Chapter no.- 5

Environmental Pollution.

Environmental Pollution:-

- Definition:-

  "Any undesirable change in physical, chemical and biological characteristics of any component of the environment (air ,water, soil),which can cause harmful effect on various forms of life or properties"

- Pollutants- The substance which are responsible for pollution are called as pollutant.

Air Pollution


CIUDAD DE MEXICO
BIENVENIDOS

Classification of Air Pollutants:-

- **Classification based on Origin**

  1) Primary pollutant - e.g. .-SO_2,H_2S,Hydrocarbon
  2) Secondary pollutant - e.g.-O3,PAN,Photochemical Smog, Acid

- **Classification based on State matter**

  1) Gaseous pollutant - e.g-pollutante.g.SO_2,H_2S,CO,SO_X,NO_X
  2) Particulate pollutant - e.g.-Dust, Soil,Pollen, microbes

- **Classification based on Chemical Composition**

- 1) Inorganic air pollutant - e.g- Co,CO_2,NO_2,H_2
  2)Organic air pollutant - e.g.- Hydrocarbons, Aldehydes ,Acetone

Sources of Air Pollution-

- Natural sources

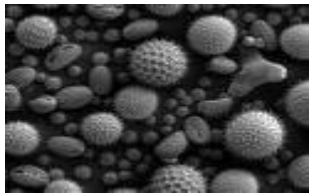
1)Volcanic eruption-

soil, Rock particles ,dust ,water vapours

2)Biological decay-CO_2, CH_4, H_2S

3)Dust storms-

soil, Rock particles, dust



4)Pollen grains

5)Forest fire-

Man made sources

1) Industrialization
2) Vehicular pollution
3) Agriculture activities
4) Domestic pollution
5) Deforestation
6) Radioactive elements
7) Mining Activities

Industrialization

Vehicular pollution

Deforestation

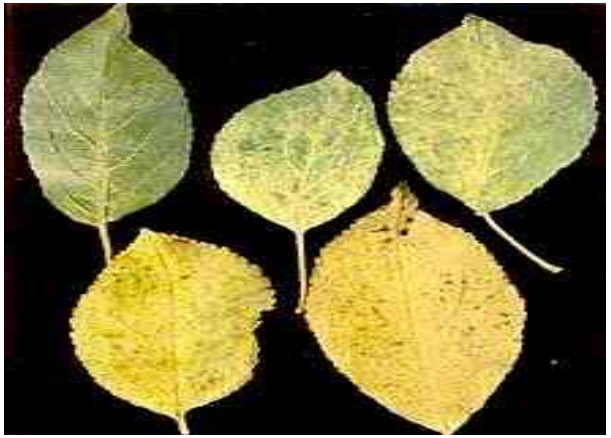
) Agriculture activities

Indoor air pollution

Effects of Air pollution

- 1) Effects on human being- Dizziness, Eye, nose, throat irritation, Headache, Respictory track problem, Cough, Asthma, Lung cancer, Carboxyhemoglobin etc.
- 2) Effects on Plant species-Chlorosis, Necrosis, Epinasty, Abscission,Affects metabolic activities
- 3) Effects on non-living material- Metal corrosion, degradation of paint, marbles, monuments
- 4) Effects on Atmosphere- Global warming, Acid rain, Ozone layer depletion.

Chlorosis



Necrosis

Epinasty

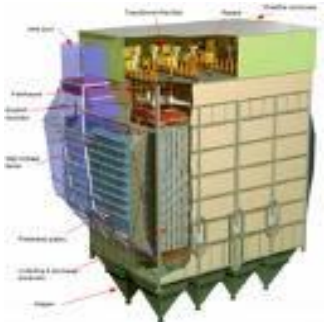
Abscission

Remedial measures of Air pollution-

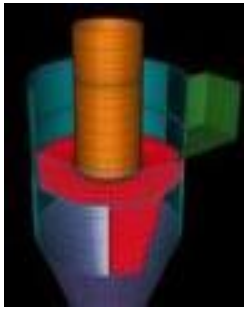
- Industries should be away from residential area.
- Increase the height of chimney.
- Use modern technology to control air pollution
- A forestation .
- Use less polluting raw material.
- Use public transportation .
- Laws
- Public awareness.

