



## 12 Effects of Atmosphere on Living Beings

### Formation of Atmosphere

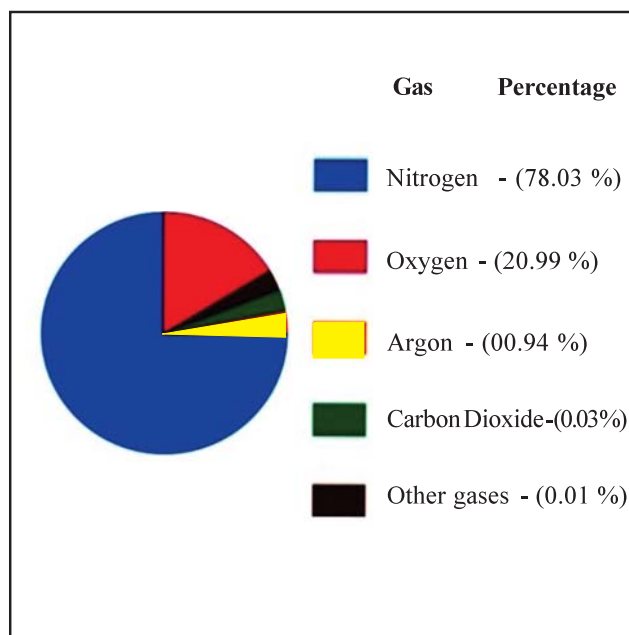
It is believed that the earth is separated from the Sun. It was in the form of a fireball when it originated. This warm ball slowly began to cool. As it cooled, the elements lying in it began to transform into liquid, solid and gases. The elements that transformed into solid form, we know it as lithosphere, the liquid elements are known as hydrosphere and which are transformed into gases are known as atmosphere.

### Atmosphere

The layer of air that surrounds the earth is known as an atmosphere. It is extended to an altitude of hundreds of kilometers from the surface of the earth. It is difficult to say, what is the height of the border above it. However, the atmosphere is considered to be existed only till the effect of the earth's gravitation remains in space. The atmospheric layer contains 99 % of air up to 32 kms above the earth's surface. As we rise above the surface of the earth, the air becomes thinner.

### Atmospheric Gases

The existence of life on the earth is impossible without atmosphere. Atmosphere is composed of gaseous, liquids and solid elements. Oxygen and Nitrogen gases present in it are important for ecosystem. Fog, mist, clouds etc. are the forms of water in the atmosphere. There are mainly snow-particles and living organisms in liquid elements. The atmosphere protects the earth from extreme heat during the day and extreme cold at night.



