

# **THE ATMOSPHERE**

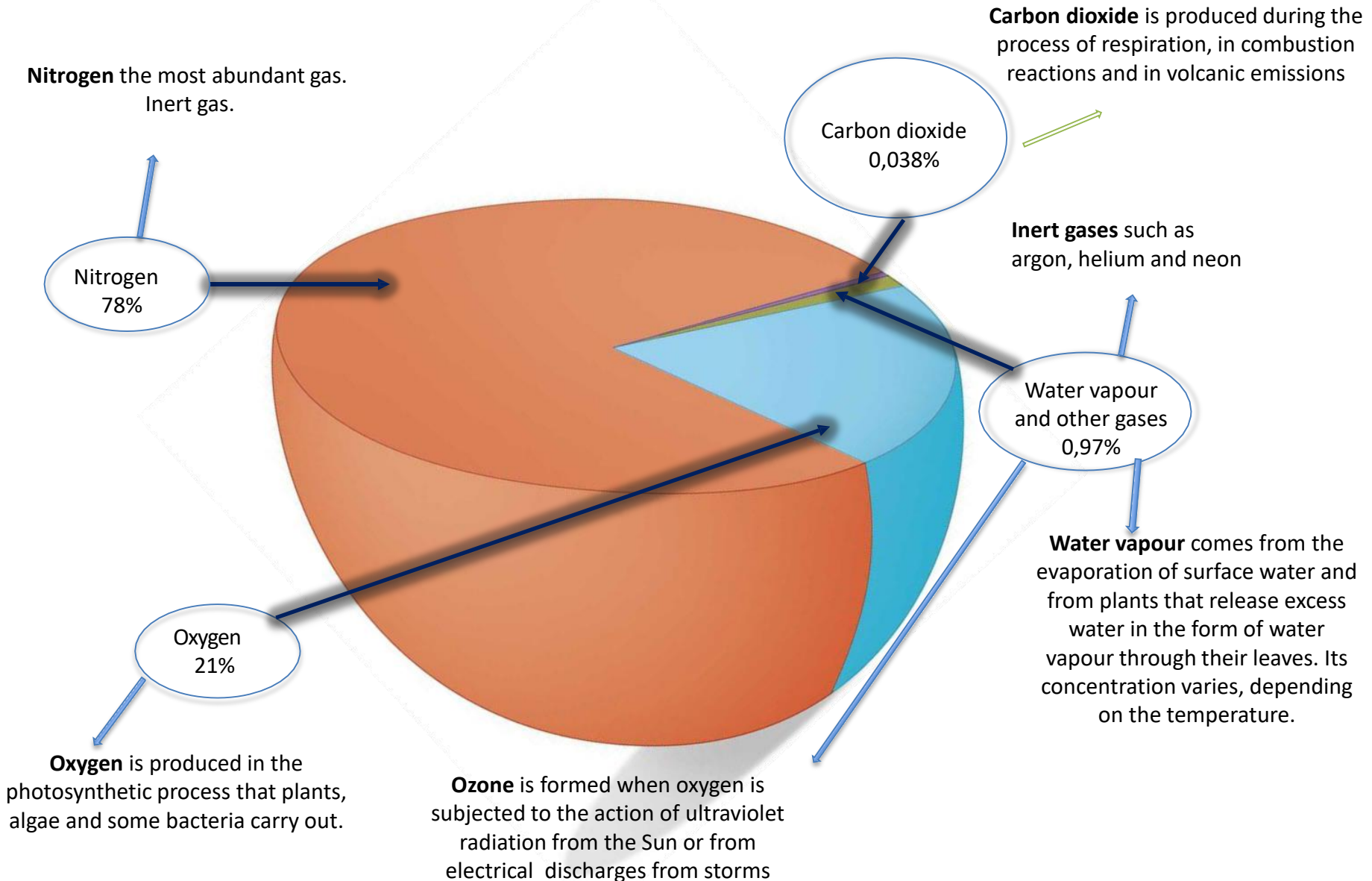
**Biology and Geology**

# THE ATMOSPHERE

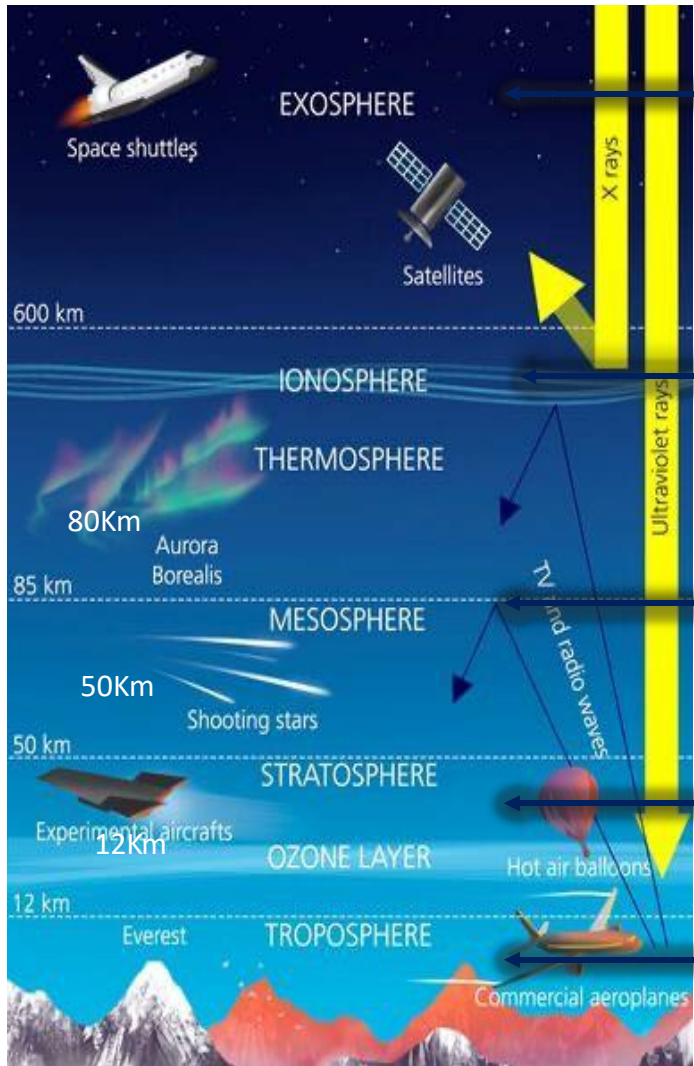
The **atmosphere** is the gaseous layer that surrounds the Earth. In addition to gases, the atmosphere contains **solid particles in suspension**.

- The particules that compose it cannot be distinguished with the naked eye. They form a **homogeneous mixture** that we call **air**.
- Gaseous state**: Fixed mass, variable volumen and variable shape.
- The **primitive atmosphere** was compounded by the **volcanic activity** gases and the gases produced by the collisions of **planetesimals**.
- The Earth's **primitive atmosphere** contained many gases, such as nitrogen, carbon dioxide, carbon monoxide, methane, a large amount of water vapour and much less oxygen than the present-day atmosphere.
- About 3.5 billions years ago, the **first photosynthetic organisms** appeared, and the amount of atmospheric carbon dioxide decreased. At the same time, the amount of oxygen increased.

# COMPOSITION OF THE ATMOSPHERE



# STRUCTURE OF THE ATMOSPHERE



The **exosphere** extends from approximately 500 km until it fades into outer space. It has a very low concentration of gases, almost non-existent. This layer is where artificial satellites are located.

The **thermosphere** extends from 80 to 500 km. This layer absorbs the strongest and most energetic solar radiation, such as X-ray. For this reason, the temperature in the upper part reaches 1000°C.

The **mesosphere** extends from 50 to 80 km. In this layer the temperature descends to -100°C. This is where shooting stars are formed, when small meteorites disintegrate on contact with air particles.

The **stratosphere** is between 12 and 50 km. The gases that form it move horizontally. The ozone layer, that protects us from ultraviolet rays, is in this layer, at an altitude of 25 km. Temperature increases until 5°C.

The **troposphere** extends to an altitude of approximately 12 km. It contains 90 % gases. The conditions are perfect for life to exist. Meteorological phenomena take place here. The temperature decreases with altitude, to reach -60°C at the top of this layer.

