

The Atmosphere

The atmosphere is the layer of air and moisture that surrounds the Earth. The common atmospheric gases are oxygen (21%), nitrogen (78%), carbon dioxide, and water vapor.

The density of the atmosphere varies with height above sea level (most dense at sea level). **Altitude** is the height (m or km) above sea level.

The atmosphere is thicker above the equator than it is above the poles. Warmer air takes up more space because warmer air expands.

Layers of the Atmosphere

1. Troposphere

- the layer closest to the Earth's surface
- 0 -12 km over the earth
- most of our weather occurs in this layer.
- contains most of the moisture
- the upper part of this layer is colder than the lower part

Temperature Gradient - The change in temperature over a distance. The troposphere has a temperature gradient of -6.5 C per 1000 m (vertical distance)

2. Tropopause

- thin boundary over the troposphere

3. Stratosphere

- a dry layer located between 12 km and 50 km above the Earth's surface.
- This layer contains **high concentrations of ozone**. Ozone protects the Earth from harmful doses of ultraviolet given off by the sun. The ozone also causes the stratosphere to be warmer.

4. Mesosphere

- the middle layer extends from 50 km to 80 km.
- This layer has low concentrations of gases and low temperatures (-75°C).

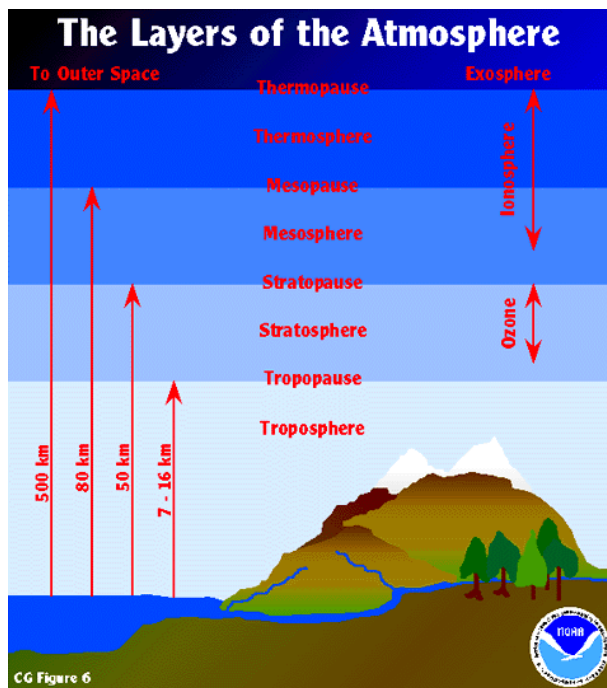
5. Thermosphere

- extends from 80 km to 500 km.
- x-rays from the sun are absorbed here so temperature goes up
- the sun's radiation cause the particles in this layer to become electrically charged to produce the northern and southern lights.

6. Exosphere

- 500 km & up

- the thin outer part of our atmosphere. There are very few particles (mainly hydrogen) in this layer.



Atmospheric Pressure

Atmospheric Pressure - the pressure the air exerts as gravity pulls it toward the Earth. Atmospheric pressure is greatest at sea level and generally decreases with altitude

Atmospheric pressure is measured in kilopascals.
The average atmospheric pressure at sea level is 101.3 kPa.

Atmospheric pressure is measured with a **Barometer**.



Why is the atmosphere important?

- Provides major gases that support life.

Oxygen

Nitrogen

Carbon Dioxide

- Protection from harmful radiation (ozone)

- Regulates earth's temperature

Greenhouse effect

- Provides fresh water

Water Cycle

