
Environmental Pollution

Objectives

Man is one of the species who inhabit the earth. He is the only one who has interfered with various natural processes for use of both biological & physical resources to meet his multiple demands. Man has polluted all the three realms of the earth-lithosphere, hydrosphere & atmosphere. It is essential for us to know about environment & its pollution.

In this presentation we will be able to know about-

- **Environment**
- **Biosphere**
- **Ecosystem model**
- **Atmosphere**
- **Atmospheric pollution**
- **Environmental Challenges**

Environment

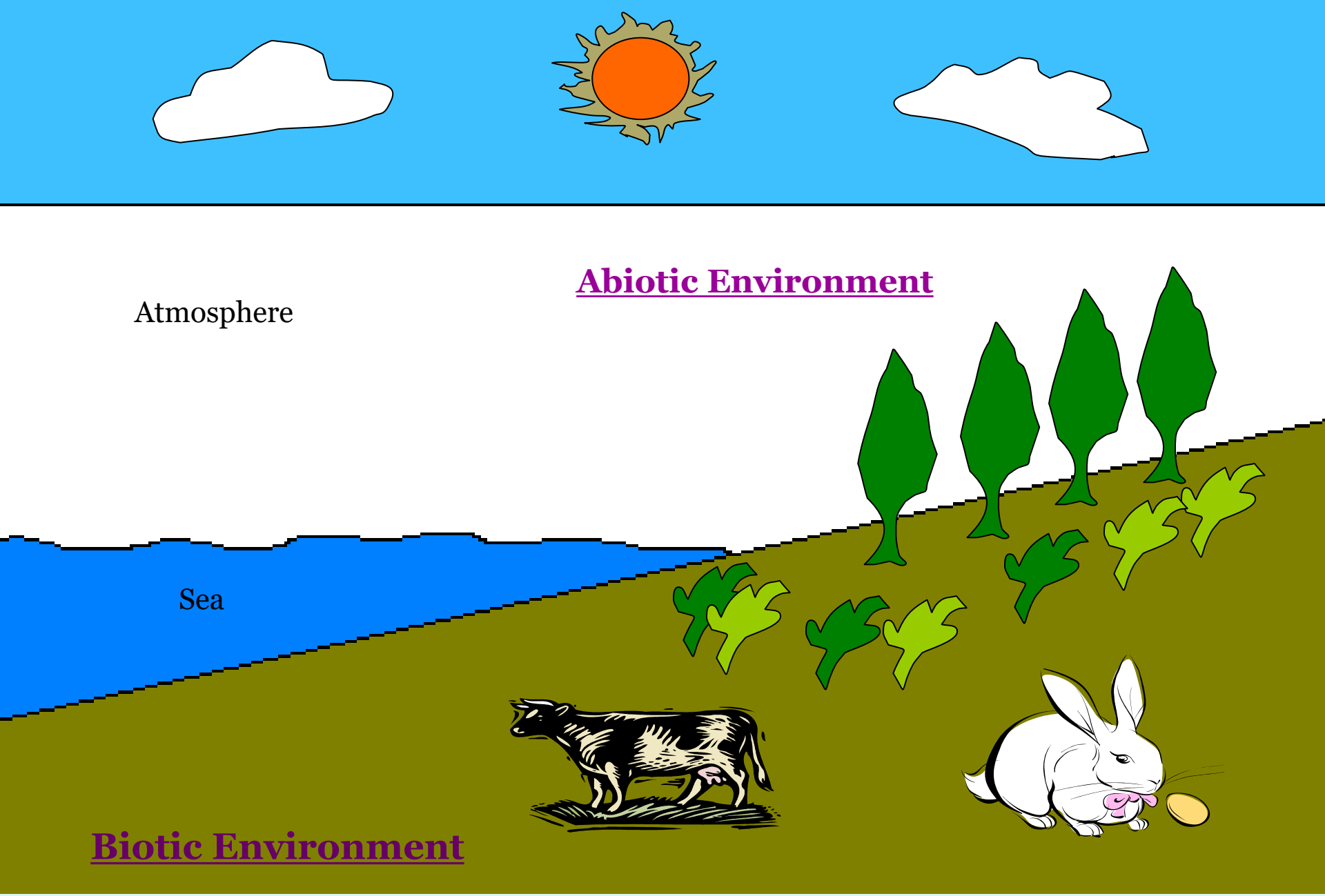






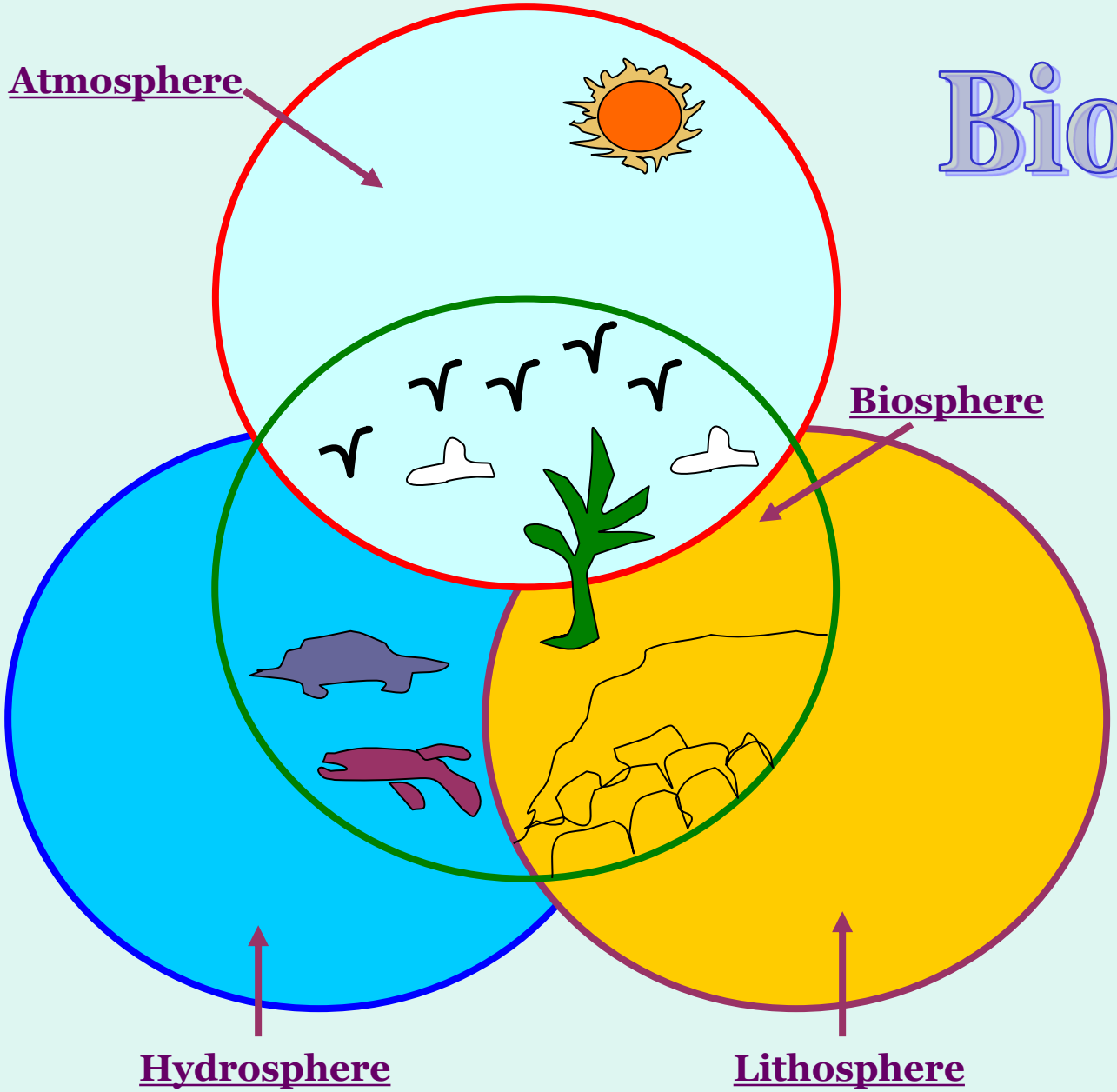


That which surrounds, the total sum of the condition of the surroundings within which an organism, or group, or an object, exists(including the natural as modified by human activity & the artificial).



Environment is the sum of biotic & abiotic component

Biosphere

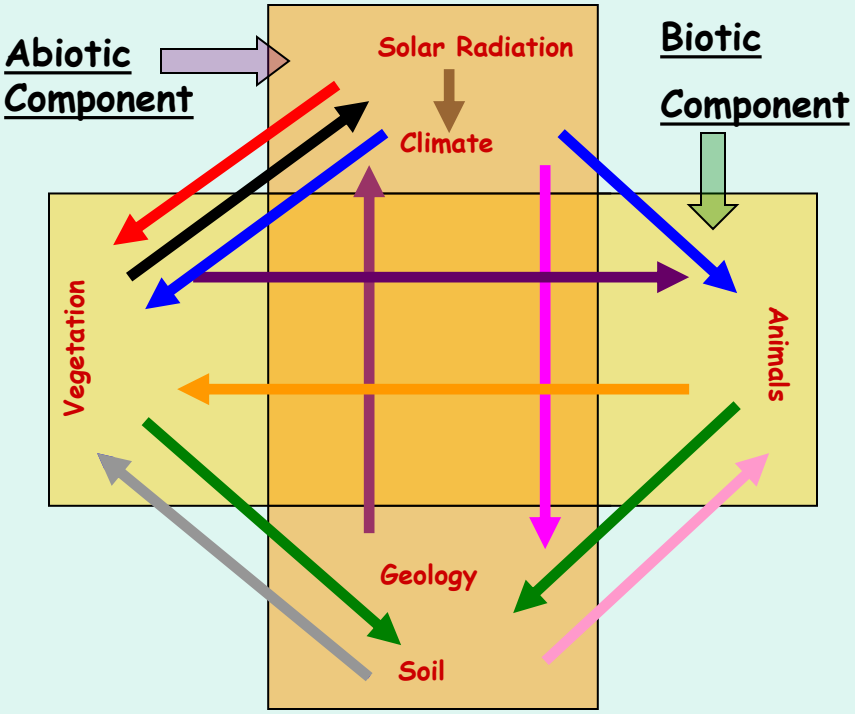


Biosphere Model

The entire part of earth's land, soil, water & atmosphere in which living organism are found is called biosphere

Or

The combined area lithosphere, hydrosphere of & atmosphere is known as biosphere.



Sun provides energy for plant photosynthesis

Amount of solar radiation varies with latitude & hence effects climate. solar radiation also power weather systems

Volcanic activity ,mountain, ranges etc. can also affect climate

Climate interacts with geology in soil formation provides water for solar climate.

Soil provides water & nutrients for plants together with a physical base in which plants can root themselves.

Plants provides food for animals

Animals alter vegetation by browsing & grazing. Human have significantly altered vegetation patterns through modification for agriculture.

Vegetation gives off water vapour who helps to stabilize the climate of the earth.

Climate restricts the type of plants & animals that can survive in a particular ecosystem. Water & temperature are two main climate controls.

