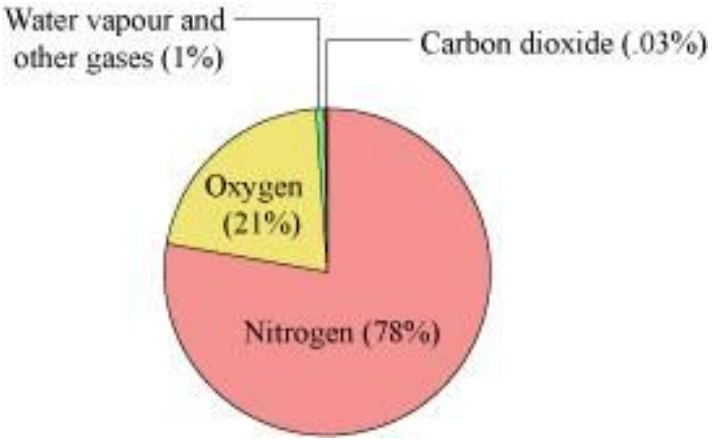
Air and Atmosphere

- **Composition of air**



- Main composition of air are Nitrogen and oxygen, they together constitute 99% of the air.
- Nitrogen is the largest constituent of air.
- An object can burn only in the presence of **oxygen**.
- About four-fifth of air is **nitrogen**. It does not support burning.
- **Dust** and **smoke** are also present in air.
- **Smoke** is released from vehicles and from burning.
- Traffic policemen wear a mask in order to **filter out smoke**.
- Dust can be seen as a **streak of light** when sunlight enters a dark room through a slit.
- Air also contains **water vapour**.
- Gases can be converted into liquid state by the lowering the temperature and increasing the pressure
- This conversion of gases into liquid is known as liquefaction of gases.
- Air is a mixture of gases and not a compound.
- LPG is an example of liquid gas

- Moving air is called **wind**.
- An important role of air is that it is used to produce energy. This is called wind energy.
- **Windmill** generates electricity when wind turns its fan rapidly.

- Windmills are also used to draw water from wells and to run flour mills.
- Air helps in the **flight** of birds and insects and in the **movement** of sailing yachts, gliders, aeroplanes, parachutes, etc.
- Air is present in all regions and is essential for life. Dissolved oxygen that is present in water is utilized by fish and other aquatic animals.

Properties

- Air is present everywhere. It cannot be seen. However, it can be felt.
- Air occupies empty spaces.
- Air is a mixture of many gases.

Role of oxygen in combustion and rusting

- Burning or combustion is a chemical process in which substances react with oxygen to produce heat.
- The substances which do not burn in air are called non-combustible substances. Glass, stone, and iron nail are examples of non-combustible substances.
- The substances that undergo combustion are said to be combustible substances or fuels.
- Fuels may be solid, liquid, or gaseous.
- The chemical process that occurs during rusting can be represented as follows: Iron (Fe) + Oxygen (O_2) + Water (H_2O) → Rust (Fe_2O_3)
- The process of depositing zinc on iron is called galvanization**.**

- Plants prepare their food in the presence of **carbon dioxide** during the process of **photosynthesis**.
- During photosynthesis, oxygen is released. Hence, it gets replenished in the atmosphere.
- Animals **take oxygen** and **produce carbon dioxide** during the process of **respiration**.
- Aquatic animals use **oxygen dissolved in water** for respiration.

- **Global warming -** The rise in overall temperature of the earth because of the green house effect is referred as global warming.
- **Air pollution**
    - The layer of air present around the earth is called atmosphere.

- Atmosphere is composed of 78% of nitrogen, 21% of oxygen, and 1% percent other gases such as carbon dioxide, ozone, water vapour, methane, etc.
- The phenomenon of contamination of air with unwanted substances so that it becomes harmful for living organisms and non-living substances is known as **air pollution**.
- The substances, which cause air pollution, are called **air pollutants**.
- Sources of air pollution are
- Power plants
- Factories
- Automobiles
- Burning of firewood

- **Types of air pollutants**
- **Carbon monoxide**
  - It is a colourless poisonous gas.
  - It is produced from incomplete burning of fossil fuels.
- **Smog**
  - It is made up of smoke and fog.

- **Sulphur dioxide**
  - It is produced from combustion of fuels.

- **Nitrogen dioxide**
  - It is produced from incomplete burning of fuels.

- **Chlorofluorocarbons (CFCs)**
  - They are released from refrigerators, air conditioners, and aerosol sprays.
  - They cause damage to the ozone layer resulting in the formation of ozone hole.

- **Suspended particulate matter**
  - It comprises of tiny particles, which remain suspended in air for a long time.
  - They are produced during burning of fossil fuels in power plants, mining, steel making, and other industrial processes.

- **Types of air pollutants**
- **Carbon monoxide**
  - It is a colourless poisonous gas.
  - It is produced from incomplete burning of fossil fuels.
  - It reduces oxygen carrying capacity of the blood.

- **Smog**
  - Smog is made up of smoke and fog.

- **Sulphur dioxide**
  - It is produced from combustion of fuels.
  - It causes respiratory problems including permanent lungs damage.
  - It causes formation of acid rain.

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- **Suspended particulate matter**
  - It comprises of tiny particles, which remain suspended in air for a long time.
  - They are produced during burning of fossil fuels in the power plants, mining, steel making, and other industrial processes.
  - They reduce visibility and cause haze.
  - They cause respiratory diseases on inhalation.

- Soot released from Mathura refinery has caused yellowing of the marble of Taj Mahal.

- **Acid rain**
  - It is formed when sulphur dioxide and nitrogen dioxide present in air react with water droplets to form nitric and sulphuric acid.
  - When it rains, it brings these acids along with it, which causes damage to plants, animals, and monuments.
  - Acid rain has caused corrosion of the marble of Taj Mahal.

- **Prevention of air pollution**
  - Use of clear fuels such as CNG, LPG, and unleaded petrol in public and private transport.

- Use of renewable sources of energy such as solar, wind, and hydel energy.
- Planting more and more trees to prevent pollution.
- Prevent burning of dry leaves and use them in composting.
- Kyoto protocol is an agreement between various countries for reducing green house emission.