Ratio of Gases

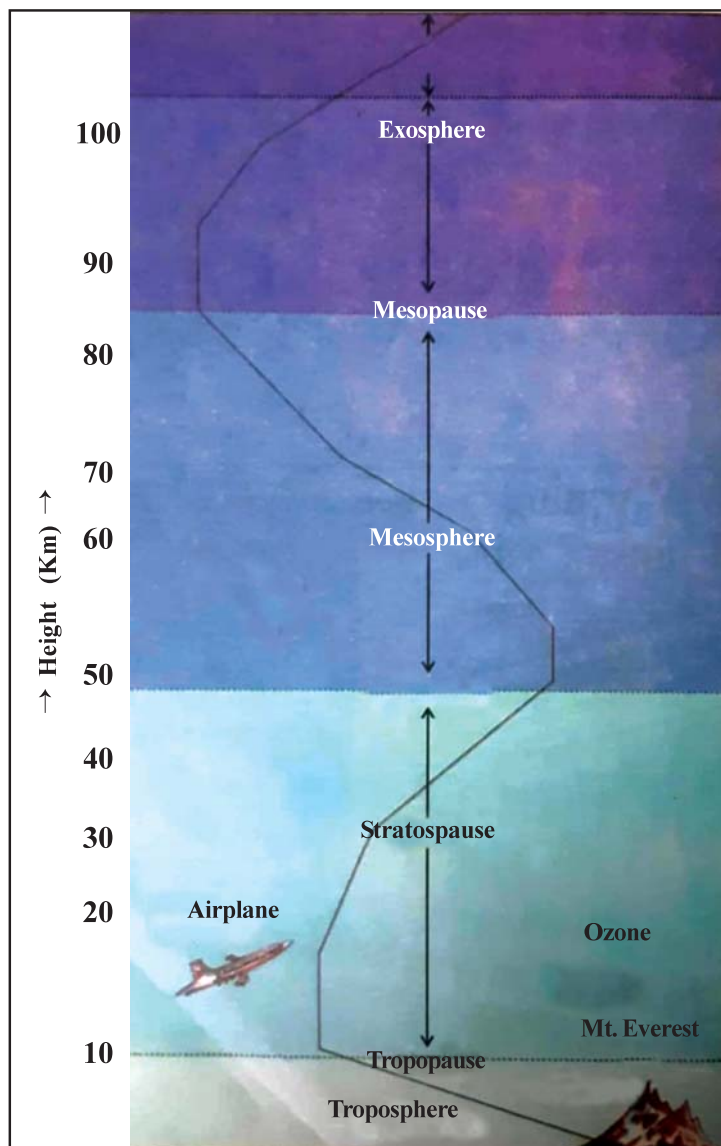
The amount of gases existing in atmosphere is shown in the table above. Nitrogen is found up to 130 km., whereas, Oxygen is found up to 110 km. and Carbon-dioxide is found approximately up to 20 kms. whereas Hydrogen and Helium is found in abundant quantity above the height of 130 km.

### Formation of Atmospheric Layer

As the altitude extends upward from the surface of the earth, the atmosphere is divided into different layers depending on the change in temperature and composition of gases. On the basis of this change it is divided into four sub layers (1) Troposphere (2) Stratosphere (3) Mesosphere (4) Thermosphere.

**(1) Troposphere :** The first layer of the atmosphere that surrounds the earth is called 'troposphere'. It extends up to an altitude of approximately 16 km at the equator, about 12 km in the temperate zone and 8 km at the poles. Changes occur in it according to the seasons. This layer is very important for the ecosystem. Atmospheric storms, sound waves, wind formation, lightening, rain, clouds, etc occur in this layer. In this layer, the temperature decreases at the rate of  $6.5^{\circ}\text{C}$  per km of altitude. At the height where temperature stops decreasing, that limit is called troposphere limit.

**(2) Stratosphere :** The layer above the troposphere is called stratosphere which extends from the troposphere to a height of about 50 km. In this layer as the height increases, temperature also increases. Seasons, clouds, rain, cyclone, etc. are not seen in this layer. The air is clean and thin here so the jet plane can fly faster with less obstruction. At an altitude of about 15 km to 35 km the amount of ozone gas is more which absorbs the sun's extremely hot ultra violet rays.



**Formation of atmospheric layer**

**(3) Mesosphere :** The part of atmosphere up to an altitude of about 80 km above the stratosphere is called 'Mesosphere'. Here, the temperature decreases with the increasing altitude.

**(4) Thermosphere :** This layer is located above the mesosphere starting from 80 km. It is extended upto the completion of atmosphere. Here the air is extremely thin. As we go higher and higher, atmospheric temperature increases. This layer is divided into two sub-divisions: Ionosphere and Exosphere. The radio waves are reflected from Ionosphere. TV, radio-broadcasting, advantage of internet is indebted to this layer. The layer above the Ionosphere is called Exosphere.

## Weather

Weather is a short time average condition of atmosphere. Weather of any place or region is decided on the basis of it's temperature, humidity, rain, air pressure, fog or clouds. Weather of morning, noon, evening or night may vary.