Dead plants & animals decomposes & return nutrients to the soil. Nutrients are also returned to the soil through animal excrement.

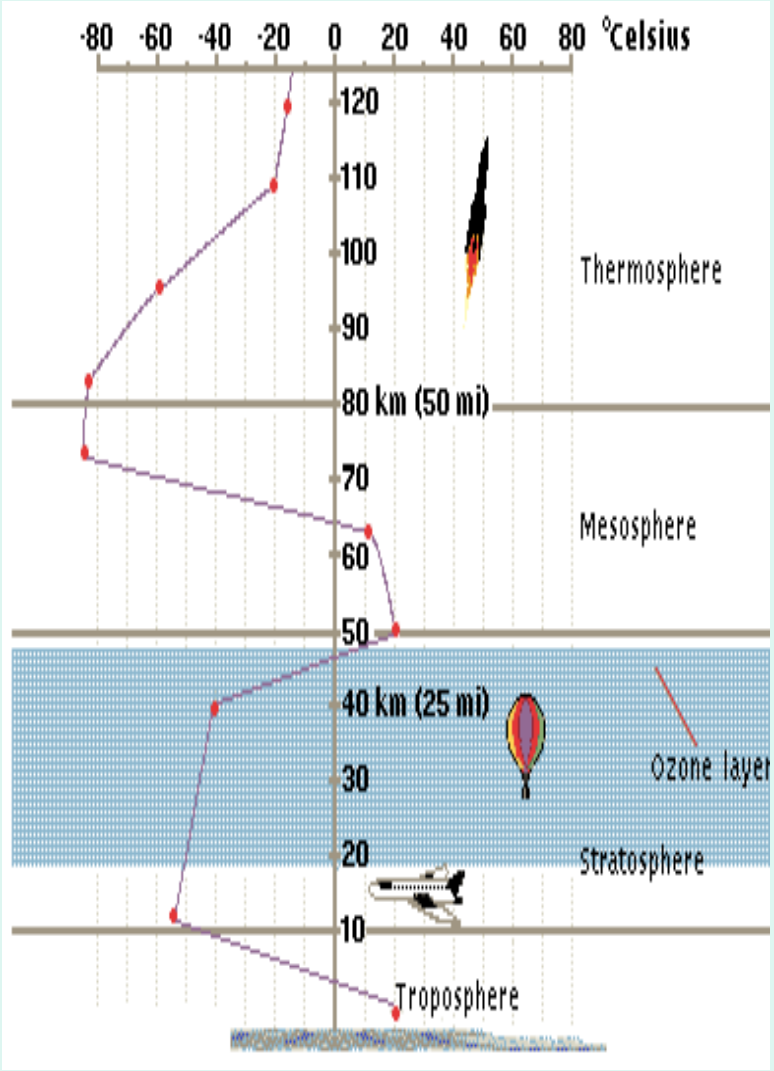
Soil [provides habitat including water & air for many invertebrates addition many animals have evolved specialist cope with different soils for example the feet of camel.

Ecosystem Model

Atmosphere

- **Our current atmosphere is a mixture of many different gases & suspended particles. It is almost same every where up to an altitude of 80 Kms. The atmosphere is divided in to 5 layers-**

Name of sphere or layer	Height in Kms.	Temperature	Important Chemical Species (Gas)
Troposphere	0-8	15 to 45	N_2, O_2, CO_2, H_2
Stratosphere	8-50	-55 to 05	O_3, O_2
Mesosphere	50-80	-2 to -90	N_2+O_2
Ionosphere	80-400		$O_2, O+, NO+$
Exosphere	400-1600		H_2, He



Composition of Atmosphere

Constituent	Symbol	Average concentration	Source	Volume
Nitrogen	N_2	780900	Biotic	7.809×10^{1}
Oxygen	O_2	209400	Biotic	$2\text{-}094\times 10^{1}$
Argon	Ar	9300	Radioactive	9.3×10^{-1}
Carbon dioxide	CO_2	318318	Biotic & industrial	3.18×10^{-2}
Neon	Ne	18	Internal	
Helium	He	5.2	Radioactive	5.2×10^{-4}
Methane	CH_4	1.3	Biotic	1.3×10^{-4}
Krypton	Kr	1.0	Internal	1.0×10^{-5}
Hydrogen	H_2	0.5	Biotic & photochemical	5.0×10^{-5}
Water	H_2O	0.25	Physical	2.5×10^{-5}
Carbon monoxide	CO	0.1	Photochemical & industrial	1.0×10^{-5}
Ozone	O_3	0.02	Photochemical	2.0×10^{-6}
Ammonia	NH_3	0-01	Photochemical	1.0×10^{-6}
Nitrogen dioxide	NO_2	0.001	Biotic & industrial	1.0×10^{-7}
Sulpher dioxide	SO_2	0.002	Photochemical	2.0×10^{-8}

