic plates _____, _____ or _____ past each other.
- Over the past 15 million to 20 million years, large numbers of earthquakes have occurred along the _____ in _____, where parts of the _____ plate and the _____ plate are slipping past one another.

Volcanoes

- A volcano is a _____

- Volcanoes are often located _____

- The _____ of the world's active volcanoes on land are located along _____

Global Effects of Volcanic Eruptions

- Major volcanic eruptions can _____
- In large eruptions, _____

- The _____ can cause a _____ in the average global surface temperature.

Erosion

- The Earth's surface is continually battered by wind and scoured by running water, which moves rocks around and changes their appearance.

- **Erosion** _____

- Erosion _____
_____ mountains are therefore _____ than _____ ones.

Water Erosion

- Erosion by both rivers and oceans can produce dramatic changes on Earth's surface.
- Waves from ocean storms can _____
- Over time, rivers can _____
- Wind also changes the landscape of the planet.
- In places where few plants grow, such as beaches and deserts, _____
- _____, such as _____, erode more easily than _____, such as _____ do.

Section 2: The Atmosphere

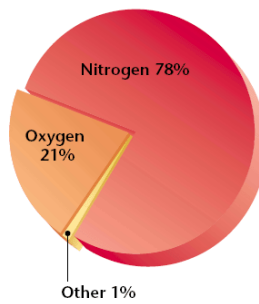
The Atmosphere

- The **atmosphere** is a _____, such as Earth.
- _____ are all parts of this mixture.
- Gases can be added to and removed from the atmosphere through living organisms. For example, animals _____ and add _____ dioxide when they _____.
- _____
- The atmosphere also _____.

- This insulation _____ and keeps Earth temperature at which living things can survive.

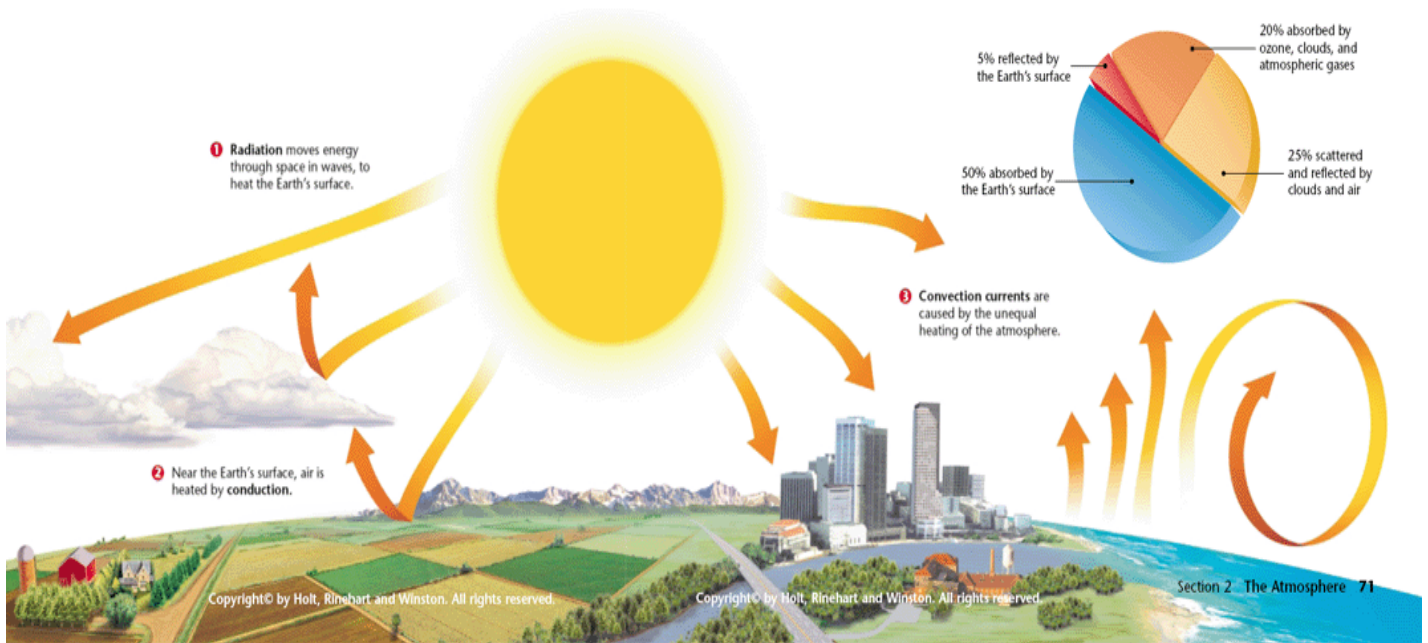
Composition of the Atmosphere

- Nitrogen makes up _____ of the Earth's atmosphere, and enters the atmosphere when volcanoes erupt and when dead plants and animals decay.
- _____
- In addition to gases, the atmosphere contains many types of tiny, solid particles, or atmospheric dust.