# THE IMPORTANCE OF THE ATMOSPHERE FOR HUMAN THINGS

- Regulatory action of the Earth's temperature.
- Protective action: stops external agents, such as meteorites or harmful radiations, from reaching the surface.
- Atmospheric gases and life.

## Carbon dioxide

is an essential gas for autotrophic organisms to perform photosynthesis

## Oxygen

is essential for respiration process

## Nitrogen

is essential for the construction of proteins

**Water vapour forms part of the water cycle**

Condensation



Condensation nuclei

Clouds  
Fog

Dew  
Frost

Precipitation







Rain  
Snow  
(Snowflakes)

Hail

# AIR POLLUTION

**Air pollution** is the alteration of the normal composition of air due to the presence of forms of energy or particles of matter, which can be harmful for living things and the environment.

- **Natural pollutants** are generated by natural phenomena, without human intervention: the dust in deserts, ashes and gases released by volcanos, pollen produced by plants.
- **Artificial pollutants** are generated by human activity.

ARTIFICIAL POLLUTANTS			
Physical pollutants			Chemistry pollutants
Electromagnetic radiation	Noise	Rardioactivity	
			

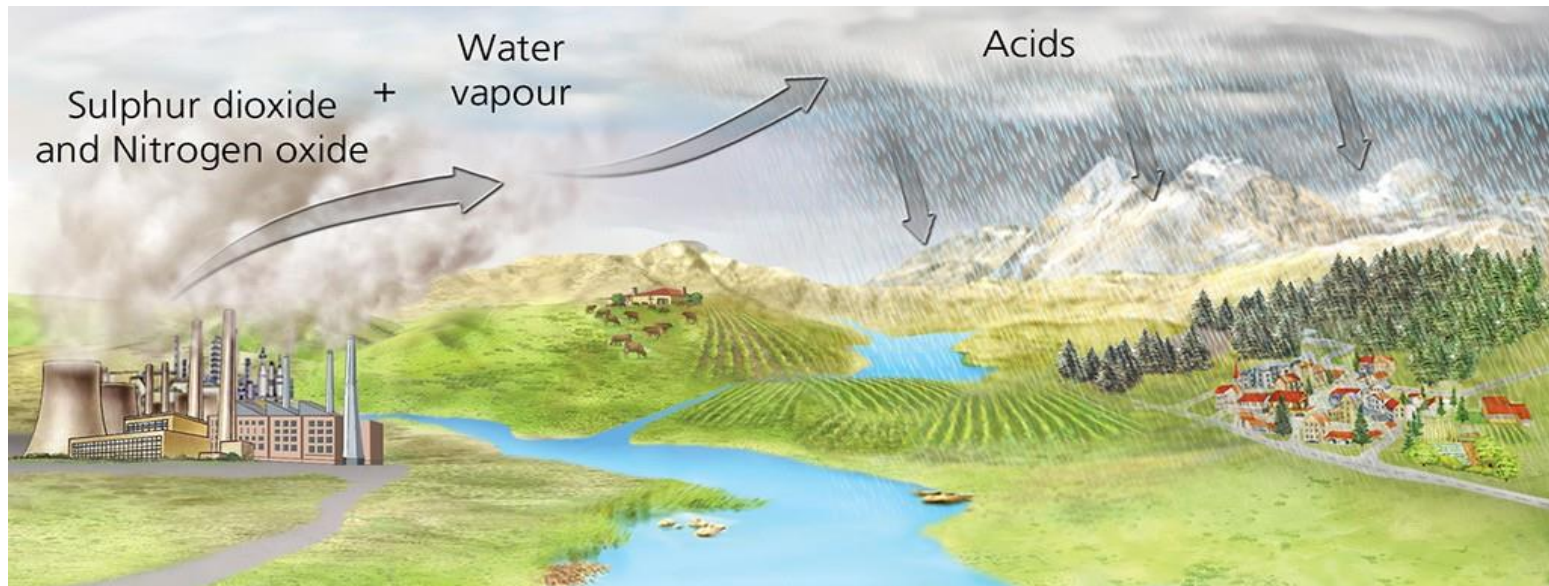


# AIR POLLUTION

## Consequences of air pollution:

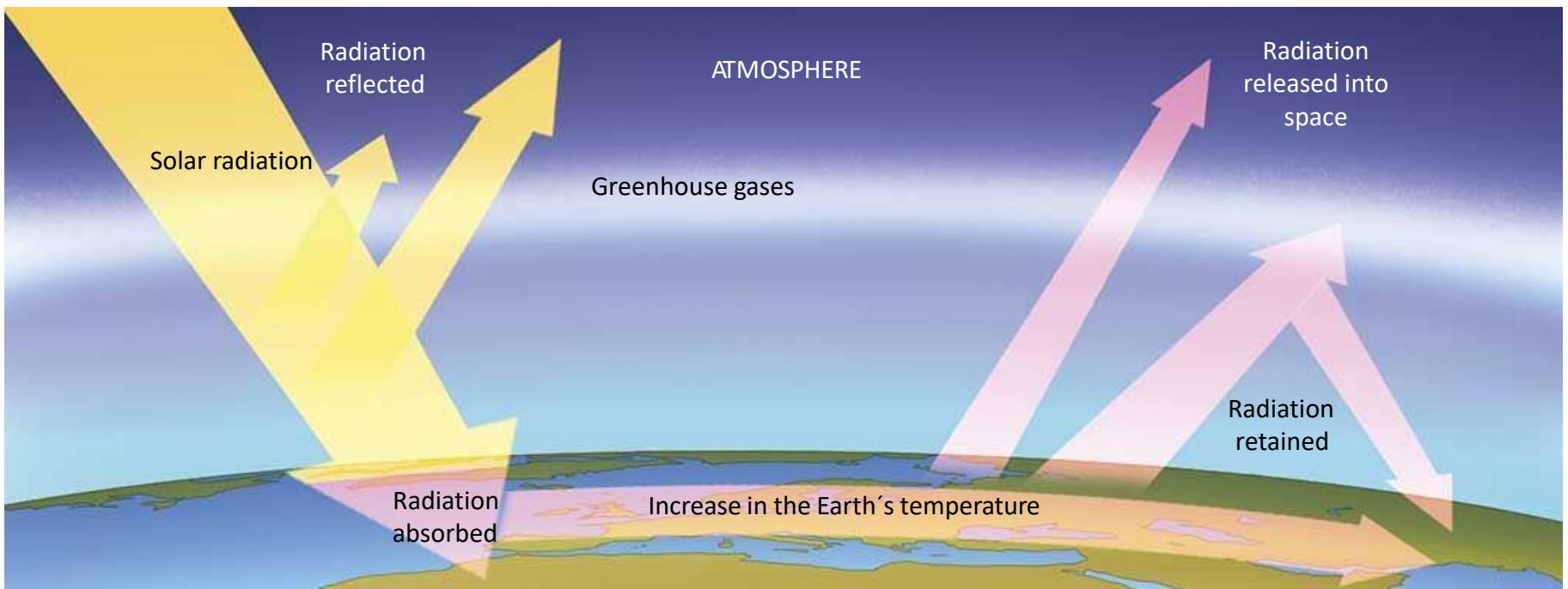
- Global level: **acid rain**.
- In ecosystems: destroy natural habitats and extinction.
- Individual level: respiratory problems and other disorders.

**Acid rain** is a direct consequence of the release of **nitrogen** and **sulphur oxides** into the atmosphere.



# THE GREENHOUSE EFFECT (+)

The **greenhouse** is the phenomena which the atmosphere retains some of the heat from the Sun. In this way, it regulates the temperature of the Earth's Surface, maintaining temperature levels adequate for life to exist.





# THE INCREASE IN THE GREENHOUSE EFFECT (-)

## CAUSES OF THE INCREASE IN THE GREENHOUSE EFFECT

- The burning of fossil fuels, such as coal or oil.
- The destruction of forests.