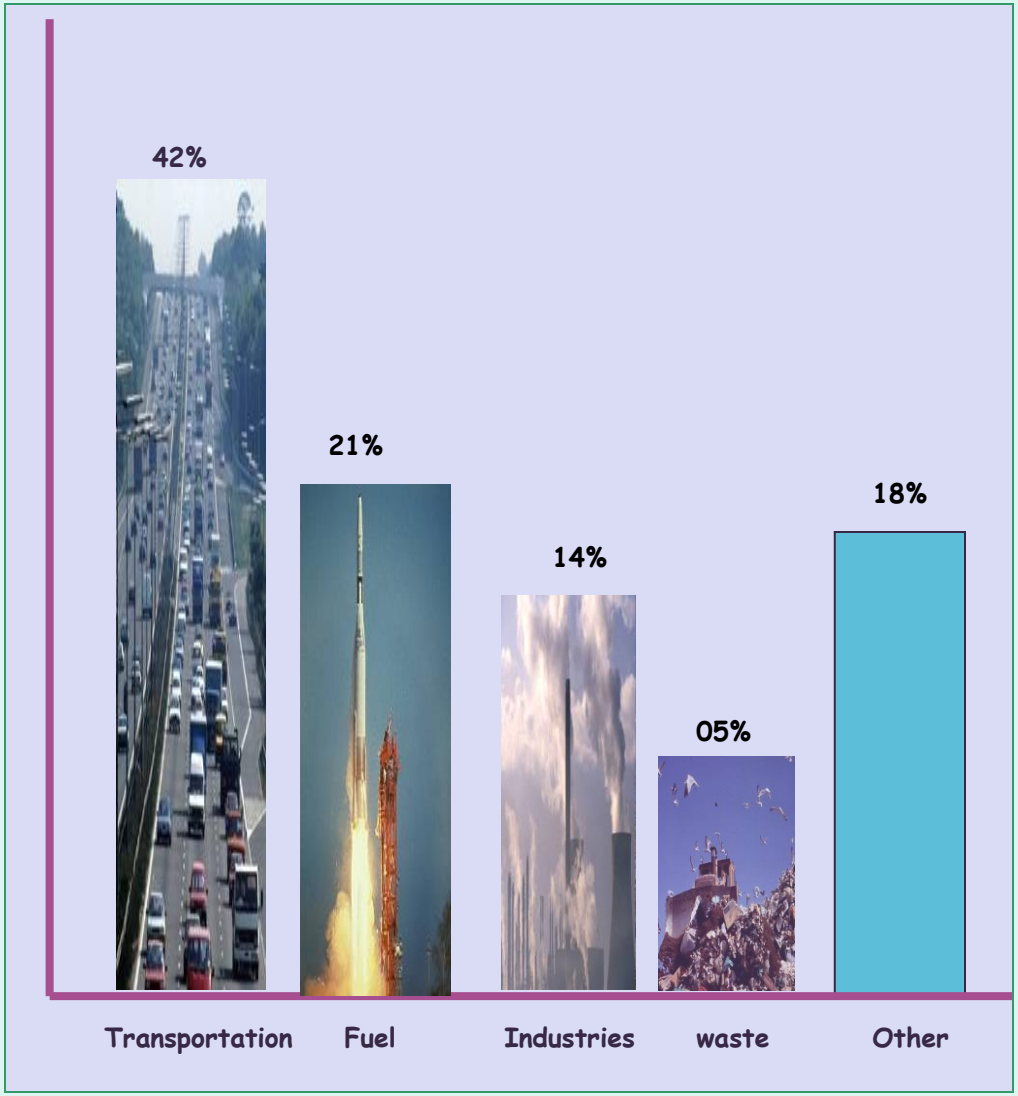
Definition of Pollution

- When Harmful Substances Contaminate the environment it is called Pollution.
- It can be defined as any undesirable change in the physical, chemical, biological characteristics of any component of the environment which can cause harm to life and property.

