Program – CIVIL ENGINEERING
Program Code – CE

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

24/07/2020

MSBTEs e-content

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic,
Nagpur

Unit IV: **ENVIRONMENTAL POLLUTION**

CO 4: Apply techniques to reduce environmental pollution

UO 4j: State sources and effects of noise pollution.

UO 4k: Describe preventive measures for noise pollution.

24/07/2020

Topic:
Noise Pollution

Written by

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic, Nagpur

Br. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

What we will learn today?

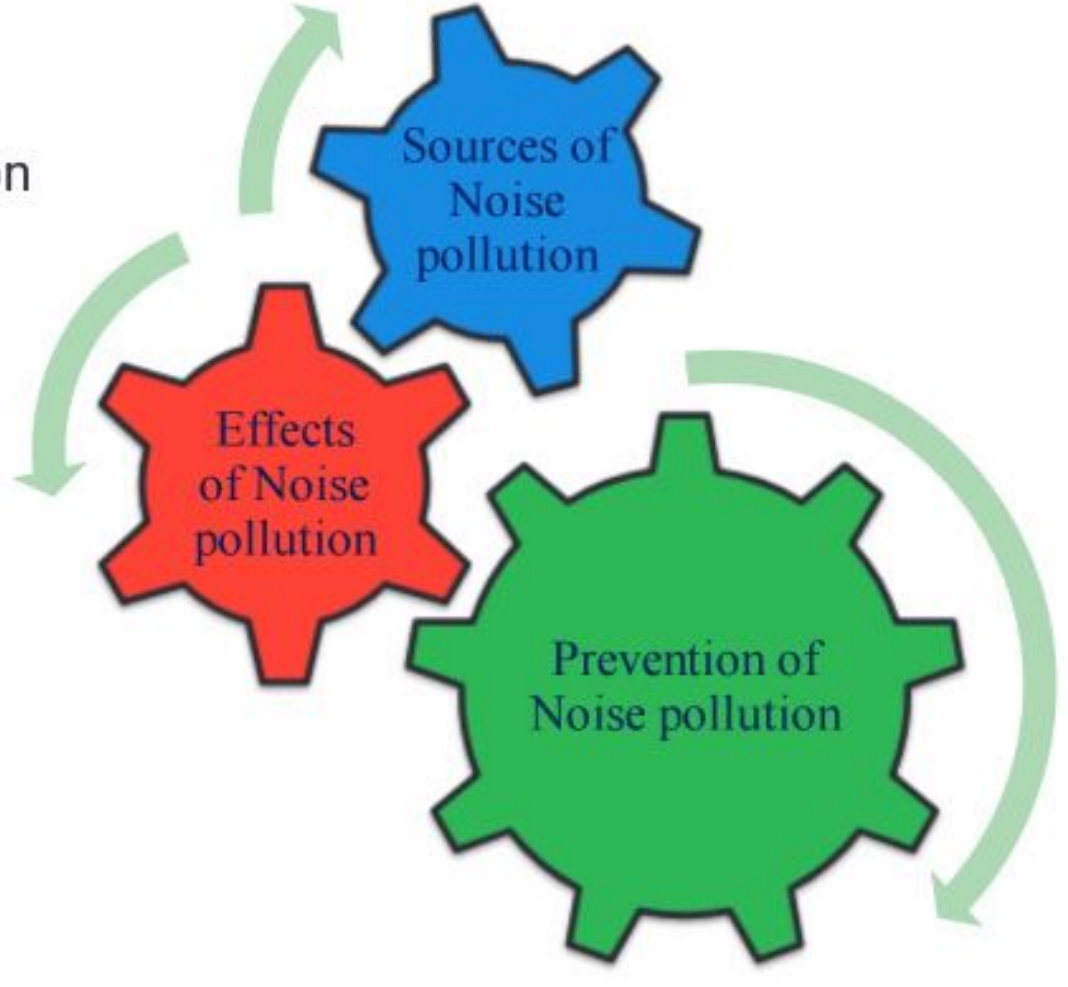
Concept Map

Learning Objective/ Key takeaways

Students will able to understand causes and effects of Noise pollution

Content: 4.6

1. Sources of Noise pollution
2. Effects of Noise pollution
3. Prevention of Noise pollution
4. Standard limiting noise levels at various zones of city



Noise

Noise is unwanted sound considered unpleasant, loud or disruptive to hearing.

- Normal sound becomes undesirable when it disturbs our normal activities such as working , sleeping and during conversation.
- World Health Organization stated that "Noise must be recognized as a major threat to human well-being".

Types of Noise:-

- Atmospheric noise.
- Industrial noise.
- Man made noise.

Noise Pollution

- When there is lot of noise in the environment, then it is termed as noise pollution.
- It is unwanted or excessive sound that can have deleterious effects on human health and environmental quality.
- **Sources of Noise pollution**
- Household or Domestic sources.
- Social and Cultural Events.
- Commercial & Industrial Activities.
- Transportation.
- Agricultural Activities
- Defense Activities
- Mining Activities
- Natural Sources

Sources of Noise pollution

Household or Domestic sources

- Gadgets like food mixer, grinder, vacuum cleaner, washing machine and dryer, cooler, air conditioners
- Others include loud speakers of sound systems and TVs, iPods and ear phones.

Social and Cultural Events

- Places of worship, discos, parties, marriage functions and other social events also create a lot of noise for the people living in that area.
- In many market areas, people sell with loud speakers, others shout out offers and try to get attention of customers

Sources of Noise pollution

Commercial & Industrial Activities.

- Printing presses, manufacturing industries,
- Textiles and steel rolling industries
- Wood cutting mills
- construction sites like dams, stone crushing

Transportation.

- Aero planes flying over houses close to busy airports.
- Over ground and Under ground trains, vehicles on roads

Sources of Noise pollution

Agricultural Activities

Noise created by Tractors,Threshers etc.

Mining Activities

Noise created by Blasting in mines
Metallurgical processes etc

Sources of Noise pollution

Defense Activities

Noise created by Tanks, Gunfire, Airplanes, Bombs, Army Exercise, Satellite and missile launching etc

Natural Sources

Noise created by Landslides, Earthquake, Thunder and lightening, storms etc

Effects of Noise pollution

- Noise pollution is more than just an annoyance; it can also lead to adverse health effects.

- In fact, studies have shown that noise pollution may leads to temporary or even permanent damage to :

1. Physiological health
2. Psychological health

Effects On Physiological health

Temporary or Permanent Deafness

Pain in Heart

Loss of Memory

Headache

Rise in blood pressure

Reduction in the Vision

Effects on Psychological health

Fatigue

Frustration

Emotional Disturbance

Depression

Effects of Noise pollution

In Animals:

- Noise pollution damages the nervous system of animal. Animal looses the control of it's mind
- Excessive noise has the ability to raise an animal's heartbeat speed and even harms an animal's metabolism.

In Plants:

- Noise also has detrimental effects on the growth of some plants.
- Noise pollution causes poor quality of crops

Prevention of Noise pollution

- Do not use car horns unnecessarily in areas like hospitals, educational campuses
- Proper and regular maintenance should be carried out for noise free better performance of Motors, machines and vehicles.
- Turn off the engine of your car or motorbike when you are not using it. It stops the annoying hum, and reduces air pollution also!
- The workers exposed to loud noises must wear earplugs, ear muffs, Noise helmets to prevent loss of hearing.

Prevention of Noise pollution

- Don 't blast music on the radio or computer or speakers and Train your dog not to bark so much.
- Protective Green Belt should be developed to separate residential area and industrial area
- The areas like Hospitals, Schools, Courts must be declared as Silence Zones
- Laws regarding Noise pollution must be strictly followed.

Measurement of Intensity of Noise

- The unit of measurement of sound is called as decibel (dB).
- The range of this scale between 1dB and 140 dB
- When it is less then 1dB we can not hear it and when it is more then 140 dB we cannot stand to it.
- Not all sound is considered noise pollution.
- **The World Health Organization (WHO) defines noise above 65 decibels (dB) as noise pollution.**
- To be precise, noise becomes harmful when it exceeds 75 decibels (dB) and is painful above 120 dB.
- https://www.iberdrola.com/environment/what-is-noise-pollution-causes-effects-solutions

Measurement of Intensity of Noise

- The whispering sound level is up to 30 dB
- Our normal talk has the sound intensity of about 40 dB
- Shouting may reach the level above 60 dB
- A traffic busy road with high speed vehicles have sound level up to 70 db.
- The industrial units using big auto machines creates the sound above 90 dB
- The natural sources of noise like thunder storms with lightening cases the noise level up to 120 dB
- Near the airport the noise pollution level is above 150 dB
- The rocket engines creates the noise pollution above 190 dB

https://www.iberdrola.com/environment/what-is-noise-pollution-causes-effects-solutions

Standard limiting noise levels at various zones of city

- Central Pollution Control Board (CPCB) has laid down the permissible noise level in India for different areas.

Zone	Permissible noise level standards in the daytime (dB)	Permissible noise level standards at night (dB)
Industrial Zone	75	70
Commercial Zone	65	55
Residential Zone	55	45
Silent Zone	50	40

https://m.economictimes.com/small-biz/productline/power-generation/generator-noise-level-regulations-permissible-limits-and-different-types-of-gensets/articleshow/69094804.cms

Conclusion:

Noise pollution have negative effects on adults, children, animals and even in plants hence it should be avoided.

Summary

We have studied

1. Sources of Noise pollution
2. Effects of Noise pollution
3. Prevention of Noise pollution
4. Standard limiting noise levels at various zones of city

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
3. Dr. J. P. Sharma, 2009. Environmental Studies, 2nd Edition, Laxmi publications, New Delhi, India.
4. R. Rajgopalan, 2011. Environmental Studies: From crisis to cure, Oxford University Press, New Delhi, India.