Various instruments are used to control particulate pollutant.

High volume sampler



Electrostatic precipitator



Cyclone separator

Wet scrubber

Water pollution

- Definition:- “Any undesirable change in physical, chemical and biological characteristics of water , which can cause harmful effect on various forms of life or properties”


©nunukphotos.com

REUTERS

Urban Solid waste

Industrial effluent

Municipal sewage

Types of water pollution

Based on Origin of pollution-

- Point sources- e.g.- Industries, Power plants, Mining activities etc.
- Non-Point sources- e.g.- Agri. surface water, Overflowing small drain

Based on Sources of pollutant-

- Natural Sources- e.g.- Flood, Storms
- Anthropogenic sources- e.g.- Industries , Mining activities

Based on Nature of pollutant-

- Physical pollution:-
- Chemical pollution:-
- Biological pollution:-

Based on Habitat and Storage-

- Surface water pollution- e.g.- River, Lake, Sea
- Ground water pollution- e.g.- Bore well, Open well

Sources of Water Pollution-

1) Municipal sewage
2) Industrialization
3) Agriculture activities
4) Mining activities
5) Radioactive elements
6) Thermal power plants
7) Oil spills
8) Ballast water

Municipal sewage

industrialization

Agriculture activities

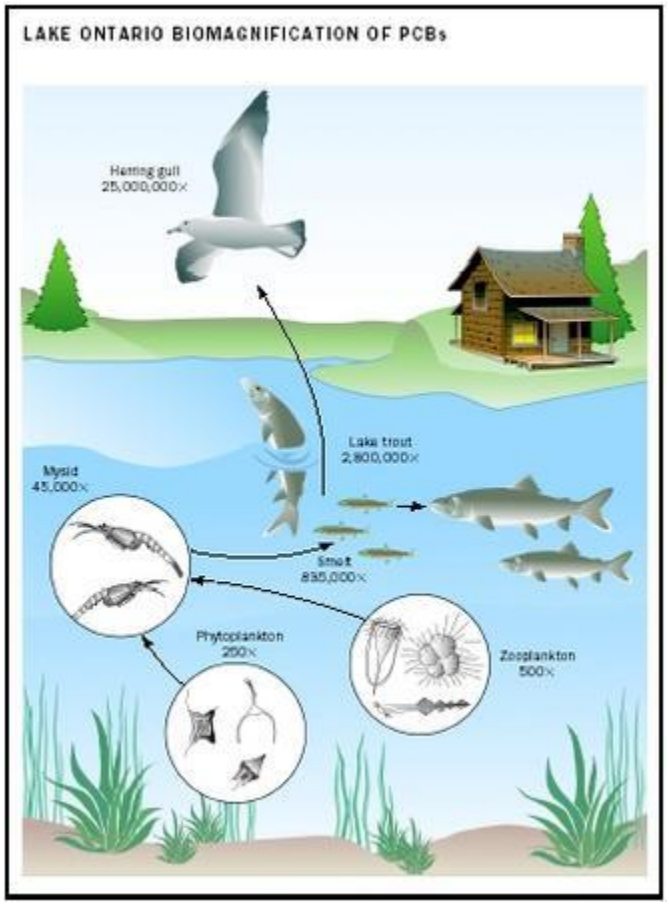
Mining activities

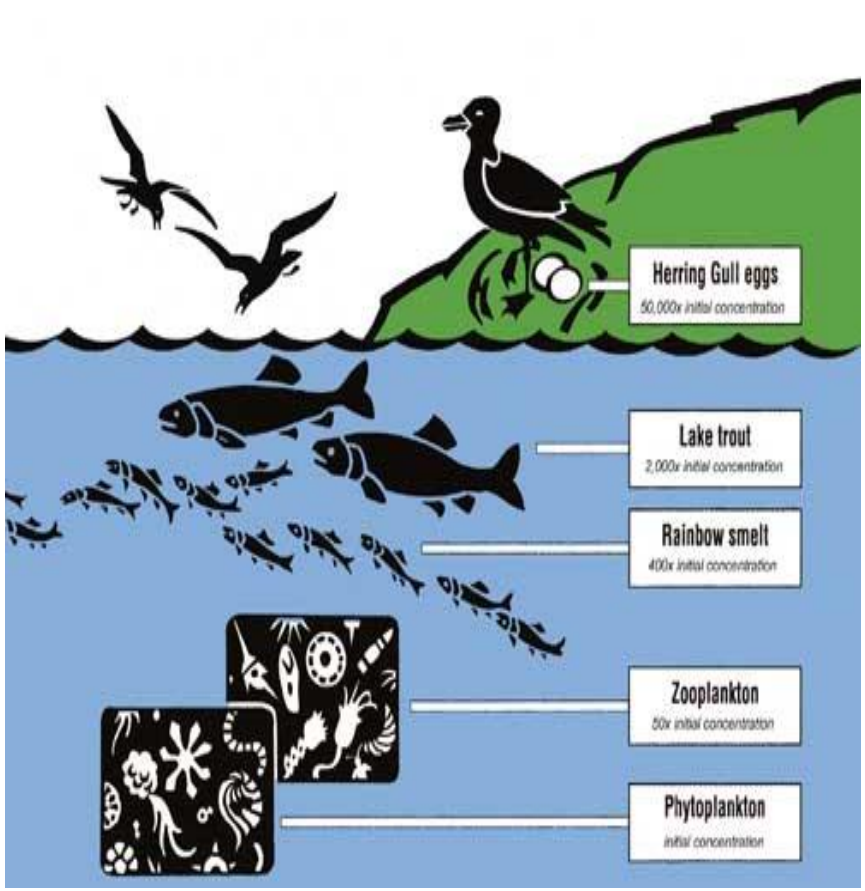
Thermal power plants

Oil spills

Effects of water pollution

- Various types of diseases-
  Cholera, Dysentery, Typhoid, Poliomyelitis ,Jaundice
- Hard water problem
- Impacts of heavy metal- Hg-**Minamata ,Cd-Itai-Itai**
- Biomagnifications
- Eutrophication
- Effects of oil spills
- Effects of Thermal pollution