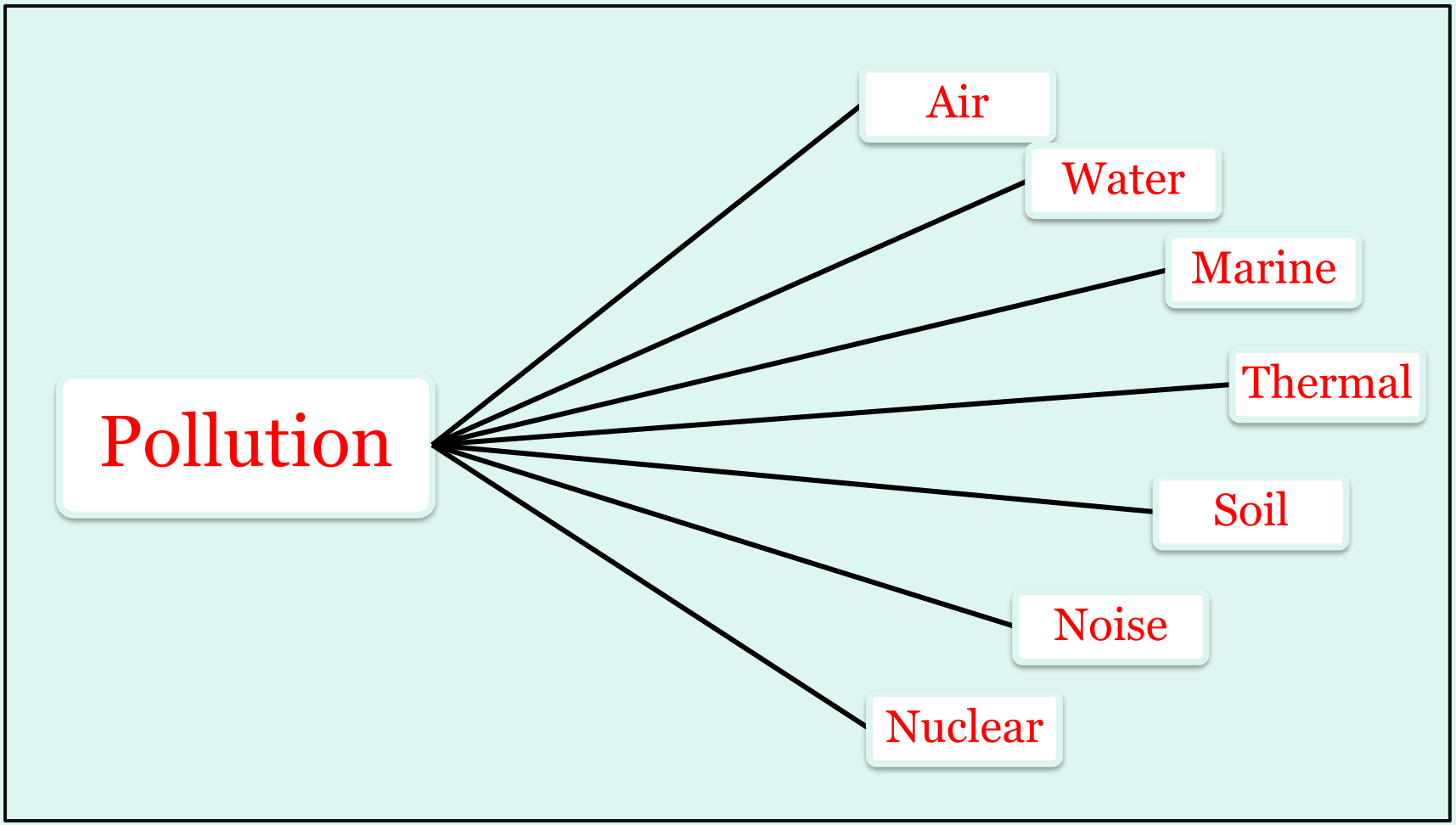
Atmospheric Pollution

Is an unwanted change in the quality of earth's atmosphere caused by emission of gases due to burning of fossil fuel, transportation, industrial institution etc.

Source	Pollution
Transportation	42%
Fuel	21%
Industries	14%
Solid waste disposal	05%
Other	18%



Types of Pollution



Different Pollutants

1. Gaseous waste: Oxides of nitrogen,SO_2,CO_2,CO.Cl,Br,I,O_3 & smog.
2. Complex organic chemicals: Benzene, ether.
3. Acid droplets: H_2SO_4, HNO_3
4. Agrochemicals: fertilizers, pesticides, herbicides, fungicides, nematicides, weedicides, bactericides etc.
5. Fluorides
6. Metals: Mercury, lead, Cd, Zn, Fe, Ni etc.
7. Solid waste: Garbage, plastic etc.
8. Radioactive waste: Nuclear reactors, uranium, nuclear explosion.
9. Noise waste

Environmental challenges

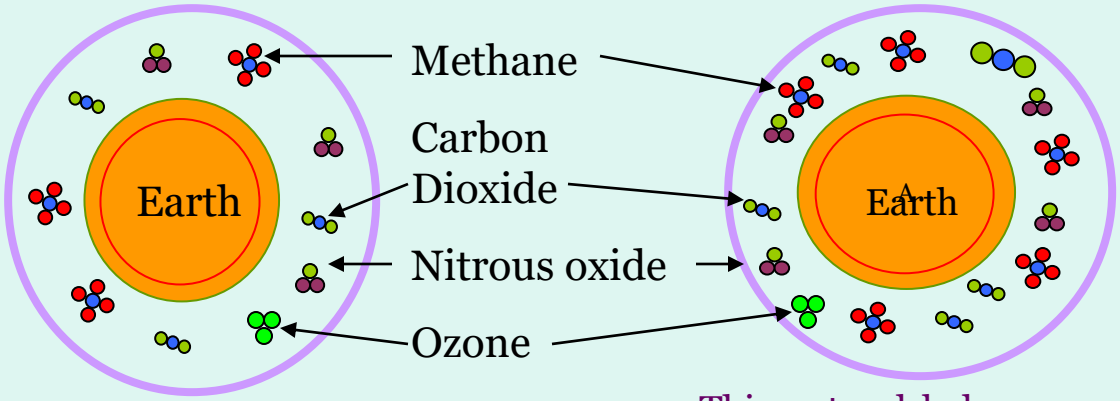
Green house effect: Increasing global temperature. Scientists predicting that earth's temperature will increase by 3-4°C by year 2030 if the pollution continues to increase at the same pace.

Ozone depletion: As ozone layer in the upper atmosphere absorbs incoming harmful ultraviolet radiation but it is now getting thinner & more UVs are reaching in to earth creating different disease like cancer& eye problems.

Photochemical smog: In 1952 London was covered by smog for 10 days .This smog was caused by fog, smoke, ash, & SO_2 plus NO_2.Sunlight played a great role in the formation of this smog. Though deaths occurring at that time were not directly attributed to the smog later statistics confirmed that 6,000 more people.

Acid rain: is caused by oxides of Nitrogen & Sulphur. It increases acidity of soil & effects the growth of trees & plants. The majestic monument Taj Mahal in India is also affecting by this.

Green House Effect

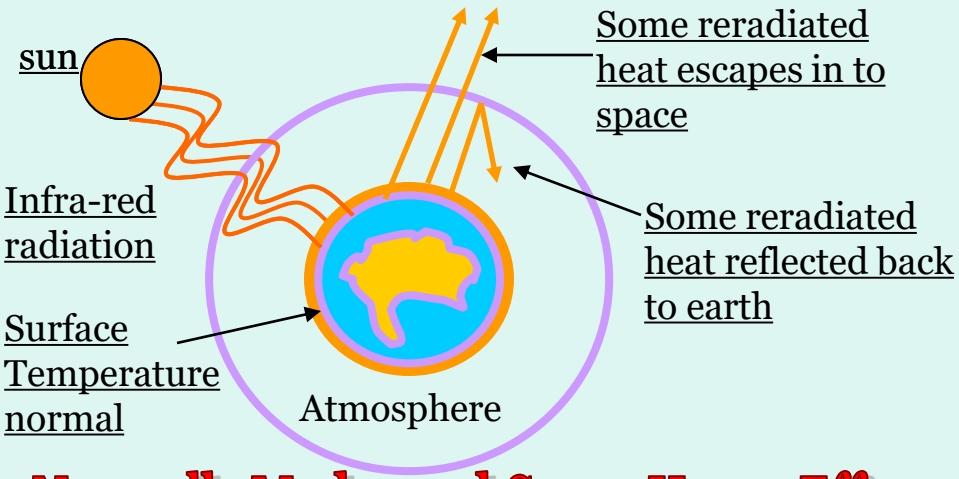


Green house gases in natural condition insulates the earth against extreme of temperature by limiting both incoming solar radiation & escape of reradiated heat in to space.