Weather is a short-term condition of the atmosphere; changes may occur in it from time to time, cold in the morning, hot in the afternoon and rainfall in the evening. This is possible in weather. Our life and activities are affected due to weather. Weather department of our country releases weather news and weather maps daily.

### Know This

The headquarter of the weather department of India is in Delhi, It is known as IMD (Indian Meteorological Department). Around one hundred different observation centers of India are located in India and Antarctica. Its four regional centers are situated in Mumbai, Kolkata, Nagpur and Pune.

## Climate

Generally, the average weather condition of any region for 35 years or more is climate. Climate is decided keeping the local condition (temperature, humidity, rainfall, air pressure, fog) in mind. Climate directly affects the ecology, fauna, human life and other such activities of the region

## Temperature

The surface of heat in the air is called temperature. The difference in the temperature of atmosphere is felt only during the day and night. Temperature also changes according to the seasons. Temperature is higher in summer than in winter.

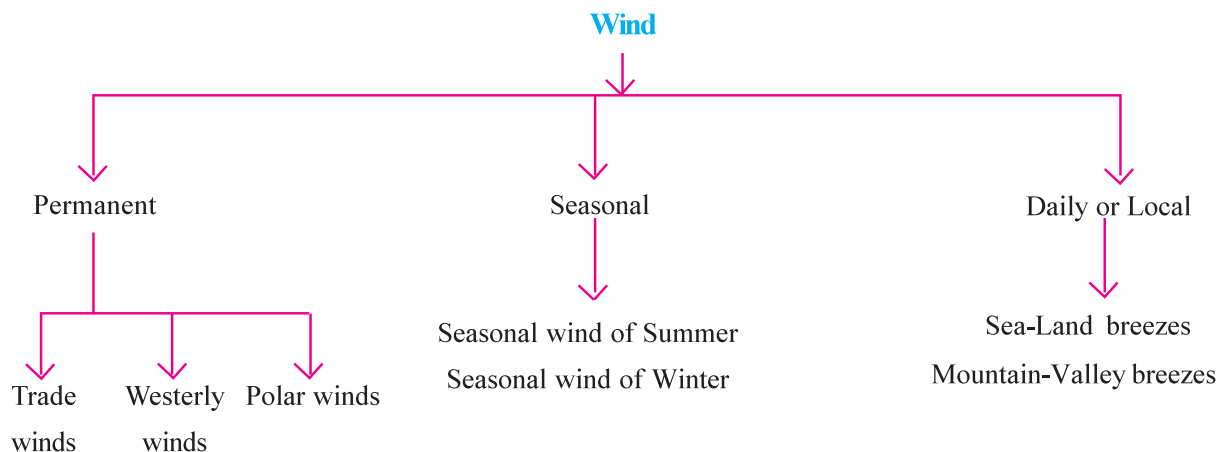
Insolation is an important factor that affects the temperature distribution. The measure of insolation decreases from the equator to poles. Due to this reason, the pole regions are covered with ice. If the temperature of the earth rises, the crop will not be able to grow. Temperature is experienced higher in cities than in villages due to asphalt roads and buildings made-up of cement.

## Atmospheric Pressure

The layer of air around the earth has a weight. A huge layer of air pushes the surface of the earth according to its weight. It is called atmospheric pressure. The pressure of the atmosphere is higher on the surface of the ocean. Atmospheric pressure decreases on moving higher from the surface of the earth. In a region with high temperature, gases become hot and move upwards, and create a low pressure. Low pressure is connected with cloudy and humid seasons. In low temperature regions; the atmosphere is cool so pressure is high.

## Wind

The dynamic air that surrounds the earth is called wind. There are three main types of light to heavy pressures of air that form up on the earth : (1) Permanent winds (2) Seasonal winds (3) Daily / Local winds.



**(1) Permanent winds :** In some parts of the earth's surface; winds blow from a certain direction throughout the year which are called permanent winds. Permanent winds includes trade winds, westerly and polar winds.