Now let's have a Quiz.....

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Unit IV: **ENVIRONMENTAL POLLUTION**

CO 4: **Apply techniques to reduce environmental pollution**

UO 4i: Describe various methods to prevent air pollution.
UO 4o: State the standards limiting/controlling values of various types of pollution.

24/07/2020

Topic:
Prevention of Air Pollution

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Course Expert
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What we will learn today?

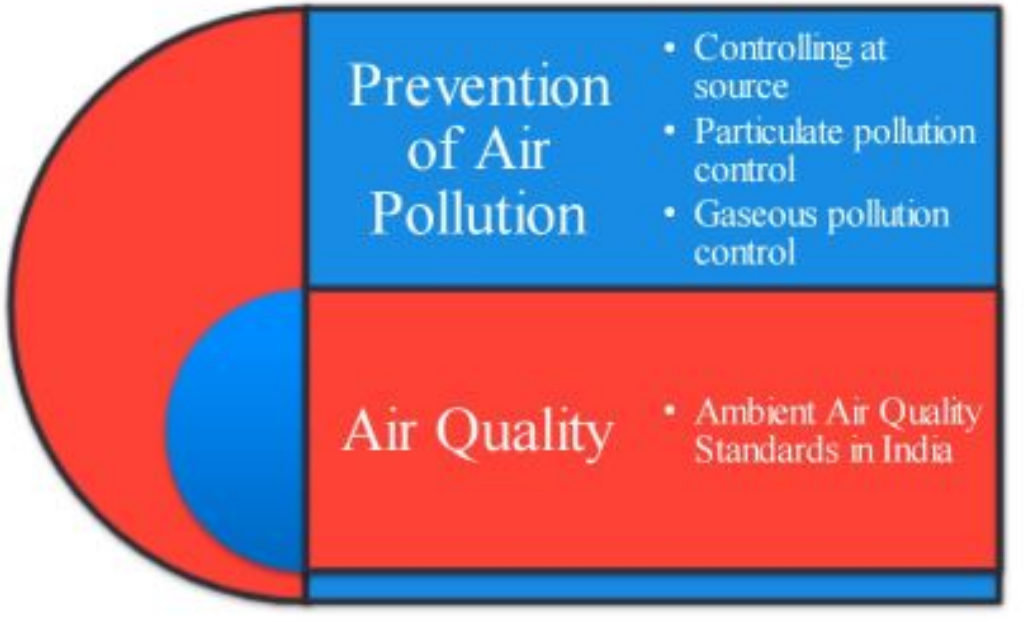
Concept Map

Learning Objective/ Key takeaways

Students will able to understand the methods for Preventing Air Pollution

Content: 4.5

1. Prevention of Air Pollution
2. Ambient Air Quality Standards



Prevention of Air Pollution

- Since the Industrial Revolution, people have been polluting the Earth like never before. There is rarely a place today that has not been subjected to pollutants in one form or another.
- The key to have a healthier life is to adopt measures that do not pollute air so much because we all have a role to play when it comes to creating healthy environment for living.
- How to Control Air Pollution???

1. Controlling at source
2. Particulate pollution control
3. Gaseous pollution control

1. Controlling at source

Source relocation: Keeping the Industrial area away from residential area.

Source shut down: Pollutant Casing hazardous effect should be immediately banned

Fuel or Energy substitution: Using environment friendly fuels like CNG, Biofuels, Biogas etc

Good operating practices: Good Maintenance, Controlled Driving speed can reduce the pollutant emission

Vehicular emission control: Regular PUC checking, Good quality fuel with oil additives can control Vehicular emission.

2. Particulate pollution control

- Particulate matter is the sum of all solid and liquid particles suspended in air, many of which are hazardous. This complex mixture contains for instance dust, pollen, soot, smoke, and liquid droplets.

These Five major groups of processes.

- Settling chambers
- Inertial separator or Cyclone
- Electrostatic precipitator
- Baghouses and filters
- Wet scrubbers

Settling chambers

- A simplest device, collecting dust of size >10μm.
- Settling chambers use the force of gravity to remove solid particles. The gas stream enters a chamber where the velocity of the gas is reduced. Large particles drop out of the gas and are recollected in hoppers.

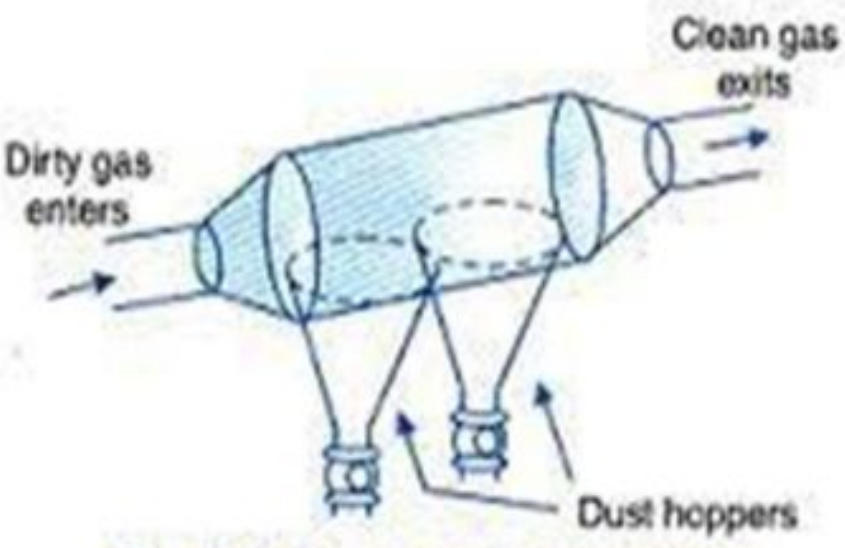
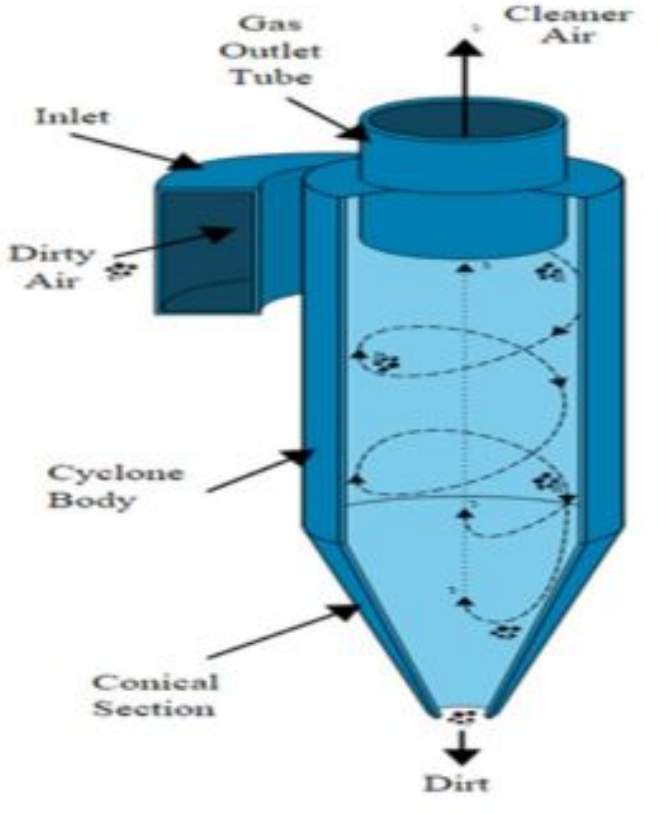


Fig. 5.3. Gravity settling chamber

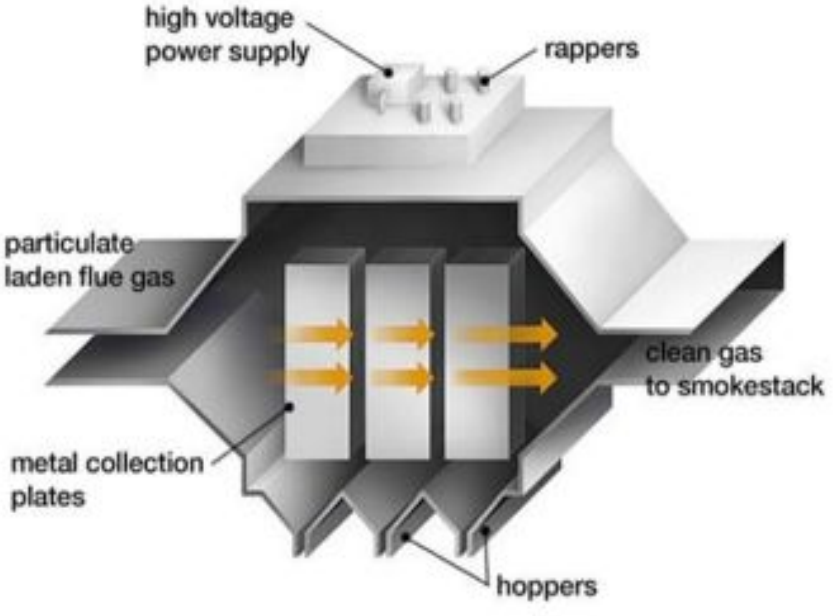
Inertial separator or Cyclone

- This process is achieved by a sudden change in the direction of gas flow.
- The dust particle is spinning in a circular path, As a result the particles collide on the wall and fall to the bottom of the vessel.