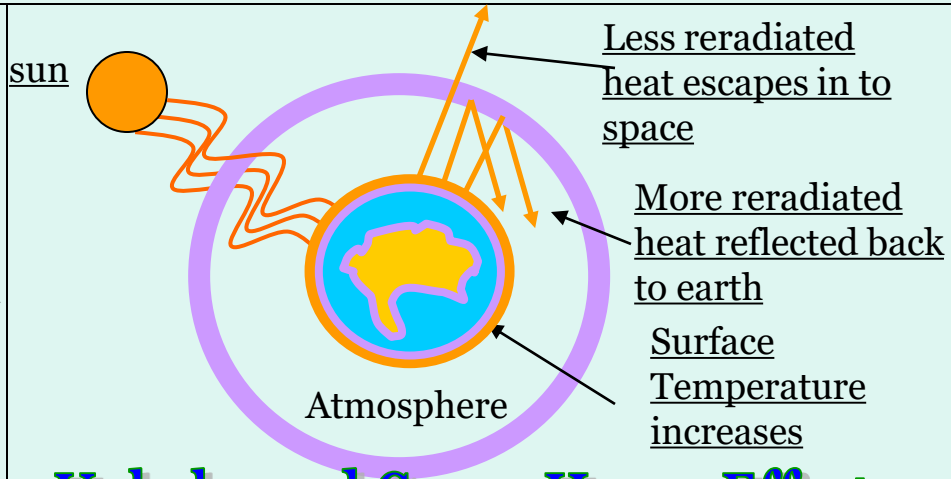
This natural balance may be distorted by Green House Effect as gases such as carbon dioxide have built up in the atmosphere trapping more heat

Carbon Dioxide	50%
Methane	18%
Chlorofluorocarbons	14%
Ozone	12%
Nitrous oxide	06%

