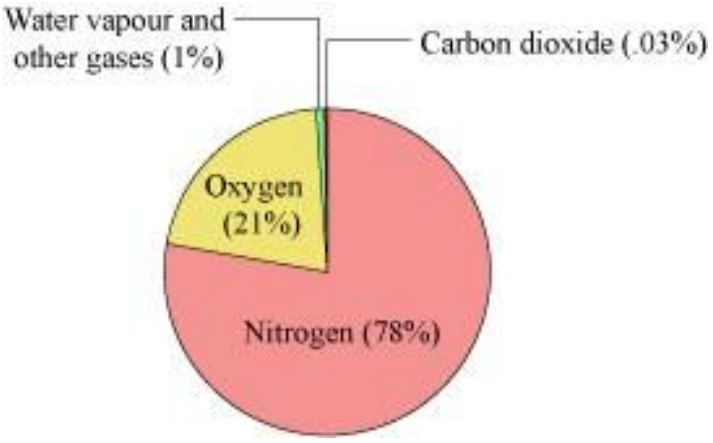
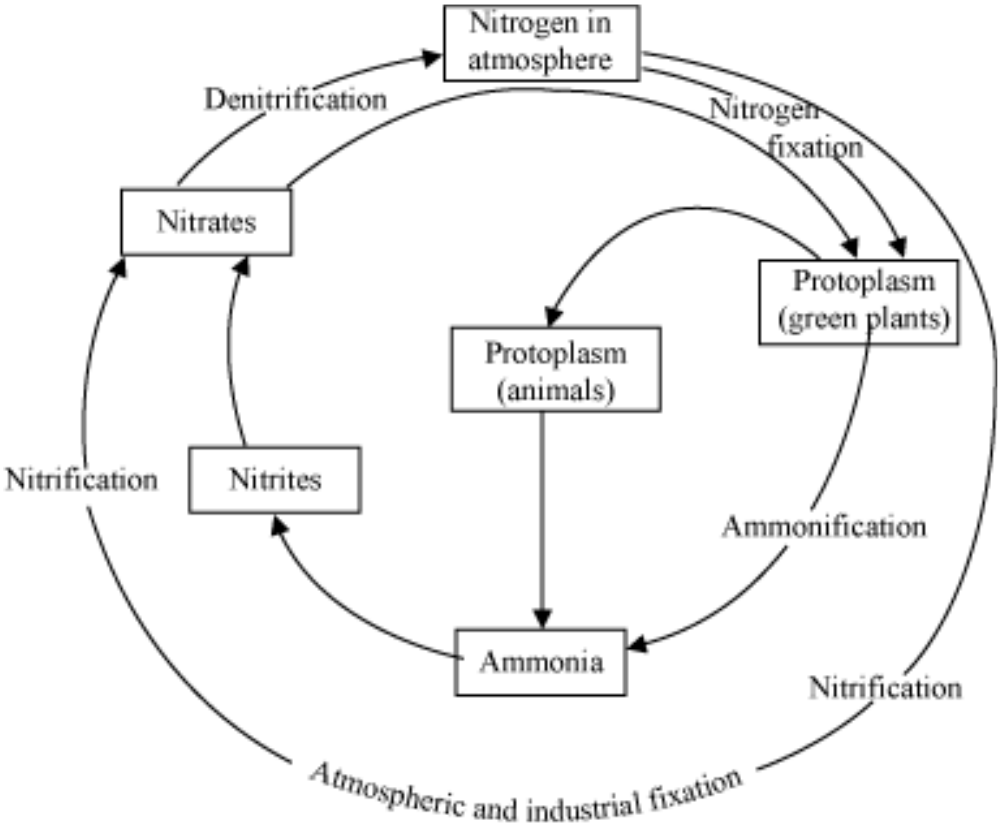
Air and Atmosphere

- **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

    - **Nitrogen cycle**



- **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.

- **Nitrogen dioxide**
    - It is produced from incomplete burning of fuels.
    - It causes respiratory problems.
    - It causes formation of acid rain.

- **Chlorofluorocarbons (CFCs)**
    - They are released from refrigerators, air conditioners, and aerosol sprays.
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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.

1. Oxygen is very important for the existence of life. In air, 21 % oxygen is present.

2. **Joseph Priestly** discovered oxygen by heating mercuric oxide. Oxygen is colourless, odourless and tasteless gas.

3. Oxygen is denoted by 'O'. It has atomic number 8 and atomic mass of 16 u. It contains 2 and 6 electrons in K and L shell respectively. In molecular form, it is diatomic.

4. It is majorly used by organisms for respiration. Plants form oxygen by the process called photosynthesis.

5. In laboratory, oxygen is prepared by heating potassium permanganate at 240 °C. On heating, potassium permanganate forms potassium manganate, manganese dioxide and oxygen.

6. When a burning matchstick is brought near a test tube containing oxygen, it burns with a brighter flame. This shows that oxygen is a supporter of combustion.

7. Chemical properties of oxygen:

(i) On reaction with carbon, oxygen forms carbon dioxide with the release of energy.

(ii) Oxygen reacts with burning sulphur to form sulphur dioxide and sulphur trioxide.

(iii) Oxygen reacts with burning phosphorus to form phosphorus pentoxide.

(iv) Oxygen reacts with warm sodium with a golden yellow flame to form sodium peroxide.

(v) Oxygen reacts with burning calcium with a brick red flame to form calcium oxide.

(vi) Oxygen reacts with iron resulting into the formation of a white spark and crackling sound to form a reddish brown powder of triferric tetraoxide.

8. Rust is the new substance obtained from the combination of iron and atmospheric oxygen. Rusting is a chemical change, which affects the articles of iron and slowly destroys them. It gets increased in the presence of moisture.

9. Oxygen is used for respiration, cutting and welding of metals, in industrial and chemical processes, in the treatment of asthma, heart attack, pneumonia and gas poisoning. Liquid oxygen mixed with powdered charcoal and coal dust, is used for blasting rocks.

- 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.