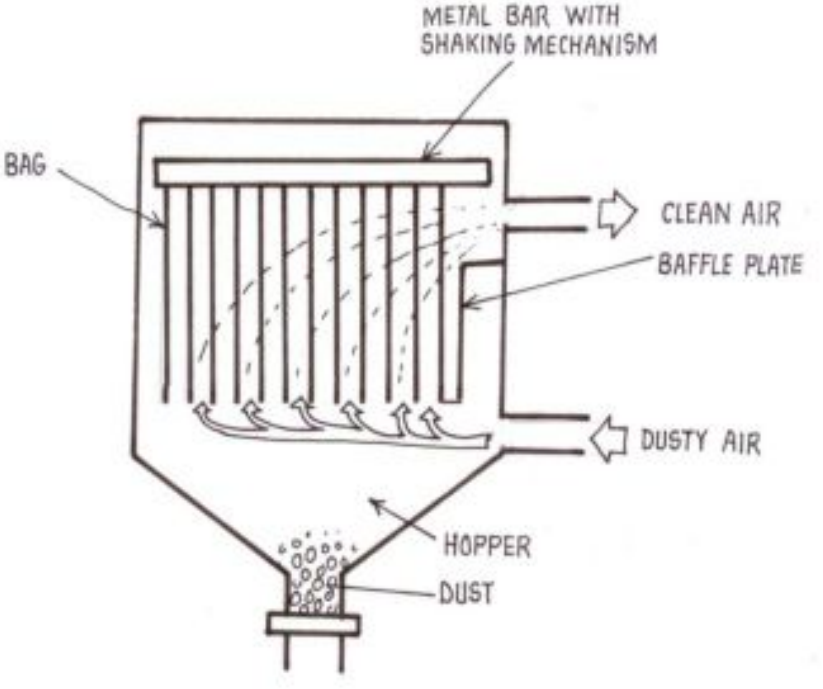
Electrostatic precipitator

- Passing the particle laden gases between high voltage discharge electrodes.
- Majority of particles get charged and collected on ground electrodes.
- At intervals electrodes are rapped to dislodge collected particles from the electrodes, which then fall into hoppers at the bottom of the precipitator.



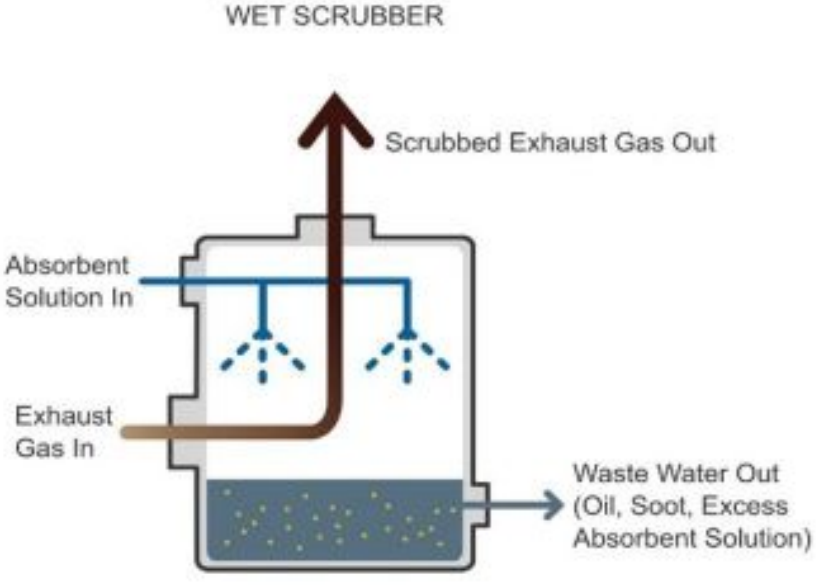
Bag houses filters

- This method is most often used type of device
- The Fabric filters, or bag houses , remove dust from a gas stream by passing the stream through a porous fabric.



Wet scrubbers

- Objective of scrubber is to trap the particulate matter in liquid droplets.
- Water subsequently flows from the bottom of the scrubber, the particulate is allowed to settle and clarified water is re-circulated



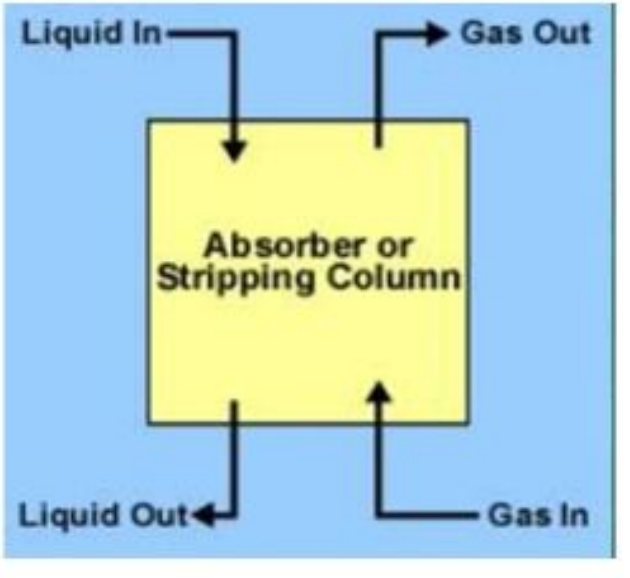
3. Gaseous pollution control

- Gaseous pollutants are controlled by means of three basic techniques:
- Absorption: concentrate the pollutants in a liquid
- Adsorption: concentrate the pollutants in on solid
- Combustion: direct incineration of pollutants
- These techniques can be employed singly or in combination.
- They are effective against the major greenhouse gases as well.

Gaseous pollution control

Absorption

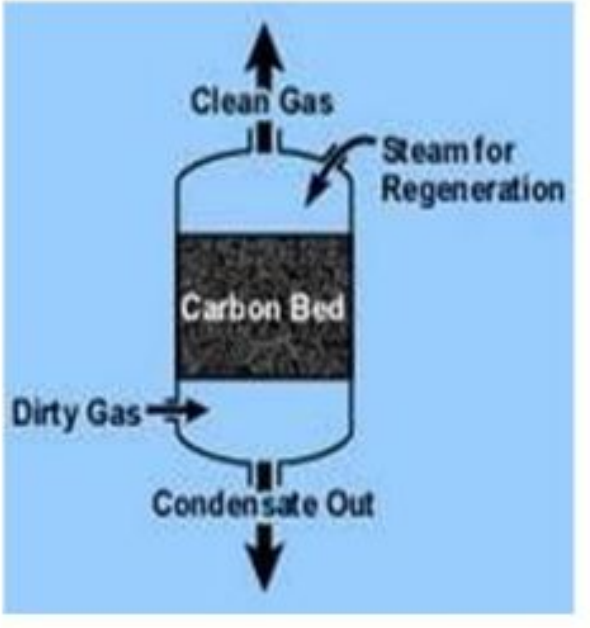
This processes is selected to remove gaseous pollutants by dissolution into a liquid solvent such as water



Gaseous pollution control

Adsorption

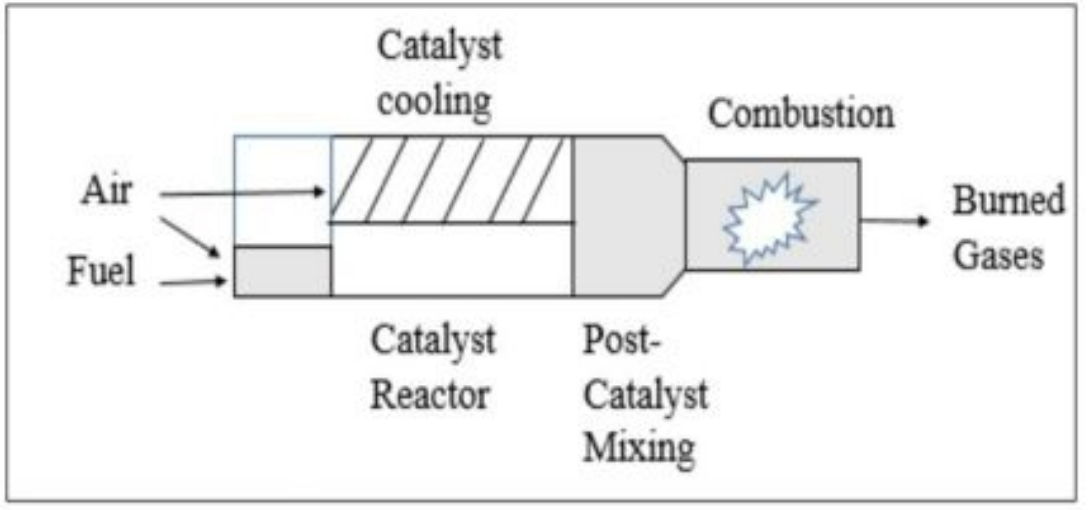
- Adsorption is a process where gases,vapours or liquids are concentrated on a solid surface
- The most important adsorbents in industrial use to-days are Bauxite, activated carbon, activated alumina, silica gel



Gaseous pollution control

Combustion

- This method for the removal of Volatile Organic Compounds (VOC) since they can be decompose to CO_2 and H



Ambient Air Quality Standards

- The Air (Prevention and Control of Pollution) Act 1981 was enacted by the Central Government with the objective of arresting the deterioration of air quality.
- It describes the main functions of the Central Pollution Control Board (CPCB) as follows:
- To advise the Central Government on any matter concerning the improvement of the quality the air and the prevention, control and abatement of air pollution.
- To plan and cause to be executed a nation-wide program for the prevention, control and abatement of air pollution.
- To provide technical assistance and guidance to the State Pollution Control Board.
- To carry out and sponsor investigations and research related to prevention, control and abatement of air pollution.
- To collect, compile and publish technical and statistical data related to air pollution; and
- To lay down and annul standards for the quality of air