**(2) Seasonal winds :** On the surface of the earth, some winds blow according to the season and their direction is changed according to the season, such winds are called seasonal winds. In countries, like India, Myanmar, Bangladesh etc., such types of winds blow so they are known as the country of seasonal winds. In summer winds of the south-west and winter winds blowing from the north-east direction, are the example of this type of winds.

**(3) Daily / Local winds :** On surface of the earth in some regions for short time, due to change in air pressure winds are formed that is called daily or local winds. Examples of local winds are sea-land breezes, mountain and valley breezes, 'LOO' (heat waves) and 'Sheet lahar' (Cold waves) etc.

#### Know This

- From the Arabic word "Mausim", the winds are named monsoon winds.
- A sudden change in air pressure causes cyclone.
- Cyclone is called typhoon, hurricane and tornado.
- 60 to 80 km winds are called gusty winds, while 80 to 120 km/h winds are called hurricane.

#### Activity

Get information and utility about these two pictures from your teachers :



**Wind Direction Indicator**



**Anemometer**

#### Humidity

The water of the ocean and reservoirs that evaporates; turns into vapour is called moisture. Moisture is added into the atmosphere by the process of evaporation from the earth's surface. Moisture in the atmosphere becomes clouds through the process of condensation and returns to the surface of the earth in the form of rain.



## Climate and human life

- The impact of any region's climate is closely observed on food, clothing, dwelling etc.
- In more rain-fed regions, the roofs of houses are steeply sloping, while in less rain-fed region houses with a low slope and flat roofs are found.
- The crops that are grown in the region are mostly taken in the diet of the people of the same region, For example, wheat is food of the people of the plains and maize is the food of the people of the hilly region.
- People use warm woolen clothes to cover the whole body in cold regions for example people of Ladakh.
- In the region where there is a warm climate, people wear cotton and loose clothing e.g. People of South India.
- People in hot deserts wrap a handkerchief of cloth around their heads to avoid the constantly flying sand. e.g. People of Arabia.
- Human nature is lazy in an area with hot and humid climate while working capacity of the people is more in the temperate zone due to its pleasant climate.
- In the region of seasonal climate, except the monsoon period several celebrations of various social occasions are seen.

## Natural Flora and Fauna

The growth of natural vegetation depends on the soil, temperature and humidity. In addition to this, the slope and depth of soil/thickness of soil affect the growth of natural vegetation. Due to the diversity in these components, the natural vegetation of a particular region is dense and change is found in its types.

Natural Vegetation is classified into three main sections :

- (1) **Forest** : Vegetation is grown in a region with favorable temperature and rainfall. Depending on the temperature and rainfall, dense or scattered forests are found.
- (2) **Meadows** : This is located in a region with moderate rainfall.
- (3) **Thorny bushes and Shrubs** : This plant is found in arid and low rainfall regions.

The main reason for the change in the type of natural vegetation is the climatic change. Let us know about the natural flora and fauna of the world which are found in it.

## Types of Forest

(1) **Tropical Evergreen Forests** : These forests are also called tropical rain forests. These dense forests are found in the equator and the tropics. The climate of this region is hot and humid due to heavy rainfall throughout the year. The leaves of the plants of this region do not fall together, they remain green throughout the year and thus they are called evergreen forests. In this forest rosewood, Ebony, Mahogany, etc. are found. In India, these types of forests are found in the Andaman and Nicobar Islands.

(2) **Tropical Deciduous Forest** : Tropical forests are also called deciduous forest. In this region, the climate is hot and the amount of rain is less. In the summer season within 6 to 8 weeks the leaves of the plant fall off from trees. It is known as 'deciduous forest'. In this forest hard timber plants like teak, sal, neem, sesame etc. are grown. These forests are found in the highlands of India, hilly areas, North





Australia and such types of vegetation are found in a large part of Central America. In these forests animals like tigers, Asian lions, elephant, golden monkey etc. are found. In this region peacocks, hawks, parrots, pigeons, mainas are found in large numbers.

