

AIR POLLUTION

- **2/3 of Bio species are terrestrial – air – life for them**
- **Air- 80% of man's daily intake (wt)**
- **Breath -2200 times-16 Kg. air**
- **Pollution affect all living things**
- **Air covers 200 mln sq. Km. of earth's surface**

COMPOSITION OF ATMOSPHERE

- **NITROGEN** —78.09%
- **OXYGEN** -- 20.95%
- **CO2** -- 3%
- **Hydrogen, Argon, Neon, Krypton, helium, xenon**

Total 6 quadrillion tons

1 Q =1followed by 25 zeroes

AIR POLLUTION

- **Air-** all gaseous substance enveloping earth protecting from abrupt changes in temperature and harmful solar radiation

ATMOSPHERE

A diagram of the Earth's atmosphere showing four layers: Exosphere, Ionosphere, Stratosphere, and Troposphere. The layers are represented by horizontal lines within a blue oval. The labels are in red text. The Ionosphere label has a small arrow pointing to the right at its right end.

EXOSPHERE

IONOSPHERE

STRATOSPHERE

TROPOSPHERE

ATMOSPHERE

- **Troposphere – 80% of mass- vapour-
weather**

8-10 km

- **Stratosphere- Ozone- 10- 50 km**
- **Ionosphere- ionized molecules, absorb
radio waves- protect from cosmic
radiation-50-150km**
- **Exosphere- outer layer-150-400 km**

AIR POLLUTION

- **Began when man started cooking**
- **Human activity –pollution**
- **Most concentration of pollutants- thickly populated cities & towns**
- **Definition –presence of that quantity of pollutants in the atmosphere which is sufficient to cause injury to human beings and other living creatures**

AIR POLLUTION

- *TYPES*
- **Pollutants released directly into the air**
- **Pollution from chemical changes occurring in the atmosphere**
- **Primary pollutants- enter the atmosphere directly**
- **Secondary Pollutants- Created in the air when other pollutants under the influence of electro magnetic radiation**

SOURCES OF AIR POLLUTION

- Major pollutants released
- Carbon monoxide—77.2%
- Nitrogen oxide -- 7.7%
- Hydrocarbons-- 13.3%

SOURCES OF AIR POLLUTION

1. Stationary combustion sources

Burning of coal, petroleum – gaseous & particulate pollutants released

- Petroleum= Hydrocarbons + Sulphur+ Nitrogen

When burned– Nitrogen & water released

- Coal– Fly ash

Oxidation of sulphur & Nitrogen –SO₂,
Nitrides(NO₂) Nitrate NO₃

SOURCES OF AIR POLLUTION

- Also produce carbon monoxide
- Particulates consisting of vanadium, plumbum, cadmium, mercury etc

2. Mobile combustion sources

Automobiles , locomotives, aircrafts , ships.

Largest source of pollution in cities

Automobiles 80% of air pollution

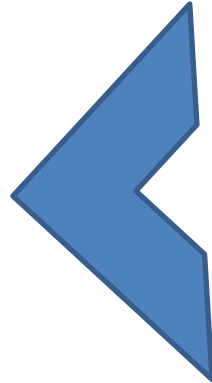
75% of noise pollution

Petroleum- led- photochemical reaction-aldehyde

SOURCES OF AIR POLLUTION

- ***3. Industrial processing & other sources***
- **Industries processing organic chemicals in high temp- release gases**
- **Chemical industries– CO, sulphur oxide, particulates**
- **Ind. Using CFCs**
- **Steel mills –particulate-ice nuclei**