## CONSEQUENCES OF THE INCREASE IN THE GREENHOUSE EFFECT: GLOBAL WARMING

Melting of the poles



Torrential rains and desertification

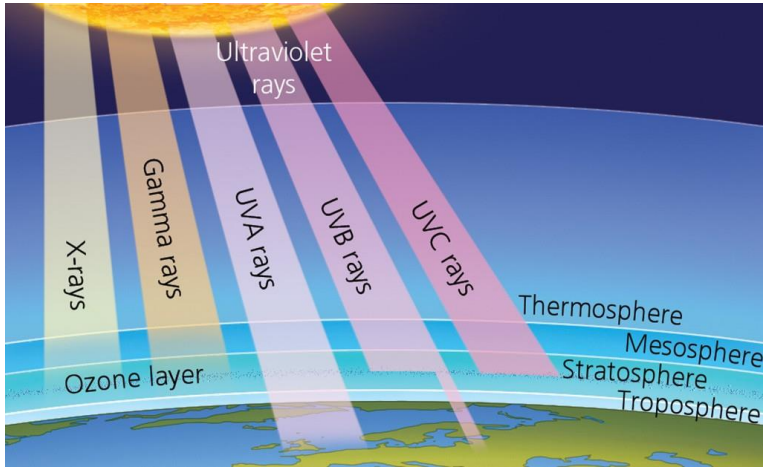
Plagues



Disappearance of ecosystems

# THE OZONE LAYER (+)

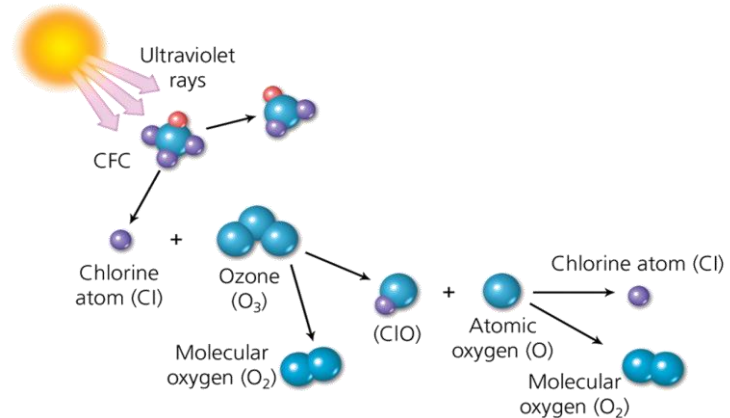
The atmosphere **protects us** from dangerous radiation from the Sun.



UV rays		
UVA rays	UVB rays	UVC rays
<ul style="list-style-type: none"> <li>The ozone layer doesn't absorb them.</li> <li>They tan our skin.</li> <li>Too much exposure can create skin and eye problems.</li> </ul>	<ul style="list-style-type: none"> <li>The ozone layer absorbs most of them.</li> <li>Some reach the Earth's surface.</li> <li>They cause similar problems to UVA rays.</li> </ul>	<ul style="list-style-type: none"> <li>The <b>ozone layer</b> absorbs all of them.</li> <li>They're more dangerous.</li> <li>They can cause skin cancer and cataracts.</li> </ul>

**Ozone** is a molecule made up of three oxygen atoms ( $O_3$ ), capable of absorbing ultraviolet radiation.

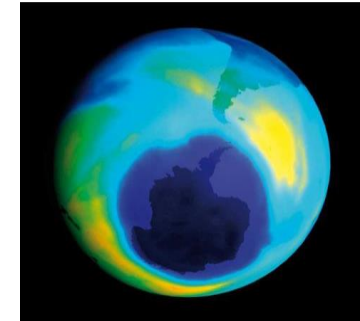
The principal cause of the depletion of the ozone layer is **chlorofluorocarbon gases (CFCs)**.



# THE DEPLETION OF THE OZONE LAYER (-)

## Causes of the depletion of the ozone layer

- Chlorofluorocarbon gases (CFCs)



## Consequences of destroying the ozone layer

- **Effects on the skin:** reddening, mild burns, premature aging, and cancer
- **Effects on the body's defences**
- **Effects on sight:** blindness and cataracts.
- UV radiation reduces the **efficiency of photosynthesis**
- **The loss of phytoplankton**