Contribution of different gases to cause green house effect

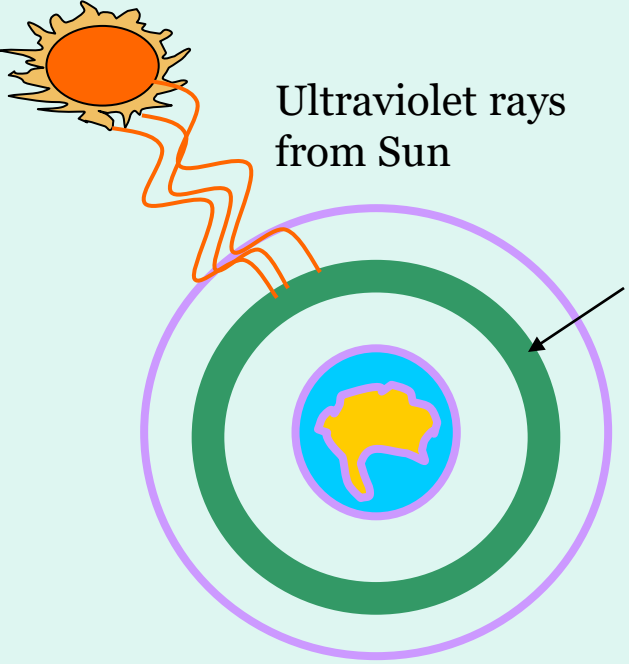


Naturally Moderated Green House Effect



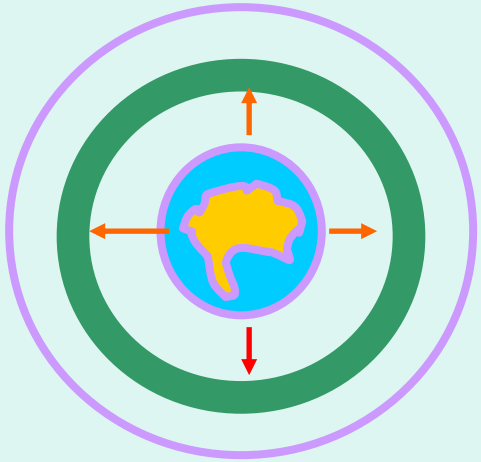
Unbalanced Green House Effect

Ozone layer depletion

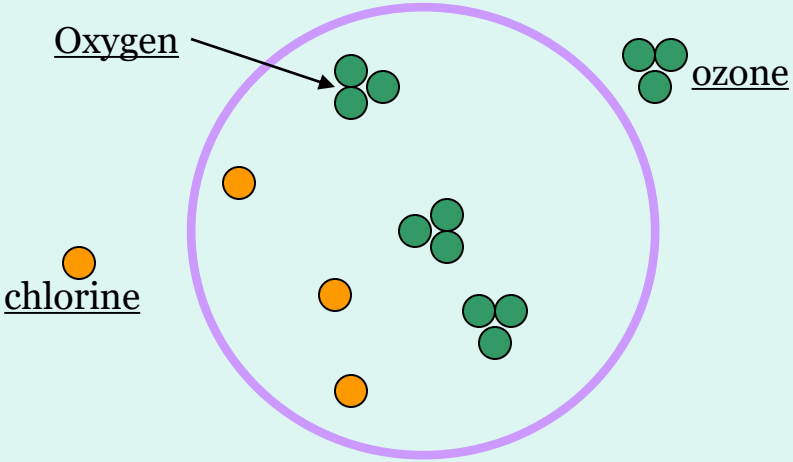


Ultraviolet rays from Sun

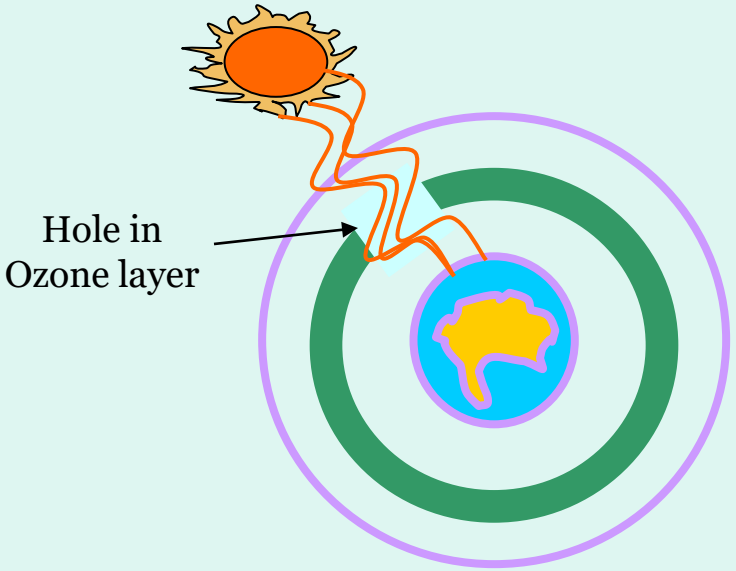
The Ozone layer in stratosphere blocks these harmful UV rays



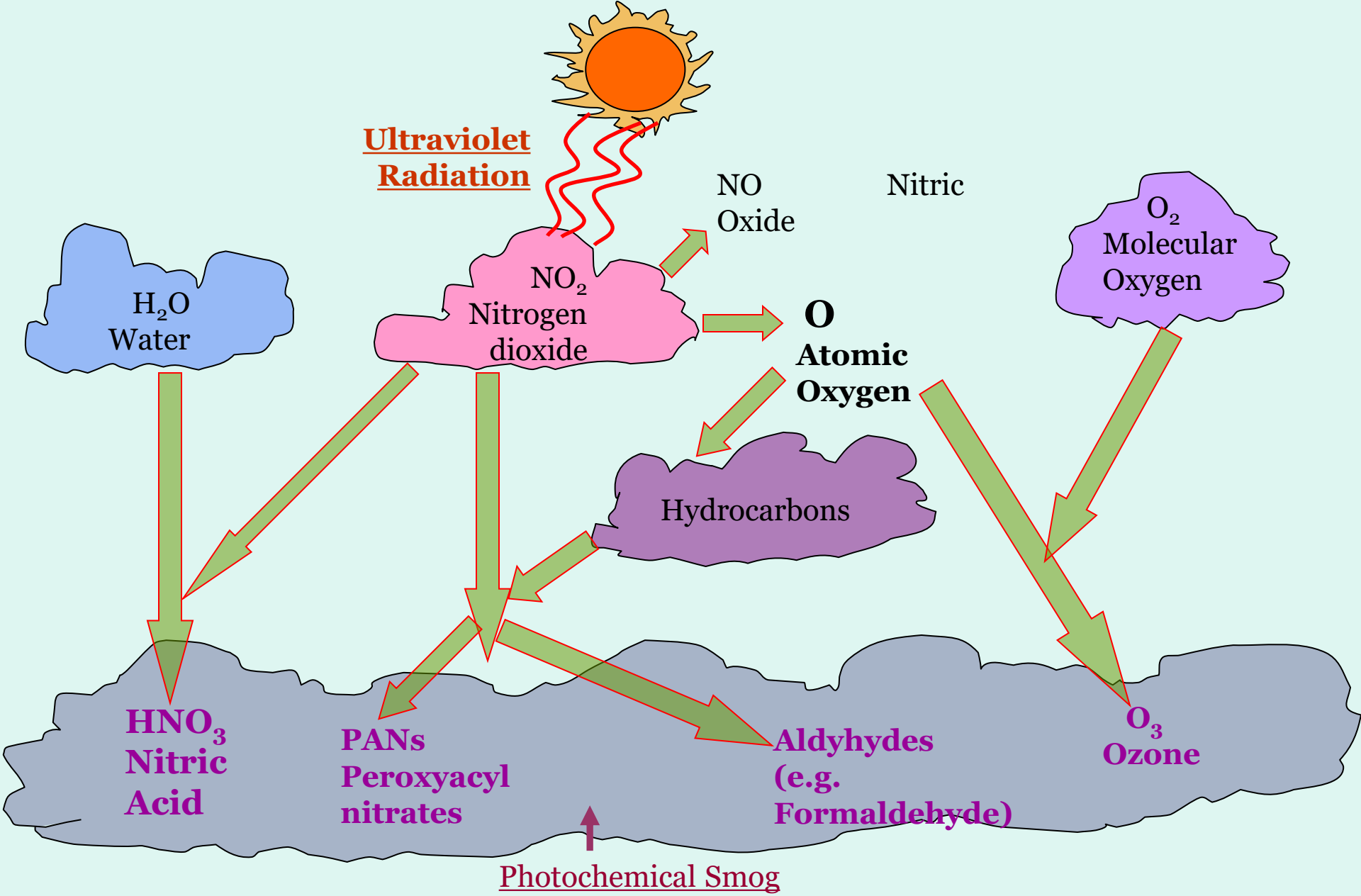
Chlorofluorocarbons are entering in to atmosphere releasing chlorine. The chlorine then break down the ozone



The chlorine released from CFCs break down the ozone molecule.