- Reduce aesthetic beauty of water body.





Biomagnifications

Eutrophication

Remedial measures of Water pollution-

- 1) Proper use of water
- 2) Use scientific and technical method to purify waste water.(Build the E.T.P.)

  (Primary treatment ,Secondary treatment, Tertiary treatment on sewage)
- 3) Use organic fertilizers
- 4) Laws
- 5) Public awareness

Chemical Treatment-

Effluent Treatment Plant

Sedimentation tank

Coagulation tank

Chlorination tank

Soil Pollution

Definition:- “Any undesirable change in physical, chemical and biological characteristics of soil, which can cause harmful effect on various forms of life or properties”

Sources of Soil Pollution-

- Municipal sewage

- Industrialization
- Agriculture activities

- Mining activities
- Radioactive elements

- Urban solid waste

Municipal sewage

Agriculture activities

Industrialization

Mining activities

Urban solid waste

Effects of soil pollution

- 1) Change in properties of soil
- 2) Death of useful microorganism
- 3) Eutrophication
- 4) Biomagnifications

Remedial measures of Soil pollution-

- Proper treatment of industrial waste
- Reuse of solid waste
- Use organic fertilizers
- Laws
- Public awareness.

Noise Pollution

The word –noise-Latin word-means- feeling of vomiting
Definition- “The release of unwanted sound in the atmosphere”

OR

Any unwanted and unpleasant sound is called as noise pollution.


ZAP
NOISE!
BOOM
BEEEP
WHIRR
POW
ZOOOM
SPLASH


Stop!
Noise
[ABUSE!]

Sources of Noise Pollution-

- **A) Natural Sources :-**

Thunders

wind storms

heavy rainfall

lightening

B) Anthropogenic sources-

a) Non-Industrial sources-

- Various Electronics devices-e.g.

TV.

