Chapter 3
The Dynamic Earth
Section 2, The Atmosphere Day 1

The Atmosphere

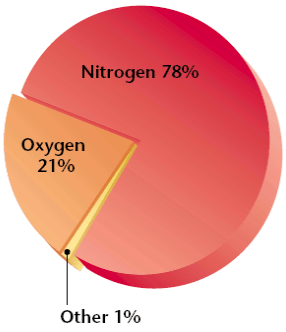
- The _____ is a mixture of gases that surrounds a planet, such as Earth.
- _____ are all parts of this mixture.
- Gases can be added to and removed from the atmosphere through living organisms.
- For example, animals remove oxygen when they breathe in and add carbon dioxide when they breathe out.

The Atmosphere

- _____ also add gases to the atmosphere, while vehicles both add and remove gases.
- The atmosphere also _____ Earth's surface.
- This insulation _____ the rate at which the Earth's surface loses heat and keeps Earth temperature at which living things can survive.

Composition of the Atmosphere

- Nitrogen makes up _____percent of the Earth's atmosphere, and enters the atmosphere when volcanoes _____.
- Oxygen is the _____ most abundant gas in the atmosphere and is primarily produced by plants.
- In addition to gases, the atmosphere contains many types of tiny, solid particles, or _____.



Composition of the Atmosphere

- In addition to nitrogen and oxygen, other gases such as _____ make up the rest of the atmosphere.

Air Pressure

- Earth's atmosphere is pulled toward Earth's surface by _____ and as a result, the atmosphere is _____ near the Earth's surface.
- Almost the entire mass of Earth's atmospheric gases is located within _____ of the surface.
- Air also becomes less dense with _____, so breathing at higher elevations is more difficult.

Layers of the Atmosphere

- The atmosphere is divided into four layers based on temperature changes that occur at different distances above the Earth's surface.
  - _____
  - _____
  - _____
  - _____

The Troposphere

- The _____ is the lowest layer of the atmosphere in which temperature drops at a constant rate as altitude increases.
- This is the part of the atmosphere where _____ exist.
- The troposphere is Earth's _____ atmospheric layer and extends to 18 km above Earth's surface.

The Stratosphere

- The _____ is the layer of the atmosphere that lies immediately above the troposphere and extends from about 10 to 50 km above the Earth's surface.
- Temperature _____ because ozone in the stratosphere absorbs the sun's ultraviolet (UV) energy and warms the air.

The Stratosphere

- _____ is a gas molecule that is made up of three oxygen atoms.
- Almost all of the ozone in the atmosphere is concentrated in the _____.
- Because ozone absorbs _____, it reduces the amount of UV radiation that reaches the Earth.
- UV radiation that does reach Earth can _____.

The Mesosphere

- The layer above the stratosphere is the _____.
- This layer extends to an altitude of about 80 km.
- This is the _____ of the atmosphere where temperatures have been measured as low as –93ºC.

The Thermosphere

- The atmospheric layer located farthest from Earth's surface is the _____.
- Here, nitrogen and oxygen absorb _____ resulting in temperatures measuring above 2,000 ºC.
- The air in the thermosphere is so thin that air particles rarely collide, so little heat is transferred, and would therefore not feel hot to us.

The Thermosphere

- The absorption of _____ by nitrogen and oxygen causes atoms to become electrically charged.
- Electrically charged atoms are called _____, and the lower thermosphere is called the _____.
- Ions can radiate energy as light, and these lights often glow in spectacular colors in the night skies near the Earth's North and South Poles.

Energy Transfer in the Atmosphere

- _____ is the energy that is transferred as electromagnetic waves, such as visible light and infrared waves.
- _____ is the transfer of energy as heat through a material.
- _____ is the movement of matter due to differences in density that are caused by temperature variations an can result in the transfer of energy as heat.

Heating of the Atmosphere

- Solar energy reaches the Earth as _____, which includes visible light, infrared radiation, and ultraviolet light.
- About _____ 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.

Heating of the Atmosphere

- The Earth does not continue to get warmer because the oceans and the land radiate the absorbed energy back into the atmosphere.
- Dark-colored objects absorb more solar radiation that light-colored objects, so dark colored objects have more energy to release as heat.
- This is one reason the temperature in cities is higher that the temperature in the surrounding countryside.

The Movement of Energy in the Atmosphere

- As a current of air, warmed by the Earth's surface, rises into the atmosphere, it begins to cool, and eventually become denser than the air around it and sinks.
- This current then moves back toward the Earth until heated and less dense and then begins to rise again.
- The continual process of warm air rising and cool air sinking and moving air in a circular motion is called a _____.

The Greenhouse Effect

- The _____ is the warming of the surface and lower atmosphere of Earth that occurs when carbon dioxide, water vapor, and other gases in the air absorb and reradiate infrared radiation.
- Without the greenhouse effect, the Earth would be too cold for life to exist.

The Greenhouse Effect

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