Ambient Air Quality Standards in India

Pollutant	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Area (notified by Central Government)
Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual* 24 hours**	50 - 80	20 - 80
Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual* 24 hours**	40 - 80	30 - 80
Particulate Matter (size less than 10 µm) or PM_{10} $\mu g/m^3$	Annual* 24 hours**	60 - 100	60 - 100
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$ $\mu g/m^3$	Annual* 24 hours**	40 - 60	40 - 60
Ozone (O_3) $\mu g/m^3$	8 hours* 1 hour**	100 –80	100 - 180
Lead (Pb) $\mu g/m^3$	Annual* 24 hours**	0.50 - 1.0	0.50 -1.0
Carbon Monoxide (CO) mg/m^3	8 hours* 1 hour**	02 - 04	02 - 04
Ammonia (NH_3) $\mu g/m^3$	Annual* 24 hours**	100 - 400	100 - 400
Benzene (C_6H_6) $\mu g/m^3$	Annual*	5	5
Benzo(a)Pyrene (BaP)- particulate phase only, ng/m^3	Annual*	1	1
Arsenic(As), ng/m^3	Annual*	6	60
Nickel (Ni), ng/m^3	Annual*	20	20

* Source: National Ambient Air Quality Standards, Central Pollution Control Board Notification in the Gazette of India, Extraordinary, New Delhi, 18th November, 2009 http://www.arthapedia.in/index.php?title=Ambient_Air_Quality_Standards_in_India#:~:text=National%20Ambient%20Air%20Quality%20Standards,of%20Pollution)%20Act%2C%201981

What we learnt today?

- **Say No to Pollution.....**
- Air pollution is a major environmental issue. It can affect the health and life support systems as well.

- Hence it is necessary to control air pollution to save life and make mother Earth Happy once again

Summary

We have studied

- Prevention of Air Pollution

1. Controlling at source
2. Particulate pollution control
3. Gaseous pollution control

- Ambient Air Quality Standards in Indi

References:

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5. Marquita. K. Hill, Understanding environmental pollution
6. G.N Pondey, Environmental management (1997)

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What we will learn today?

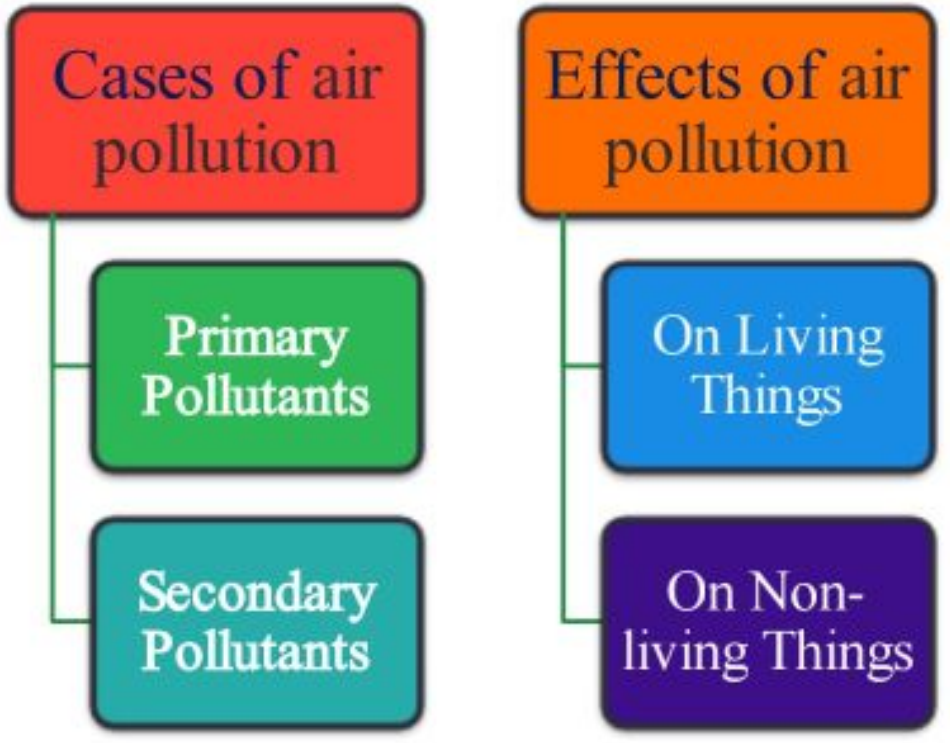
Concept Map

Learning Objective/ Key takeaways

Students will able to understand causes and effects of Air pollution

Content: 4.5

1. Cases of air pollution
2. Effects of air pollution



Air Pollution

Definition:

Presence or addition of harmful substances to the air which causes negative impacts to the health of living organisms is called as Air Pollution .

Causes of Air Pollution:

Natural – Volcanic eruptions, Natural fires, Pollens, Dust etc.
Manmade- Automobiles, Industries, Incineration, farming etc.

Types of Air Pollutants:

1. **Primary Pollutants** (Released directly in air)

Ex: ash, salts, pollen, spores, smoke, dust etc

2. **Secondary Pollutants** (Formed by chemical reaction between air and primary pollutants)

Ex: smog, acid rain, ozone etc

Causes of Air Pollution

Primary Pollutants (Released directly in air)

Natural Sources

Pollens

Volcanoes

Dust

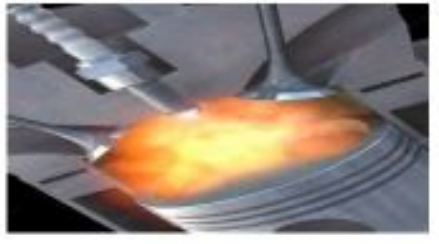
Bacteria & Viruses

Fire

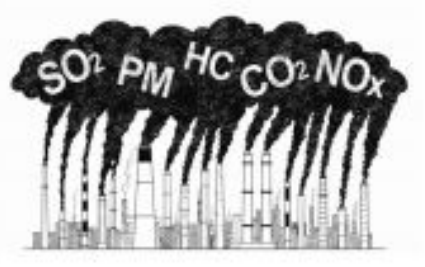
Causes of Air Pollution

Primary Pollutants (Released directly in air)

Man made Sources



Combustion Processes



Chemical Processes

Nuclear or Atomic Processes

Mining Processes

Oil Refinery Processes

Farming Activities

Causes of Air Pollution

Secondary Pollutants

(Formed by chemical reaction between air and primary polluta

1) Acid Rain: The primary pollutants released from chemical industries like CO2, SO2, NO2, Cl2 reacts with atmospheric moisture to form acids resulting in acid rain.

Acid Rain

MAKING ACID RAIN

- When CO_2 reacts with water, carbonic acid is formed.
  $CO_2(g) + H_2O(l) \rightarrow H_2CO_3(aq)$
- When SO_2 reacts with water, sulfurous acid is formed.
  $SO_2(g) + H_2O(l) \rightarrow H_2SO_3(aq)$
- When NO_2 reacts with water, nitric acid is formed.
  $2NO_2(g) + H_2O(l) \rightarrow HNO_2(aq) + HNO_3(aq)$

Causes of Air Pollution

Secondary Pollutants

(Formed by chemical reaction between air and

primary pollutants)

2) Photochemical Smog:

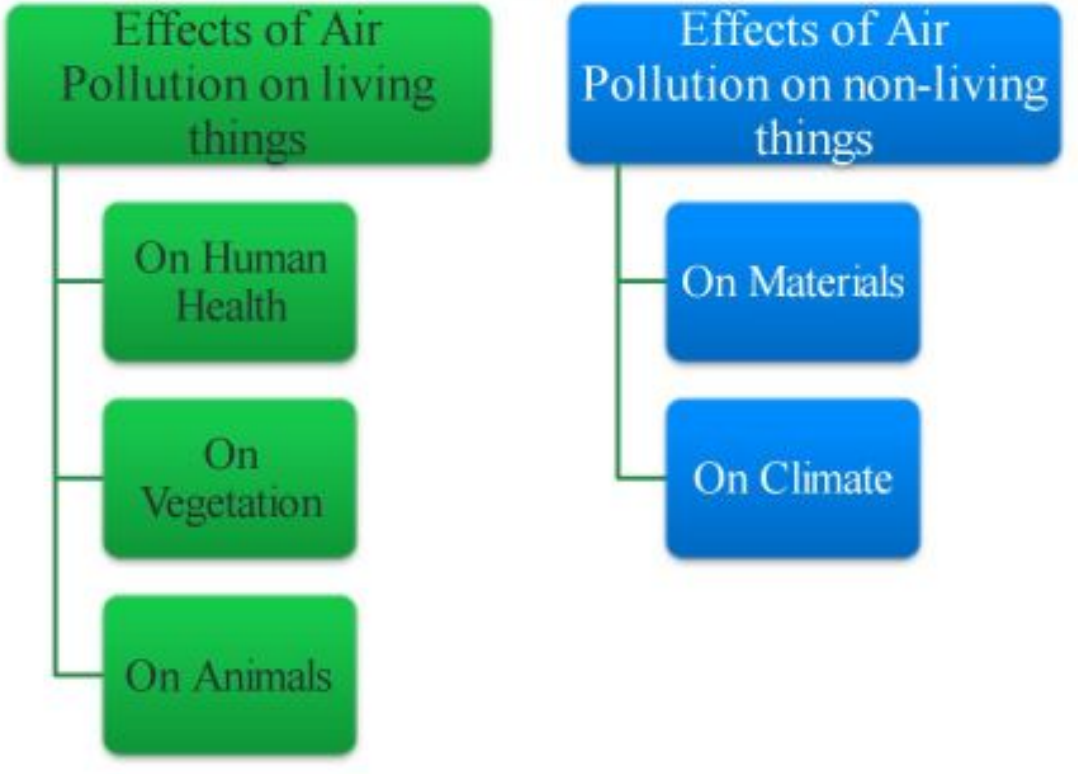
The primary pollutants like NO and Hydrocarbons released from automobiles or on burning fossil fuels reacts with each other in presence of Sunlight and ozone Forming a toxic brown haze called as photochemical smog.