Energy Transfer in the Atmosphere

- **Radiation** is the _____
- **Conduction** _____
- **Convection** is the _____

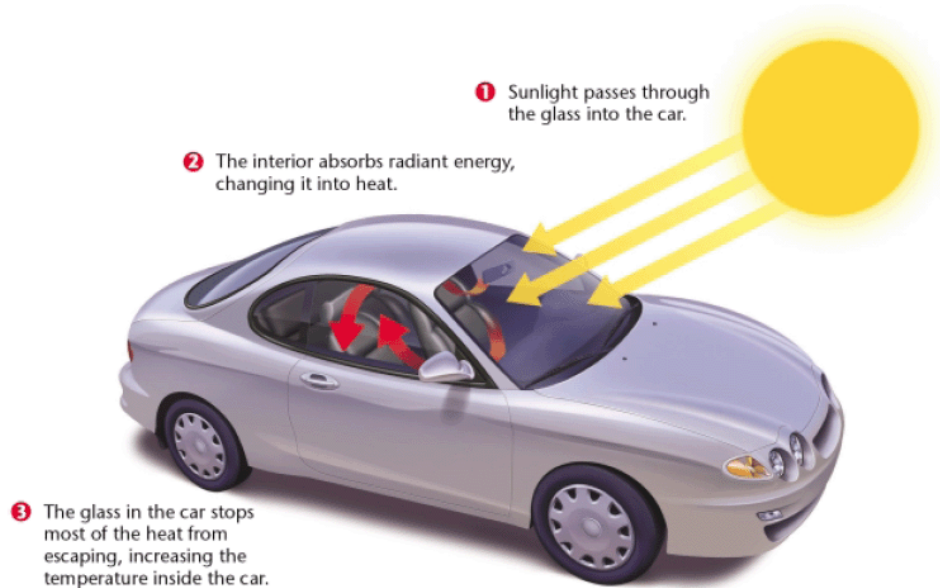


Heating of the Atmosphere

- Solar energy reaches the Earth as _____, which includes visible light, infrared radiation, and ultraviolet light.
- About half of the solar energy that enters the atmosphere passes through it and reaches the Earth's surface, while the rest of the energy is absorbed or reflected in the atmosphere by clouds, gases, and dust or it is reflected by Earth's surface.
- The Earth does not continue to get warmer because _____.
- Dark-colored objects absorb _____ solar radiation than light-colored objects, so _____.
- This is one reason the _____ that the temperature in the surrounding countryside.

The Greenhouse Effect

- The **greenhouse effect** is the _____.
- Without the greenhouse effect, _____.



- The gases in the atmosphere that trap and radiate heat are called _____.
- The most abundant greenhouse gases are _____, although none exist in high concentrations.
- The quantities of carbon dioxide and methane in the atmosphere vary considerably as a result of natural and industrial processes.

Section 3: The Hydrosphere and Biosphere

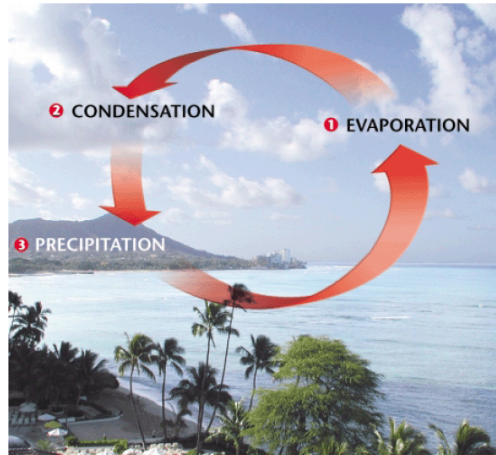
The Hydrosphere

- The hydrosphere includes _____.
- This includes water in the _____.