**(3) Temperate Evergreen Forests :** In this region, temperature is even and rainfall is heavy. In this region, evergreen forests are found. These forests are found in South-East America, South China and South-East Brazil as well as in the North-eastern mountainous region of India. The main plants that are grown in the forests are bamboo, pine and eucalyptus. In this forest elephants, one-horned rhinos etc. animals are found.

**(4) Temperate Tropical Forests :** These forests are found the North of Tropic of cancer and in the south regions of Tropic of Capricorn. These forests are found in North-East America, China, New Zealand, Chile and Western Europe as well as in North India. In these forests major plants like Oak, Maple are found. Animals like deer, fox, wolves are found in these forests.

**(5) Mediterranean Forests :** These forests are found in the region near the Mediterranean sea which is found mostly in Europe, Africa, Asia continent. The climate of this region is hot-dry in summer, cold and moist in winter. Citrus fruit plants like oranges, figs, olives, grapes etc. are found in these regions.

**(6) Coniferous Forests :** These forests are found in a region with cold climate of about 50° to 70° North latitudes as well as in high mountain regions. The vegetation of these forests are in a conical shape. In these forests pine, cedar, fir etc. are the main plants. The wood of these plants are soft and fluffy. It is used more in paper, matchsticks or in packing. In this region animals like monkeys, polar bears, musk deer, yaks are found.



**Coniferous Forest**

## Grasslands

**(1) Tropical Grasslands :** The climate of this region is hot. The rainfall here is moderate to low. Here, grass grows to a

height of 3 to 4 meters. The Savanna Grassland in Africa is world famous. Main animals like lions, leopards, elephants, zebras, giraffes, deer are found in this region.

**(2) Temperate Grasslands :** Short and nutritious grass grows in the middle of the continents which have a moderate climate. In this region animals like wild buffalo, bison and antelope are found. In Gujarat, this type of grass grows in Velavadar of Bhavnagar and Banni area of Kutch.

### Thorny Bushes and Shrubs

The climate of the desert is warm and dry. Vegetation is seen less in this region. To adjust with the climate thorny vegetation is found. Plants like Bordi, Thor, Acacia, Khijdi etc. are found in this area. In this region animals like camels, foxes, hyena are found. Animal like the wild ass that is found in the little rann of Kuchchh, is unique in the world. Apart from this, flamingos are seen in a muddy area of the great desert of Kuchchh. Migratory birds also come here. Snakes and scorpions are also found in this region.



Forest of Desert Region

Besides, shrubs and short grasses grow in the highlands of the mountains, in the region with cold and arid climates. Such vegetation is found in the region of the Himalayas and Ladakh. Animals like snow leopards, pandas etc. are seen here. Pashmina goats are also seen in Kashmir.

#### Activity

Prepare a report after discussing the effects of climate on human life by showing different climatic regions (forests, plains) on the globe as well as the world map.

#### Exercise

#### 1. Answer the following questions in one sentence :

- (1) Upto how many kilometers does the Troposphere extend over the equator ?
- (2) Which trees are found in tropical evergreen forests ?
- (3) Which animals are more common in coniferous forests ?
- (4) What kind of clothes do the people of the desert region wear ? Why ?
- (5) What is the south-west wind called ?

#### 2. Write short notes :

- (1) Temperate grass-land.
- (2) Forests of Mediterranean sea
- (3) Isotope cover
- (4) Atmospheric pressure.

#### 3. Answer the following questions :

- (1) What is climate ? State the effects of climate on human life.
- (2) Describe the tropical evergreen forest.

#### 4. Fill in the following blanks with the correct word :

- (1) Reflection of radio-wave is attributed to ..... layer.
- (2) Pashmino-goat is found in ..... .
- (3) Polar winds blowing from the poles towards polar circle are called ..... .