Among the photochemical products the most potent pollutants are:

1. Benzpyrene
2. peroxyacetyl nitrate **(PAN)**
3. peroxybenzoil nitrate (**PB2N**)

Effects of air pollution

- **Air pollution** occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere
- Air pollution not only causes hazardous health effects on in humans, plants and animals but also contributes to climate change.



Effects of Air Pollution on living things

- **On Human Health**
- Our physical and psychological wellbeing is affected differently by the kind of air pollution we are exposed to. There are many organs and bodily functions that can be harmed, the consequences including:
- Respiratory diseases
- Cardiovascular damage
- Fatigue, headaches and anxiety
- Irritation of the eyes, nose and throat
- Damage to reproductive organs
- Harm to the liver, spleen and blood
- Nervous system damage.

Effects of Air Pollution on living things

- **On Vegetation**
- Air pollution have negative effect on the plants; they can have direct toxic effects, or indirectly by changing soil pH
- They cover the leaf blade reducing light penetration which strongly influences the process of photosynthesis
- Effects of some specific pollutants are:

1. Necrosis: The damaging of leaves due to rise in Ozone

2. Abscission: The premature fall of leaves de to rise in NO_2

3. Chlorisis: Yellowing of leaves due to rise in SO_2

Effects of Air Pollution on living things

- **On Animals**
- Air pollutants can poison wildlife through the disruption of endocrine function, organ injury, increased vulnerability to stresses and diseases, lower reproductive success, and possible death.
- When pet animals are fed with fodder having remains of insecticides and pesticides it will severely affects their digestive system.

Effects of Air Pollution on non-living things

- **On Materials**
- The main pollutants affecting materials are sulphur dioxide and sulphates, nitrogen oxides and nitrates, chlorides, carbon dioxide and ozone
- The materials most sensitive to air pollutants are calcareous building stones and metallic structures.
- The damage include losses of mass, changes in porosity, discoloration, corrosion of metallic structures.

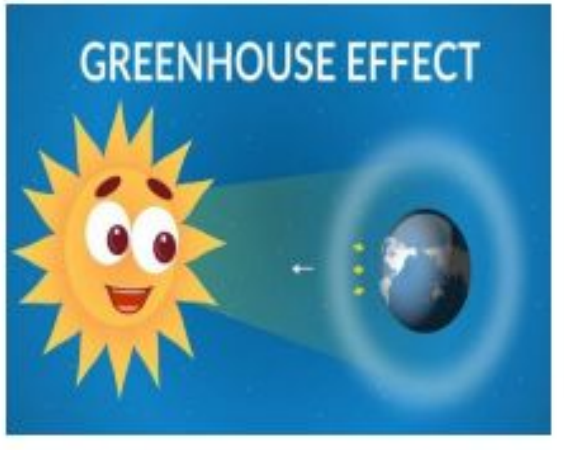
Yellowing of Taj Mahal

Decolorizing of paint

Rusting of metallic structure

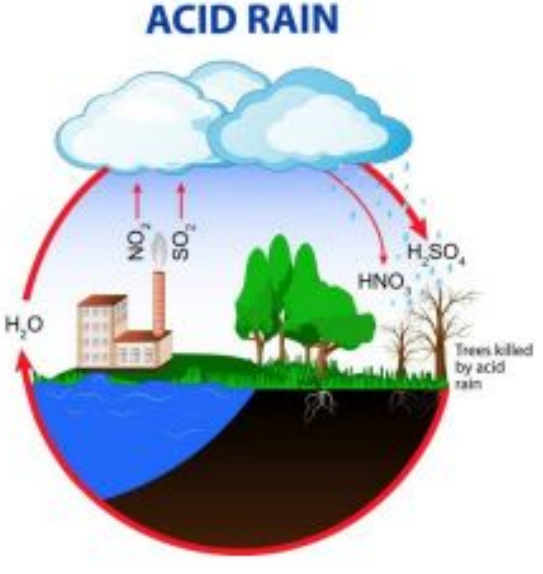
Effects of Air Pollution on non-living things

- **On Climate**
- Air pollutants have a complex relationship with climate change.
- Some pollutants such as **Carbon dioxide** increase warming by trapping heat in the atmosphere casing **Global warming** due to **green house effect**.

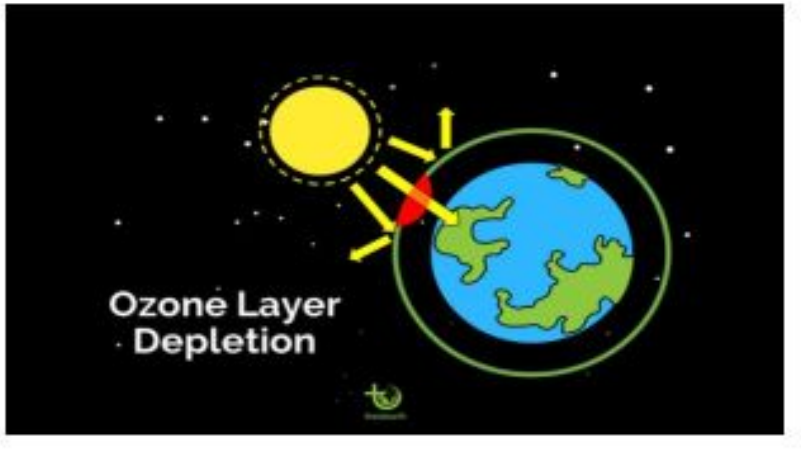


Effects of Air Pollution on non-living things

- **On Climate**
- Excess of **Carbon dioxide, sulfur dioxide, Nitogen dioxide** in air reacts with moisture results in **acid rain.**



➤ The release of **CFC gases** damages the protective Ozone layer allowing Harmful UV radiations to reach to earths surface. It is called as **Ozone depletion.**



So What The Mother Earth Wants To Say?????

Stop Air pollution....
Please save me....

In upcoming video we will see the methods to control and prevent air pollution.

Summary

We have studied

1. Cases of air pollution

- Primary Pollutants
- Secondary Pollutants

2. Effects of air pollution

- On Human Health
- On Vegetation
- On Animals

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Now let's have a Quiz.....

Program – CIVIL ENGINEERING
Program Code – CE

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

27/07/2020

MSBTEs e-content

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Unit IV: ENVIRONMENTAL POLLUTION

CO d: Apply techniques to reduce environmental pollution

UO 4f: State the impacts of sewage.
UO 4g: State various units and their functions of sewage treatment plant.

27/07/2020

Sub-topic: 4.4:Wastewater

Written by

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic, Nagpur

Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

What we will learn today?

Learning Objective/ Key takeaways

- Students will able to understand Sewage Treatment Process

Content:

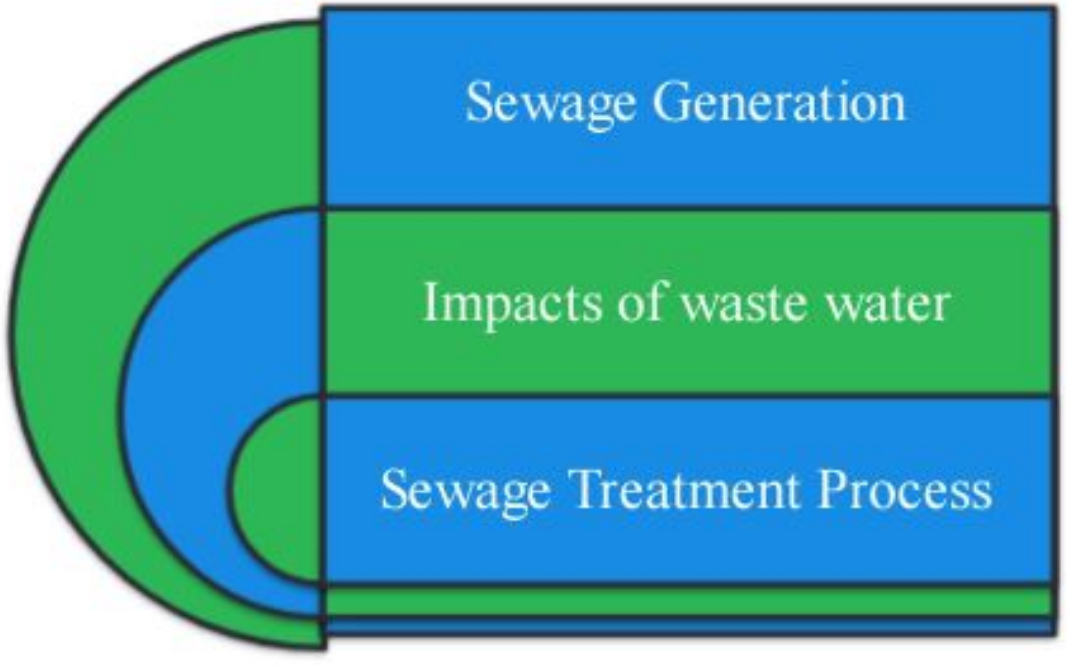
4.4: Waste Water (Sewage) Generation,

Impacts of waste water,

wastewater Treatment Process,

CPCB Norms of sewage discharge

Concept Map



Generation of wastewater

- The liquid waste generated from domestic and industrial facilities is called as wastewater.
- Water bodies can be polluted by a wide variety of substances, including pathogenic microorganisms, organic waste, toxic chemicals, sediments, oil and grease, solid waste etc.
- Such polluted water is called as waste water or sewage.

