Composition of Atmosphere

According to NASA, the **structure and composition of atmosphere** on Earth are given below. Other than the listed atmospheric gases, trace quantities of helium, neon, krypton, methane, and hydrogen, as well as water vapor is also present in the atmosphere. Check here the complete details of the structure of atmosphere.

Composition of Atmosphere	**Percentage**
Nitrogen	78 percent
Oxygen	21 percent
Argon	0.93 percent

Below are the variable components of the atmosphere whose quantities change over time and location.

Composition of gases in Atmosphere	
Sulfur dioxide (SO_2)	trace
Ozone (O_3)	trace
Nitrogen oxides (NO, NO_2, N_20)	trace
Methane (CH_4)	trace
Water vapor (H_2O)	0-4%
Carbon dioxide (CO_2)	0.038%

Important Facts of Atmospheric Composition and Structure

The composition of atmosphere constitutes a layer of gas or mixture of gases that surrounds any planet. It stays in position with the help of the heavenly body's gravity. When the atmospheric temperature is low, and gravity is high, a planet can possess an atmosphere.

- The structure and composition of atmosphere on Earth includes carbon dioxide (0.04%), argon (0.9%), oxygen (21%), nitrogen (78%), and a trace amount of other rare gases.
- An inconsistent quantity of water vapor (roughly 1% at sea level) is observable near the atmosphere, which ultimately drops with height.
- Carbon dioxide gas is a major cause of the greenhouse effect.
- The atmosphere is also composed of dust particles.
- They develop from nonnative sources like smoke soot, fine soil, dust, pollen, and corroded meteors.

Features of Composition of Atmosphere

The composition of atmosphere of Earth consists of the air which encloses the Earth. The broadness of the earth's atmosphere is approximately 480 km.

- Around 99 percent of the entire atmospheric thickness is present at a height up to 32 km from the earth's distance.
- The atmospheric pressure of air decreases as the height increases.
- The structure and composition of atmosphere contain a combination of beneficial gases that facilitates existence on any planet or even Earth.
- The earth's gravity enables it to maintain the atmosphere.
- Preventing the entrance of UV rays is the primary function of the atmosphere.

Composition of Gases in Atmosphere

The **composition of the atmosphere** on Earth includes nitrogen, oxygen, argon, carbon dioxide, and trace gases. Approximately 1% of water vapor is also in the atmosphere at sea level. More details about the composition of gas in atmosphere and its uses are given below.

Nitrogen - 78% Composition of Atmosphere

- The atmospheric structure and composition comprises 78% nitrogen.
- The Nitrogen Cycle is a process by which living beings obtain the required nitrogen, as nitrogen gas cannot be utilized instantly from the air.
- Biotic or living things require nitrogen to produce proteins.
- It is a fairly inert gas and is an important element of all organic compounds.
- Nitrogen's main role is to prevent combustion by diluting oxygen.

Oxygen - 21% Composition of Atmosphere

- The composition of atmosphere comprises 21% oxygen.
- It is essential for respiration and utilized by all living organisms.
- Oxygen can combine with other elements to form important compounds, such as oxides.
- It is a compulsory gas needed for combustion.

Ozone Gas - Composition of Atmosphere

- It is about 10 to 50 km beyond the earth's surface and functions as a filter by absorbing (ultraviolet or UV rays) coming from the sunlight.

- The amount of ozone gas in the atmosphere is minimal and is restricted to the ozone layer discovered in the stratosphere.
- Ozone prevents deadly rays from getting into the earth's surface.

Water Vapour - (0-4%) Composition of Atmosphere

- Gases formed from water present in the air is called water vapor.
- Its maximum quantity in the atmosphere could be up to 4% which is seen in warm and damp areas.
- Water vapor is an irregular gas that decreases with height.
- The amount of vapors also reduces from the equator towards the poles.
- Water vapor reaches the atmosphere through evaporation and transpiration.
- It works like a covering permitting the earth to become neither frigid nor warm.
- The vapors assist in offering steadiness to the air.

Dust Particles - Composition of Atmosphere

- Dust particles exist in higher quantities in subtropical and temperate areas due to arid winds in discrepancy to the equatorial and polar areas.
- These particles are generally found in the lower layers of the atmosphere.
- They are found in smoke-soot, sand, oceanic salt, ash, pollen, etc.
- They serve as hygroscopic or absorptive cores on which atmospheric water vapor crystallizes to form clouds.

Argon - 0.9% Composition of Atmosphere

- The atmosphere's composition of Argon is 0.9%.
- They are particularly utilized in lamp bulbs.

Carbon Dioxide - 0.03% Composition of Atmosphere

- The composition of atmospheric carbon dioxide is 0.03%.
- Carbon Dioxide is used by plants to create oxygen through the process of Photosynthesis.
- It is among the gases that contribute to the greenhouse effect.
- It is important because it is indistinct from outgoing earthly radiation and clear to arriving solar radiation.

5 Layer Composition and Stratification of Atmosphere

The Earth's atmosphere is split into five layers depending on the temperature: mesosphere, troposphere, stratosphere, thermosphere, and exosphere. They are

- Mesosphere
- Thermosphere (Ionosphere)
- Exosphere
- Troposphere
- Stratosphere.

Troposphere Layer

- The bottommost atmospheric layer is the Troposphere.
- The highest thickness is at the equator because the heat is transported to significant heights by powerful convection winds.
- The moderate troposphere height is 13 km; its altitude is roughly 18 km near the equator and 8 km near the poles.
- All the weather and climate transitions occur in the Troposphere.
- With increasing height, the temperature decreases; for instance, the temperature drops by 1℃ (usual lapse speed) after crossing 165 m of height.
- The layer is also known as the Tropopause, as the area's temperature is almost constant (about -45℃ along the poles, -80℃ across the equator).
- The zone dividing the stratosphere from the troposphere is the Tropopause.

Stratosphere Layer

- This layer, which is above the Troposphere, is the Stratosphere.
- This is the second atmospheric layer which stretches to 50 km height.
- Stratosphere encloses the layer of ozone, which shields life from hazardous effects by absorbing ultraviolet rays from the sunlight.
- The layer gets hotter as the height increases (opposite to that of the troposphere) as the ozone layer causes absorption of UV radiation that is transformed into heat.
- The reason airplanes fly smoothly in Stratosphere is because weather-related sensations are missing in this atmospheric layer.
- Mesosphere and Stratosphere are separated by Stratopause.

Mesosphere Layer

- The atmosphere's third covering is the Mesosphere which rises over 80 km.
- As the altitude increases, temperature decreases in the Mesosphere layer, and at 80 km height, the temperature goes down to -100℃.
- The upper boundary which divides the thermosphere and mesosphere is mesopause.
- Meteorites from exterior space enter the atmosphere and get burned in Mesosphere.

Thermosphere (Ionosphere) Layer

- Ionosphere is the layer inside the Thermosphere.
- Thermosphere is named an ionosphere because it possesses ions, particles that are charged electrically.
- The layer is between 80-400 km beyond the Mesosphere layer.
- As the height increases, temperature also increases in the thermosphere atmospheric layer.
- Radio waves are reflected on the Earth with the aid of this particular layer.
- The orbit of the satellites is present in the Thermosphere's upper side.

Exosphere Layer

- The atmosphere's uppermost layer is the exosphere.
- It is just on top of the thermosphere.

- It slowly integrates with outward space.