POLLUTANTS



GASEOUS

PARTICULATE

ORGANIC GASES

INORGANIC GASES

GASEOUS



A. INORGANIC GASES

- **1. Oxides of Sulphur**

**Sulphur dioxide- Fossil fuels for ind. Uses
SO₂**

India 14 million tons in 2000

Reacts with oxygen– SO₃+ H₂O –

**-- H₂SO₄ & H₂SO₃ Sulphuric & Sulphurous
acid- Secondary pollutants**

- **2. Oxides of Carbon(Co & CO₂)**

INORGANIC GASES

- **Carbon monoxide**

- * **Incomplete burning of fossil fuels, wood charcoal**

- * **Cigarette smoke, motore vehicle, domestic heating equip. ,Refinery**

6 bln tonnes annually emitted globally

**Lungs absorb- Combines with hemoglobin-
reduce oxygen carrying capacity**

ORGANIC GASES

- **A. Aldehydes.**

**Thermal decomposition of fats, oils, glycerol---
aldehydes—nasal ,respiratory irritation**

- **B. Hydrocarbons**

Methane, ethylene

Anaerobic decomposition of organic matter—

1. Metric tons of methane /year—injure mucus membrane

INORGANIC GASES

- **1. Carbon dioxide**
- **Not a pollutant itself- human activity increase its volume– green house effect**

2. Oxides of Nitrogen

Thermal power plants

Factories , autos, air craft (fossil Fuels)

A ton of coal burnt--- 5-10 Kg. Nitrogen oxides

60% of nitrogen oxides naturally produced-

Above requisite level –pollution- acids produced

INORGANIC GASES

- **3. Ozone** –secondary pollutant
- Nitrogen
oxides+hydrocarbons+sunlight—O₃
- **4. Other inorganic gases**
Hydrogen flouride
Hydrogen sulphide

PARTICULATES

- **Solid particles , liquid droplets, fumes, smoke ,dust, pollens, bacteria, fungi etc**
- **5% of weight of air pollutants**
- **8 bln. Solid particles enter atmosphere per day.**

PARTICULATES

- **1. smoke & grit**
- Smoke& ash—domestic hearth
---chimneys
- main source in
Ind. Areas



Incomplete combustion-lung irritation, asthma

2. Photo chemical smog

smoke +fog = smog

Toxic due to chem. Contents

PARTICULATES

- **4. heavy metals**
- **Combustion of fuels in factories –harmful to lungs. Led poisoning, plumbism**
- **5. radio active elements**
- **Dust after nuclear tests suspended in the air**
- **6.Liquid particles**

Released by sprays, aerosols---ozone depletion

EFFECTS OF AIR POLLUTION

- SO₂
- NO₂
- CO₂
- SO₃
- SILICON
- ALLERGENS
- Dry mouth, throat irritation
- Lungs function
- Laziness, exhaustion.
- Blood O₂transport
- SILICOSIS
- ALLERGY

EFFECTS OF AIR POLLUTION: PLANTS

- **SO₂** - bleached spots on leaves- barley, pumpkin, alfalfa, wheat, apple
- **N. oxides**- brown spots on leaves, growth-suppress
- **Flourides**- damage leaf tissues-crop yield
- **Ethylene**- premature leaf fall, floral bud shedding,

EFFECTS OF AIR POLLUTION: ANIMALS

- **Damage live stock- similar effects as on humans**
- **FLUROSIS- Flouride toxicity on animals**

EFFECTS OF AIR POLLUTION: MATERIALS

- **Acid rain- corrosion of metals , stones buildings**
- **Destroys textiles, paper**
- **Historical monuments**

SOLUTIONS

- USE PURIFIED PETROL
- MODERNISE IND.S
- AIR TREATMENT PLANTS
- ALTERNATIVE ENERGY- SOLAR
- TREATMENT OF EMISSION

Settling chambers, cyclone separator

- PLANTING TREES
- CHANGE LIFE STYLES, EDUCATION

EFFECTS OF AIR POLLUTION: CLIMATE

- **GLOBAL WARMING**
- **MELTING ICE CAPS**
- **OZONE DEPLETION**
- **WARM EARTH'S SURFACE, ACID RAIN,
SEA LEVEL INCREASE**