Types of Sewage:

1. Domestic sewage
2. Industrial sewage
3. Sanitary sewage
4. Storm sewage

Types of Sewage:

1. Domestic sewage

- It carries used water from houses and apartments.
- It is the primary source of pathogens (disease causing microorganisms)
- A lot of diseases result from being in contact with sewage water, such as diarrhea, cholera, typhoid, dysentery or skin infections.
- Domestic sewage contains excess of nitrates and phosphates which promote the growth of algae.

Types of Sewage:

2. Industrial sewage

- It is the used water from various processes in the industries.
- Industrial waste include dirt and gravel, masonry and concrete, scrap metal, oil, solvents, chemicals, scrap lumber, even vegetable matter from restaurants etc.
- The biomedical waste and e - waste when enters in waste water its effects becomes more dangerous.

Types of Sewage:

3. Sanitary sewage:

Sanitary sewage includes liquid waste from domestic and Industrial places. This sewage is extremely foul and requires to be disposed off very carefully.

4. Storm sewage:

The surface runoff developed during and immediately after rainfall over the connected area which is collected in the form of sewage is called as storm sewage.

Impacts of waste water

Impacts of waste water on the environment

- Creates nuisance- Bad smell.
- Pollutes water resources,
- Air pollution,
- Land / soil pollution,
- The most immediate effect of wastewater on the environment is destruction of natural habitats of aquatic wildlife like fishes, crabs, birds, tortoise etc. due to exposure to harmful chemicals

Impacts of waste water

Impacts of waste water on Human Health

- Pathogens in waste water spreads water-borne diseases like Typhoid, Cholera, Paratyphoid **Fever**, Dysentery, **Jaundice** and Amoebioasis.
- Chemicals in the water also have negative effects on our health. Pesticides can damage the nervous system and cause **cancer** .

Hence Sewage must be treated before released into water bodies

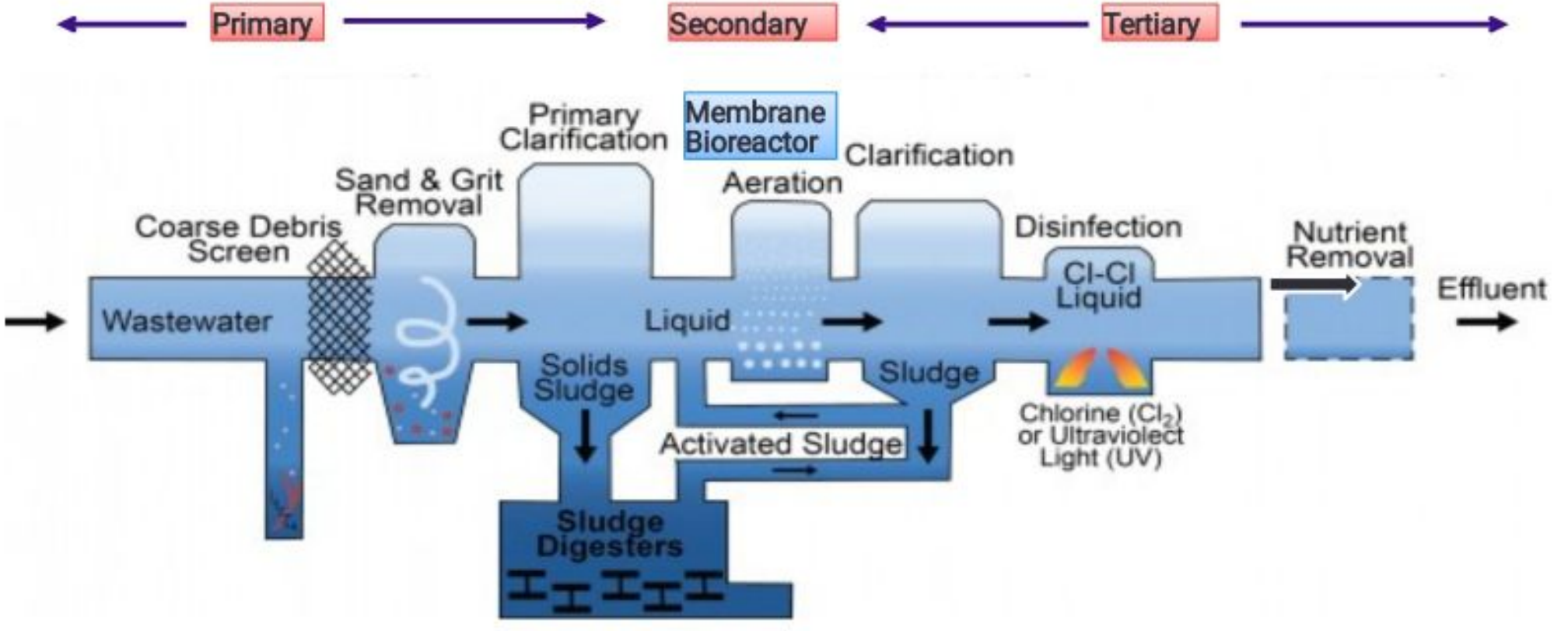
Sewage Treatment Process

- Sewage treatment is the process of removing pollutants from both domestic and industrial waste water.
- The objective of sewage treatment is to produce a safe disposable effluent without polluting the surrounding environment.

Steps in Sewage Treatment

1. Primary Treatment,
2. Secondary Treatment, and
3. Tertiary Treatment

Flow chart of Sewage Treatment Process



https://www.google.com/url?sa=i&url=http%3A%2F%2Fcss.umich.edu%2Ffactsheets%2Fus-wastewater-treatment

Primary Treatment

Primary treatment removes materials that can be easily collected from the raw sewage

1. Suspended debris removal by Bar Screening

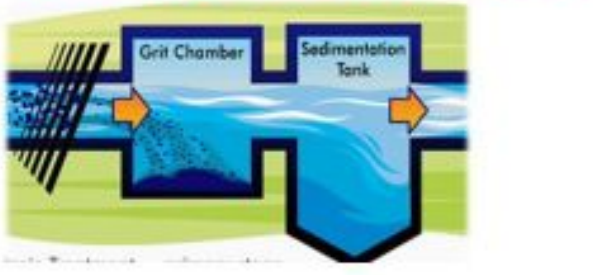
- The influent sewage water passes through a bar screen to remove all large objects like cans, sticks, plastic packets etc. carried in the sewage stream.

2. Grit Removal in sand and grit channel

- The velocity of the incoming sewage is adjusted to allow the settlement of sand, grit, stones and broken glass.

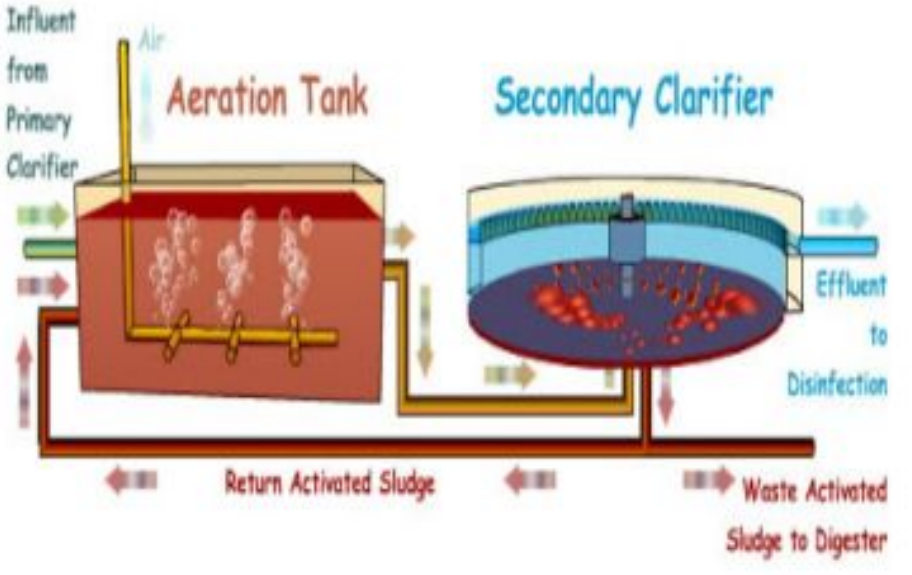
3. Sludge removal by Primary Clarification in sedimentation tank

- The effluent is kept undisturbed Primary sedimentation tank. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment.



Secondary Treatment

- Secondary treatment removes dissolved and suspended biological matter.
- Secondary treatment is typically performed by a membrane bioreactor with water-borne micro-organisms in a managed habitat.
- This Biological films of bacteria, protozoa and fungi form on the membrane eat or reduce the harmful organic content from waste water.
- It includes Aeration and Secondary clarifier.



Tertiary Treatment

- The purpose of tertiary treatment is to raise the effluent quality before it is discharged to the water bodies.

1. Filtration

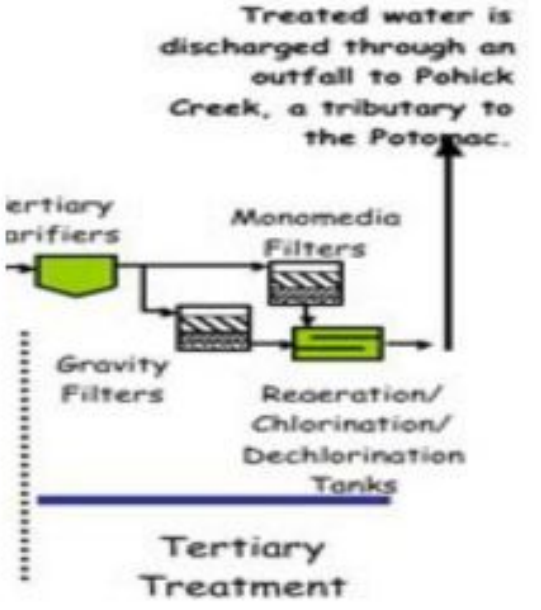
- Sand filtration removes much of the residual suspended matter. Filtration over activated carbon, also called carbon adsorption, removes residual toxins.