Tape recorder

Transistor

Loud speaker

- Kitchen appliance-

Mixer

grinder

Pressure cooker

Washing machine

Vacuum cleaner

- Transportation sources-

Aircraft

Two wheelers

Three wheelers

rail,

Ships,

Rockets

Four wheelers

- Other sources- Festivals, cultural programs, Dance party etc





b)Industrial sources- Various types of industries


Some noise level and their intensity in decibel (dB)-

Measurement of noise:- In dB –Decibel

Sr.No.	Noise Sources	Decible(dB)
01	Threshold of normal hearing	0
02	Normal Breathing	10
03	Whispering	30
04	Sound of an average living room	40
05	Silent places	40 – 50
06	Normal conversation	50 – 60
07	Sound of any office	55
08	Automobile noise	70
09	Jet air craft up to 300 m height	100 – 110
10	Jet air craft at take off point	150
11	Rocket engine	180 - 193

Industrial sources (noise level in some Industries)-

Sr.No.	Industries	Noise level (dB)
1	Heavy vehicle industry	100-160
02	Glass blowing industry	70-108
03	Saw mill	90-112
04	Sugar industry	80-103
05	Power Plants	90-100
06	Plastics industry	90-95
07	Automobile (engine testing) industry	80-90
08	Heavy engineering unit	85-95
09	Fabrication unit	80-95

Ambient noise level for various areas -

Sr.No.	Category of area	Day time(6 am-9pm)	Night time(6 pm-9am)
01	Industrial area	75	65
02	Commercial area	65	55
03	Residential area	55	45
04	Silence zone	50	45

Effects of Noise pollution:-

- **1) Effects on human being:-**Auditory Fatigue and permanent deafness, Increase in blood pressure, Damage kidney ,Liver and brain, Headache, Sleeplessness, Nausea, Feeling of vomiting, Loose of concentration ,Tension , hypertension and also injurious to small growing foutus.
- **2) Effects on Animals-**Disturbs the biodiversity, Disturbs the Ecosystems, Disturbs the migratory root of animals also affect reproductive rate .
- **3) Effects on non living material-**Cracks in Buildings, Rating in windows panel and damage the surface material.

Remedial measures of noise pollution-

- 1) Use ear protection aids-ear plug ,ear muff, noise helmet head phone
- 2) Reduce noise at sources –

  By process- a) use silencing devices

  b) use sound absorbing material

  c) change operation system

  d) replacement of noisy machineries

  e) proper oiling & greasing to machineries
- 3) Plantation- Neem, Vad, Peepal,Ashoka
- 4) Laws
- 5) Public awareness.




Thermal pollution

- Definition – The term thermal pollution has been used to indicate the harmful effects of heated water and effluent discharged by various power plants & industrial effluents is called as thermal pollution.

Sources of Thermal Pollution-

- Various power plants
- Industrial effluents

Effects of Thermal pollution:-

- Decrease in DO.
- Increase in Toxicity
- Effects on aquatic Animals- Reduce reproduction ,respiratory metabolic activities
- Effects on aquatic Plants:- Diatoms- 18-20
  Algae - 30 – 35
  Blue green algae – 35-40

Remedial measures of Thermal pollution-

- 1)Make cooling ponds-




- **Make cooling Towers**

- 3) Check the water parameter-
- 4) Laws-
- 5) Public awareness.-

Nuclear Hazards

OR

Nuclear Pollution

- **Types of radiations-**
- Alpha radiation- 2 proton,2 neutrons
- Beta radiation- only neutrons
- Gamma radiation-Electromagnetic radiation (X rays,radio and light wave)
- **Sources of Nuclear pollution:-**
- Various nuclear test- Strontium (Sr-89 Sr-90),Cesium(Cs-137),Barium
- (Ba-141),Iodine(I-131) Uranium and Thorium
- Radioactive fallout-
- Nuclear power plants- Low radioactive waste., Medium radioactive waste., High radioactive waste.

Effects of Nuclear pollution:-

- Genetic damage- Mutation in DNA structure and Damage chromosomes and genes ,injurious to small growing foetus
- Somatic damage- Loss of eye vision, Burning, Misscarriages,Cancer of Bone, breast, , Thyroid lung and skin etc.

