# Atmosphere

- Planet earth → enveloped by deep blanket of Gases
  → Gaseous cover of Earth — Atmosphere.

## Composition of Atmosphere

### GASES

| Constituent Gas | % Volume |
|---|---|
| Nitrogen | 78·08 |
| Oxygen | 20·95 |
| Argon | 0·93 |
| Carbon dioxide | 0·036 |
| Neon | 0·002 |
| Helium | 0·0005 |
| Krypton | 0·001 |
| Xenon | 0·00009 |
| Hydrogen | 0·00005 |

### Water vapour

- Account for 4% of air by volume [In Tropics]
- Less than 1% of air [desert + Polar Regions]
- Dec. from equator towards poles
- Absorb Heat & prevents extreme temperatures on earth
- Moisture holding capacity is directly proportional to Temperature.

### Dust particles

- Higher conc. of dust particles [Subtropical & Temperate Regions]
  Reason — Dry winds.
- Provide Nuclei to water vapour to form clouds.
- Blue colour of sky - scattering by dust particles.
- Duration of twilight — affected by presence of dust particles.

# Structure of Atmosphere

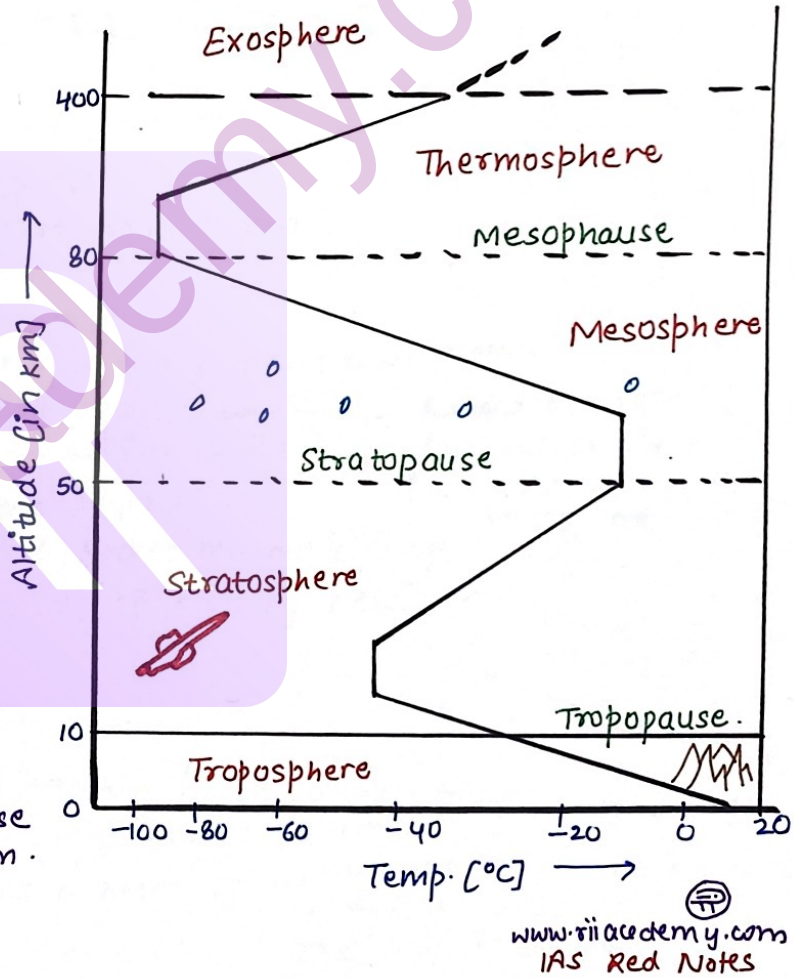
- Atmosphere – divided 5 different layers depending upon Temperature conditions.
- 5 Different layers.

## 1> Troposphere

- Location & Height → Lowermost layer.
  - Avg Height = 13 km & extends to Height = 8 km Near poles & about 18 km at equator.
- Weather & Temperature conditions
  - Temp. decrease at Rate of 1°C for every 165 m of Height.
  - Lowest Temp. – over equator
  - All changes - Climate & weather take place in this layer.
- Tropopause → Troposhere ends.
- densest atmospheric Layer.
- Aviation takes place here.

## 2> Stratosphere -

- Location & Height – found above tropopause & extends upto 50km.
  - Max. conc. of ozone → ozonosphere

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- Weather & Temp. conditions – Free of any clouds & weather changes.
  - Temp. increase during summers & dec. during winters
  - Temp. increases with Height.
  - Highest part – atmosphere – Jet planes can Reach.
- Stratopause – Top of stratosphere.

## 3> MESOSPHERE –

- Location & Height – lies above Stratopause
  - extends upto 80km from 50km.
- Weather & Temp. conditions –
  - Temp. decrease with Height.
  - with Temp = -90°C, Top of this layer → coldest place of Earth.
  - Noctilucent clouds [Night shinning clouds] → formed by extremely Rare water vapour [found at top of Mesosphere].
    ↳ OR POLAR MESOSPHERIC CLOUDS
  - Meteors – Burn up in this layer.
  - Both sounding Rockets & Rocket powered aircraft
    ↳ capable of Reaching Mesosphere.
- Mesopause – Upper Boundary of Mesosphere.

## 4> THERMOSPHERE –

- Location & Height – Located b/w 80-700km above earth's surface.
  - Ionosphere – contains electrically charged particles.
    ↳ Ionization occurs as a Result of → UV Rays, X-Rays, Gamma Radiations.

- Divided into different layer ⟶ D-Layer
  ⟶ E-Layer
  ⟶ F-Layer

- **Weather & Temp. conditions –**
  - Temp. Increase Rapidly with Increase in Height
  - Air is very thin.
  - Radiowaves from earth are reflected back – to earth.
  - Both cloud & water vapour free.
  - International space station.
  - Aurora Borealis [Northern lights] & Aurora Australis [Southern lights]
    ↳ Sometimes seen here.

## 5) EXOSPHERE

- **Location & Height** ⟶ uppermost layer of Atmosphere
  ⟶ Lies beyond 400km to 1000s of km
  ↳ where it merges with outer space.

- **Weather & Temp. conditions –**
  - Temp. Increases with Height
  - May cross 5000°C
  - Largely made up of ⟶ Helium, ⟶ Hydrogen
  - Molecules → very low density
  - This layer doesn't behave like gas & particles escape into space.
  - Most earth satellite orbit in this layer.

# Stratification of Atmosphere
## Basis – CHEMICAL COMPOSITION

- Acc. to International space symposium, 1962.
  - Atmosphere – 2 Broad layers.

### HOMOSPHERE
- Lower layer, extends upto 88km from earth's atmosphere
- Proportion of different gases
  - ↳ Uniform at different levels
- subdivisions
  - ↳ Troposphere, stratosphere, Mesosphere

### HETEROSPHERE
- upper layer, extends beyond 88km to more than 3500 km
- Non-uniform in its composition
- subdivisions
  - ↳ Thermosphere.

## SIGNIFICANCE OF ATMOSPHERE

### Protection from Harmful Radiations
- Incoming UV Radiation
  - ↳ keep planet warm through insulation & prevent extreme Temp.

### Regulates Earth Temperature
- Including Trapping Heat from sun & preventing it from escaping into Atmosphere.

### Weather & climate
- Including → Temp.
  - → precipitation
  - → Wind.

### Major Role-Water cycle
- By Transporting water vapour from oceans to land, where it fall as precipitation.