2. Sludge removal by secondary Clarification in sedimentation tank

- Liquid sludge is separated and subjected for further treatment to make it suitable for final disposal . Typically, sludge's are thickened (dewatered) to reduce the volumes for disposal.

3. Chlorination

- Chlorination is a water treatment that destroys disease-causing bacteria, parasites and other organisms. Chlorination also oxidizes iron, manganese and hydrogen sulfide so they can be filtered out.



Tertiary Treatment

4. Chlorination

- Chlorination is a water treatment that destroys disease-causing bacteria, parasites and other organisms. Chlorination also oxidizes iron, manganese and hydrogen sulfide so they can be filtered out.

5. Removal of plant nutrients

- The phosphates and Nitrates promote the growth of algae and the eutrophication of lakes, can be removed by chemical precipitation. A method called nitrification-denitrification can be used to remove the nitrates.

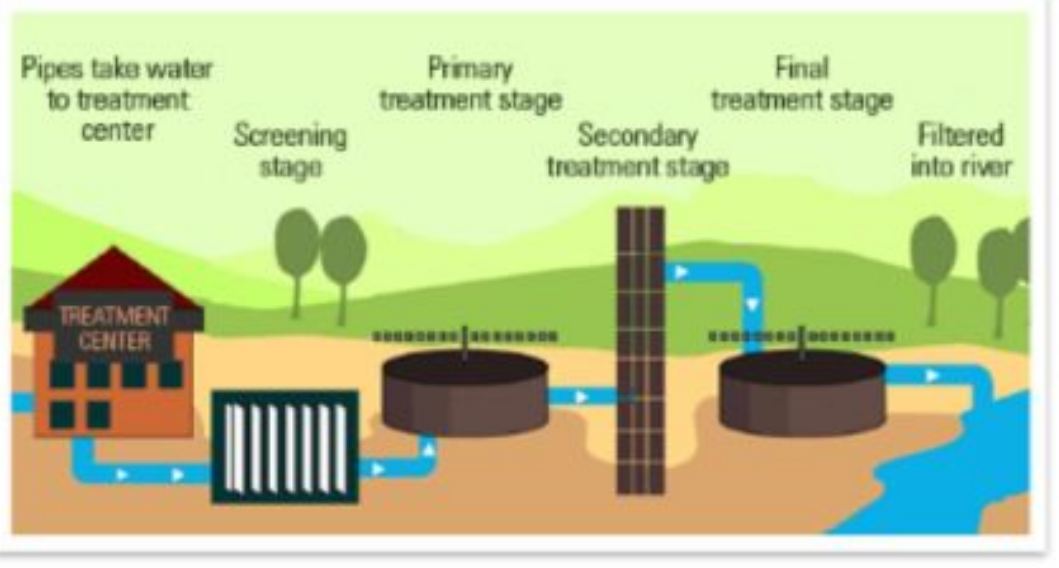
CPCB Norms of sewage discharge

- Central Pollution Control Board (CPCB) have issued the following standards for treated sewage discharge in accordance with provision of section 17(1)(g) of the Water (Prevention and Control of Pollution) Act, 1974.

SR. No.	Parameters	Inland surface water	Public sewer	Land irrigation
1	pH	5.5- 9.0	5.5- 9.0	5.5- 9.0
2	BOD, (mg/lit)	30	350	100
3	COD,(mg/lit)	250	-	-
4	SS, (mg/lit)	100	600	200
5	Ammonical-Nitrogen(mg/lit)	50	50	-
6	Total Nitrogen(mg/lit)	100	-	-
7	Oil and Grease, mg/l	10	20	10
7	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent

Conclusion

- Aquatic biodiversity is the rich and wonderful variety of plants and animals and also essential to maintain environmental balance.
- They have the equal right of living.
- Hence waste water must be treated before releasing into water bodies.



Summary

We have studied

1. Waste Water (Sewage) Generation
2. Impacts of waste water
3. Sewage Treatment Process
4. CPCB Norms of sewage discharge.

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
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Now let's have a Quiz.....

Program – CIVIL ENGINEERING
Program Code – CE

MSBTEs E-CONTENT

Expert-Dr. B. R. Ambade, LCE, G P Bramhapuri

19/07/2020

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

Unit Outcome- UO 4l,4m, and 4n

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Br. B. R. Ambade
Course Expert and Coordinator

Ms. Swati Ingale
Course Expert

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI,, Nagpur

Topic 4- ENVIRONMENTAL POLLUTION

Sub Topics – Municipal Solid Waste,

Biomedical Waste and E Waste

19/07/2020

CO-d: Apply techniques to reduce environmental pollution.

What we will learn today ?

1. **Agenda point** – Introduction to Solid Waste
2. **Agenda point** – Types of Solid Waste
3. **Agenda point** – Characteristics
4. of Solid Waste
5. **Agenda point** – Impacts of Solid Waste

Agenda point – Management of Solid Waste

Content

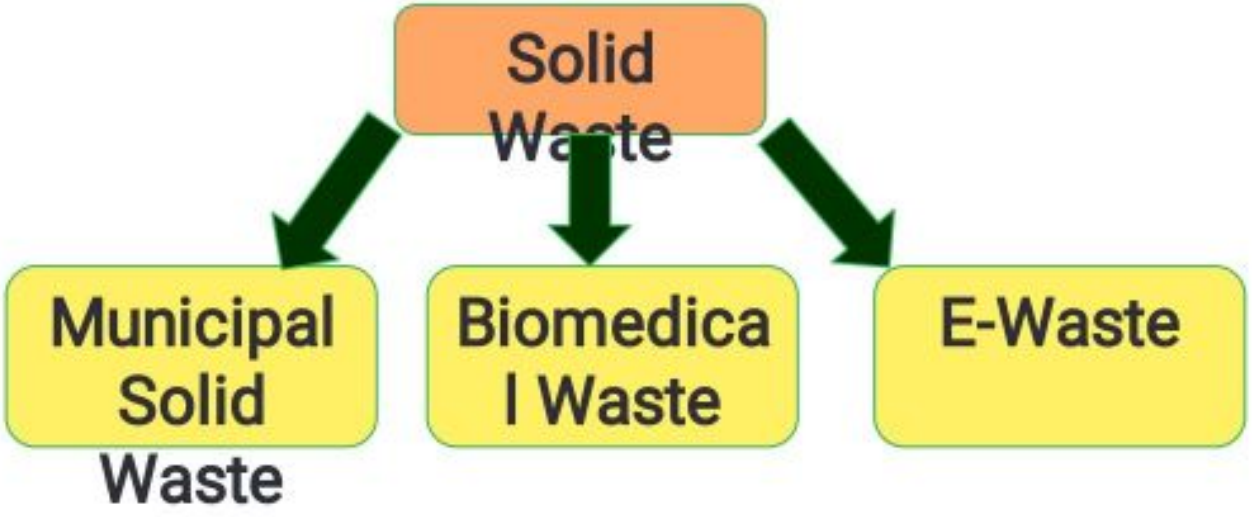
4.7 Municipal Solid Waste, Biomedical Solid Waste, E-Waste.

Sources, generation, characteristics, effects and methods to manage.

Learning Objective/ Key learning

- 4l. State characteristics of solid waste.
  - 4m. State the impacts of solid waste.
    - 4n. Describe Incineration, RDF and Sanitary Landfilling.

Concept Map of Solid Waste



Sub Topic : Municipal Solid Waste

- **Solid Waste** – The waste which is *solid* in nature and *discarded* by *community* because of it has *no value* and of *no use* .

Example,

- Chocolate with wrapper has its value and use.
- When chocolate is consumed then we have a wrapper, it is solid, have no value and no use. Thus it is solid waste.

- **More examples-** paper, Plastic, Glass, Metal, Rubber, Food waste, Vegetable waste, Cardboard, Leaves, Street waste, Biomedical waste, E-waste, Agriculture waste, Industrial waste, Construction and demolition waste etc.

Footnotes

Sub Topic : Municipal Solid Waste, cont.....

➤**Municipal Solid Waste (MSW)**– The solid waste which is generated within the Municipal limits of the city or town is called as MSW.

➤**Sources of MSW:**

- Domestic sources- Paper, Plastic, glass, metal, food and vegetable waste, house swept etc.
- Commercial sources –Paper, Plastic, cardboards etc.
- Institutional sources- Paper, Plastic, cardboards etc.
- Street waste – Leaves, soil, ash, sand etc.
- Market waste – Vegetable and fruit waste, Paper, Plastic etc.
- Construction and demolition waste – sand, broken bricks, waste concrete, old reinforcements etc

Footnotes

Sub Topic : Municipal Solid Waste, cont.....

- **Generation of MSW:**
  - Per capita generation of waste varies from 200 gm to 600 gm per capita / day. Average generation rate at 0.4 kg per capita per day.
  - As per Ministry of Housing and Urban Affairs Annual Report for the year 2016-17, it is estimated that the total generation of solid waste is approximately 1,50,000 T/day. Out of the total, approximately 90% (1,35000 T/ day) is collected. Out of the collected waste, 20% (27,000 T/day) is processed and the remaining 80% (10,8000T/day) is going to the dump sites.

