

Atmosphere: Composition and Layers



This is a dynamic PDF e-book by GKToday. Please note that its content is subject to updates or changes on the GKToday website [www.gktoday.in] to ensure the latest information. You can download the most recent version of this e-book by visiting [this link](#) or by scanning this QR code.

Disclaimer: The authors and publisher have made every effort to ensure that the information in this E-book is correct. However, GKToday does not assume and hereby disclaims any liability to any party for any loss, damage, or disruption caused by errors or omissions, whether such errors or omissions result from negligence, accident, or any other cause. This document is a property of GKToday. Reselling, redistribution, or duplication is strictly prohibited.



Earth's atmosphere is mainly consisted of nitrogen, oxygen, and argon, which together constitute the major gases of the atmosphere. The remaining gases are often referred to as trace gases. The below table shows the composition of Dry atmosphere.

Composition of Earth's Atmosphere	
Gas	Volume
Nitrogen (N ₂)	78.08%
Oxygen (O ₂)	20.95%
Argon (Ar)	0.93%
Carbon dioxide (CO ₂)	0.04%
Neon (Ne)	0.00%
Helium (He)	0.00%
Methane (CH ₄)	0.00%
Krypton (Kr)	0.00%
Hydrogen (H ₂)	0.00%
Nitrous oxide (N ₂ O)	0.00%
Carbon monoxide (CO)	0.00%
Xenon (Xe)	0.00%
Ozone (O ₃)	0 to 7×10 ⁻⁶ %
Nitrogen dioxide (NO ₂)	0.00%
Iodine (I ₂)	0.00%
Ammonia (NH ₃)	trace

The upper boundary of the atmosphere is not clearly defined. For differentiation of aeronautics and astronautics, the Kármán line at 100 kilometers from sea level is used.

Below around 100 kilometers or so, the atmosphere behaves like a fluid. The **outermost layer of Earth's atmosphere is mainly composed of hydrogen and helium**. The particles are so far apart that they can travel hundreds of kilometers without colliding with one another. Since the particles rarely collide, the atmosphere no longer behaves like a fluid. These free-moving particles follow ballistic trajectories and may migrate into and out of the magnetosphere of the Earth.

The atmosphere has been divided into several layers on the basis of change in height and some other factors such as change in climate etc. These include the Troposphere (the lowermost), Stratosphere (stratified), Mesosphere, Thermosphere, Exosphere (outer space). Between individual spheres there are usually distinguished transitory layers, called 'PAUSES' where temperature varies but little with height. The character and composition of the atmosphere changes as we go higher and higher. Thus, there are 4 important spheres, with 3 pauses as follows:

- Troposphere with tropopause



- Stratosphere with stratopause
- Mesosphere with mesopause, and
- Ionosphere or thermosphere.