Remedial measures of Nuclear pollution-

- International ban on nuclear test- CTBT International treaty
- Proper disposal of Radioactive waste-

Disposed deep in to under ground, disposed at bottom of sea, Stored inbig Stored in underground tank (stainless steel)

- Proper handle of Radioactive waste-
- Laws-
- Public awareness-

Solid waste management

Solid waste management

Waste- Any unwanted and discarded material

Solid waste- pollution-Any unwanted and discarded solid material other than liquid and gas

Solid waste pollution-Any unwanted and discarded solid material other than liquid and gas which are adversely affect on human being ,living organisms and non living material is called as Solid waste.

Sources of Solid waste:-

1)Urban waste- Generally called as Refuse –

Domestic and commercial Waste

e.g. Kitchen waste ,Discarded food Paper ,Plastics, glass, Metals, Tins, Cans, Crockery ,ceramics Plant residue, Rubbers , Ceramics , Stones ,Tyres, cloths, Aluminum cans ,soil ,Scared Vehicles ,various building materials, Electronic waste etc

2)Industrial waste- e.g.-factory rubbish ,Packing material, Glass, Wood paper plastics Coal ash , fly ash , mica waste , metal scrap , used batteries , Acids, Alkalis , Phenols, Pesticides, Insecticides ,Heavy metals and radioactive materials etc.








Types of Solid waste:-

- **Biodegradable waste-** Kitchen waste and industries like food processing ,Fruit processing, paper & pulp industries , Textile, Sugar , Dairy ,slaughter house ,All agriculture waste etc.
- **Non-Biodegradable waste-** Plastics, Polythene bags, Scrap material Metals, Cans, Ceramics ,Asbestos , Bottles, Aluminum cans, Glass, rubber Stones etc
- **Toxic waste-** Chemicals like Acids, Alkalis , Phenols, Pesticides, Insecticides ,Heavy metals and radioactive materials etc
- **Biomedical waste-** Cotton, bandage,Syrange ,needles, Saline pipe ,Neddles ,bottols ,seizers ,Various body organs ,Anatomical and pathological waste etc.

Effects of Solid waste:-

. **Various types of pollution-** air, water and soil pollution

- **Various types of diseases- pse.ba**cillary dysentery ,Diarrhea , Typhoid leptospirosis , malaria , dengue etc.

- **Creates unhygienic environment condition.-**

- **Reduce aesthetic beauty of site**

- **Ground water contamination**

Remedial measures of Solid waste –

- Reduction in use of raw material-
- Reuse, Reduce ,Recycle of solid waste –
- Energy production-
- Composting-
- Vermicomposting-
- Land filling-
- Incineration-
- Laws-
- Public awareness-

Composting

- Composting of degradable waste-

Vermicomposting

Eisenia foetida
Austrilian worms
Eudrillus engineac

- Vermicomposting of degradable waste-








Nutrient content of Vermicompost

- Nitrogen- 1.5 – 2.5 %
- Phosphorus- 0.9 – 1.7 %
- Potash- 1.5 – 2.4 %
- Calcium- 0.5 – 1.0 %
- Magnesium- 0.2 – 0.3 %
- Sulphur- 0.4 - 0.5 %
- And other micronutrients with vitamins, enzymes and hormones.

Land filling

- Land filling- The disposal of solid waste in sanitary land filling is one of most imp. method to reduce the volume of solid waste.




Incineration




Incinerators

- **Role of individual in prevention of pollution**

- Develop respect for all forms of life.
- Plant more trees.
- Avoid miss use and over use of natural resources.
- Use renewable energy resources.
- Reduce dependency on fossil fuels
- Use public transportation.
- Save the electricity.
- Reduce , Reuse and Recycle of solid waste.

- Use organic fertilizers.
- Use modern technologies to reduce air , water , soil and other environmental pollution.
- Straightly obey the various Environmental Laws
- Public awareness about the environment related issues.

Thank You

Save the Earth,

Save the Environment