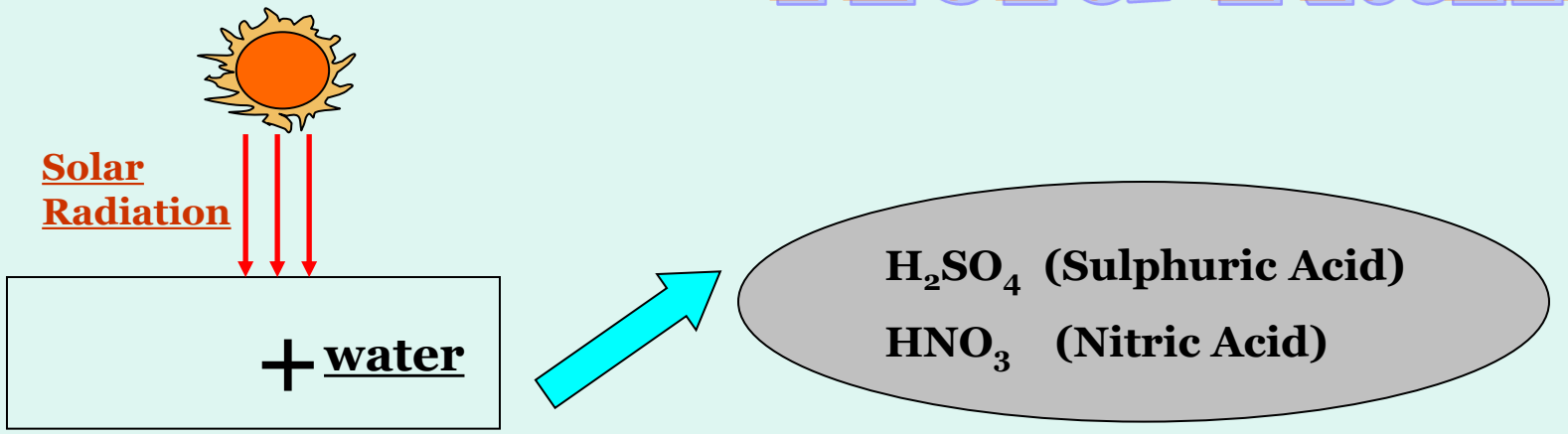
More ultraviolet radiations are reaching in to earths surface as there is a hole in ozone layer.

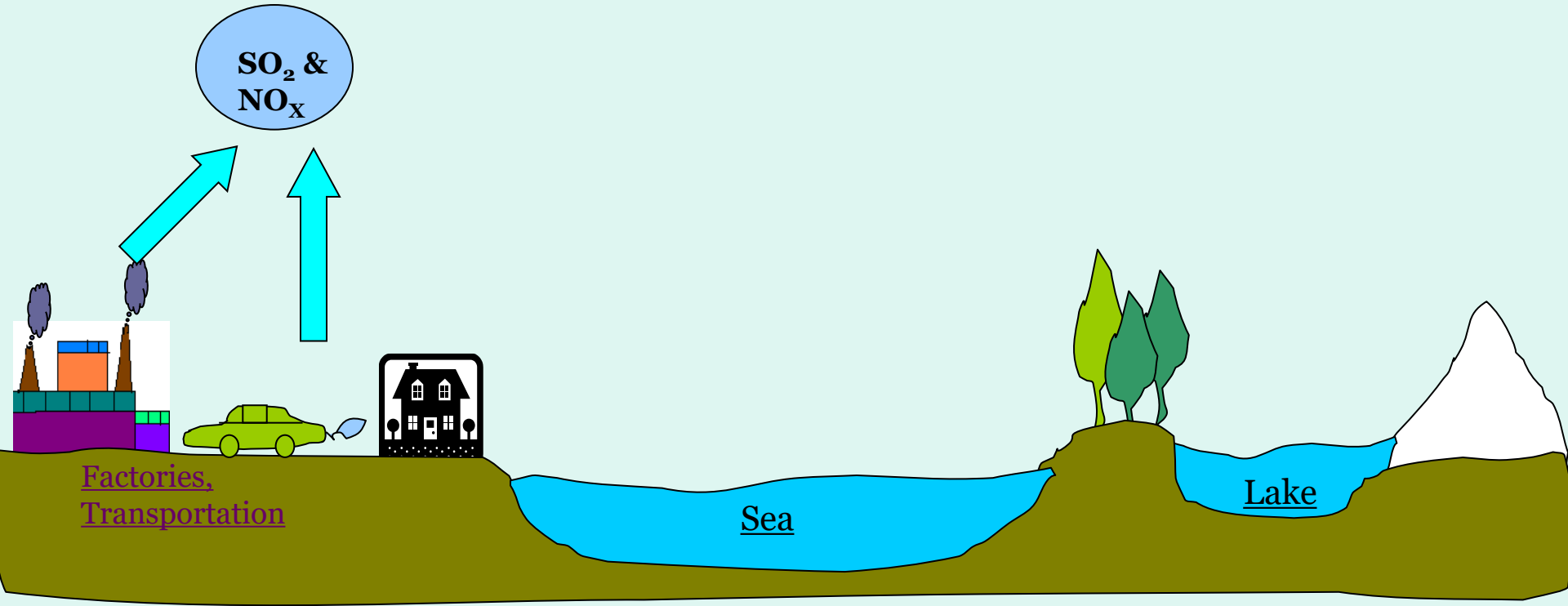


Formation of Photochemical Smog


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+ water
H_2SO_4 (Sulphuric Acid)
HNO_3 (Nitric Acid)


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