The Water Cycle

- The **water cycle** is the _____.
- _____.
- **Evaporation** is the _____.
- Water _____ from the Earth's oceans, lakes, streams, and soil, but the majority evaporates from the oceans.

- **Condensation** is _____.
 - Water vapor forms water droplets on dust particles which then form clouds in which the droplets collide to create larger, heavier drops that then fall from the clouds as rain.
 - **Precipitation** is _____
-



- _____ in a single large interconnected body of water called the _____. The world oceans play important roles in the regulation of the planet's environment.



- The largest ocean on Earth is the _____ with a surface area of about 165,640,000 km².
- The deepest point on the ocean floor, the _____, is found in the Pacific Ocean.
- The Challenger Deep is located _____ at the bottom of the Mariana Trench and is 11,033m below sea level which is deeper than Mount Everest is tall.
- The second largest ocean on Earth is the _____, and covers about half the area of the Pacific Ocean which is a surface area of about 81,630,000 km².

- Like the Pacific Ocean, the Atlantic Ocean can be divided into a _____ based on the directions of surface current flow north and south of the equator.
- The _____ is the third largest ocean and the Arctic Ocean is the smallest ocean.

Ocean Water

- The difference between ocean water and fresh water is that _____.
- **Salinity** is _____.
- Salinity is _____ or in places where fresh water flows in to the sea. In contrast, salinity is higher where water evaporates rapidly and leaves the salts behind.

A Global Temperature Regulator

- One of the most important functions of the world ocean is to _____.
- Because the _____, the temperature of the atmosphere changes more _____.
- If the ocean did not regulate atmospheric and surface temperatures, temperatures would be too extreme for life to exist on Earth.
- Local temperatures in different areas of the planet are also regulated by the world ocean.
- Currents circulate warm water causing land areas they flow past to have more moderate climates.
- For example, the British Isles are warmed by the waters of the Gulf Stream.

Fresh Water and River Systems

- **Fresh water** is _____.
- Most of the fresh water is locked up in _____.

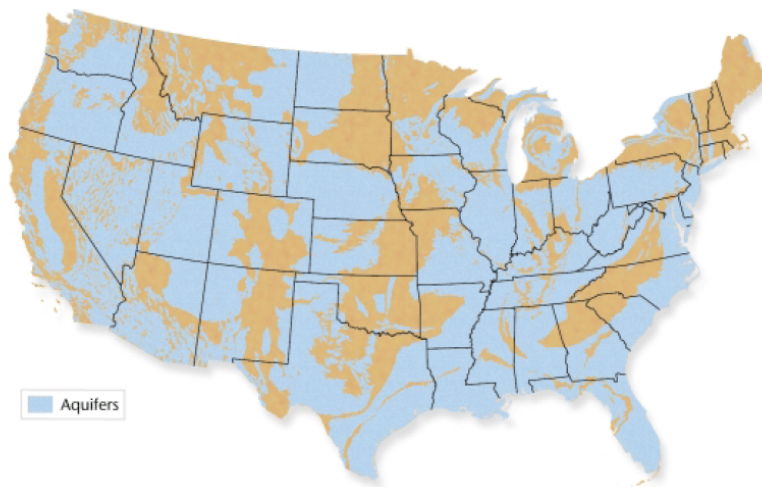
- A river system is a _____ that drains an area of land and contains all of the land drained by a river including the main river and all its smaller streams or rivers that flow into larger ones, or tributaries.

Ground water

- _____.
Most of this water trickles down through the ground and collects as groundwater.
- Although it makes up only 1 percent of all the water on Earth, _____

Aquifers

- _____



The Biosphere

- The **biosphere** _____
- The materials that organisms require must be continually recycled. Gravity allows a planet to maintain an atmosphere and to cycle materials.
- Suitable combinations that organisms need to survive are found only in the biosphere.
- The biosphere is located _____
- Plants need sunlight to produce their food, and almost every other organism gets its food from plants and algae.

- Most of the algae float at the surface of the ocean and is known as _____.

Energy Flow in the Biosphere

- The energy used by organisms must be obtained in the biosphere and must be constantly supplied for life to continue.
 - When an organism dies, its body is broken down and the nutrients in it become available for use by other organisms.
 - _____.
 - **Closed systems** _____.
 - **Open systems** _____.
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- Today, the Earth is essentially a _____ with respect to _____, but an _____ for _____ as energy travels from plant to animal which is eaten by other animals. In the process, some energy is lost as heat to the environment.