- **Physical Characteristics of MSW:**

  Density Moisture Content
  Size Distribution Field Capacity
  Permeability Porosity

Sub Topic : Municipal Solid Waste, cont.....

Physical compositions of MSW:

Parameter	Low income countries (≤ 360 $)	Middle income countries (360 – 3500 $)	High income countries (≥ 3500 $)
Metal (%)	0.2 – 2.5	1 – 5	3 - 13
Glass, ceramics (%)	0.5 – 3.5	1 – 10	4 - 10
Food and garden waste (%)	40 - 65	20 – 60	20 - 50
Paper (%)	1 – 10	15 – 40	15 - 40
Textile (%)	1 – 5	2 – 10	2 - 10
Plastic / rubber (%)	1 – 5	2 – 6	2 - 10
Misc. Combustible (%)	1 – 8	--	--
Inert (%)	20 – 50	1 – 30	1 - 20
Density (kg/cum)	250 – 500	170 – 330	100 - 170

Sub Topic : Municipal Solid Waste, cont.....

Chemical Characteristics of MSW

Population Range (Million)	Nitrogen (%)	Phosphorous (%)	Potassium (%)	C / N ratio	Calorific value (Kcal/ kg)
0.1 to 0.5	0.71	0.63	0.83	30.94	1009.89
0.5 to 1	0.66	0.56	0.69	21.13	900.61
1 to 2	0.64	0.82	0.72	23.68	980.05
2 to 5	0.56	0.69	0.78	22.45	907.18
5 & above	0.56	0.52	0.52	30.11	800.70

Impacts of MSW

On Public Health -

- Chemical poisoning through chemical inhalation,
- Uncollected waste can obstruct the storm water runoff resulting in flood,
- Low birth weight,
- Cancer,
- Congenital malformations, Respiratory diseases,
- Neurological diseases,
- Nausea and vomiting,
- Mercury toxicity from eating fish with high levels of mercury,
- Plastic found in oceans ingested by birds,
- Resulted in high algal population in rivers and sea,
- Epidemics through stray animals, etc.

On Environment –

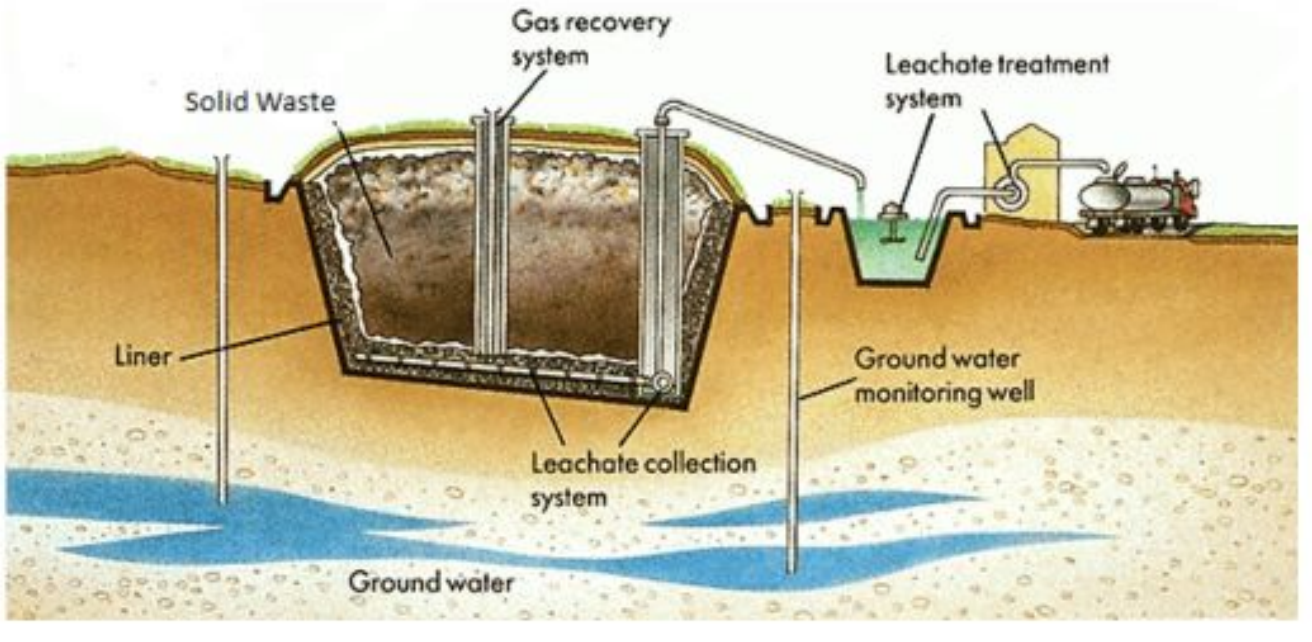
- Soil pollution due to dumping of MSW on soil,
- Air pollution due to methane (GHG) emission (Global Warming and climate change),
- Water pollution due to leachate generation and its contamination into water bodies,
- Fires within the waste dumps,
- Bird menace above dump site affects aircrafts,
- Create nuisance, etc.

Sub Topic : Municipal Solid Waste, cont.....

- Methods of MSW management:
  - Sanitary landfilling,
  - Incineration,
  - Refuse Derived Fuel (RDF).

Sub Topic : Municipal Solid Waste, cont.....

- **Sanitary Landfilling**: sanitary landfills refer to an engineered facility for the disposal of MSW designed and operated to minimize public health hazards and environmental impacts.
- **Components of Sanitary Ladfilling**: Liner, Leachate Management System, Landfill Gas Management facility, Ground water monitoring wells, Final cover at top.



Revision

- **What we learned today?**
  - Solid waste.
  - Municipal Solid Waste and its sources.
  - Generation of MSW.
  - Characteristics of MSW.
  - Methods of MSW Management.

Now, let's have a Quiz.....

References

1. Asnani P.U., 2004. United states Asia Environmental Partnership Report, US Agency for International Development, Centre for Environmental Planning and Technology, Ahmadabad.
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Program – CIVIL ENGINEERING
Program Code – CE

MSBTEs E-CONTENT

Expert-Dr. B. R. Ambade, LCE, G P Bramhapuri

19/07/2020

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

Unit Outcome- UO 4l,4m, and 4n

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Written by

Dr. B. R. Ambade
Course Expert and Coordinator

Ms. Swati Ingale
Course Expert

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI,, Nagpur

Topic 4- ENVIRONMENTAL POLLUTION

Sub Topics : E -Waste

19/07/2020

CO-d: Apply techniques to reduce environmental pollution.

What will we learn today ?

1. **Agenda point** – E-Waste
2. **Agenda point** – Generation of E-waste
3. **Agenda point** – Composition of E-Waste
4. **Agenda point** – Impacts of E-Waste
5. **Agenda point** – Management of E-Waste

Content

4.7 Municipal Solid Waste, Biomedical Solid Waste, E-Waste.

Sources, generation, characteristics, effects and methods to manage.

Dr. B. R. Ambade
Course Expert and Coordinator

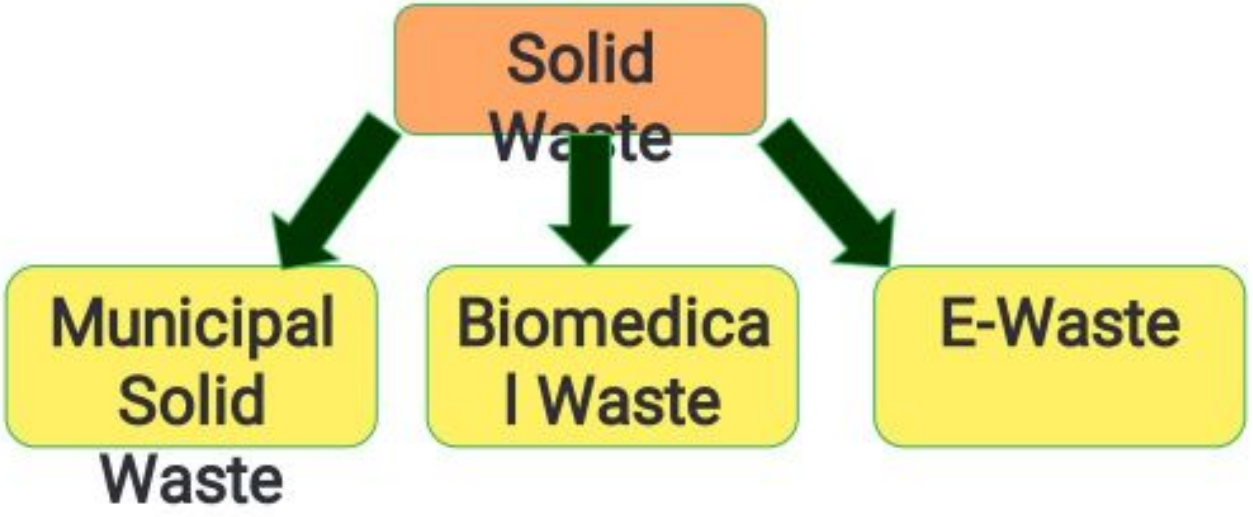
Ms. Swati Ingale
Course Expert

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

Learning Objective/ Key learning

- 4l. State characteristics of E-waste.
  - 4m. State the impacts of E- waste.
    - 4n. Describe Incineration, RDF and Sanitary Landfilling.

Concept Map of Solid Waste



Sub Topic : E-Waste

- **E- Waste** – The waste from electronic and electrical appliances which have reached their end of life period are called as E-waste or Electronic waste.
- **Examples** – Refrigerator, washing machine, TV, Scanners, Printers, Computers, cables, AC etc.
- **Sources of E-waste**:
  - House holds,
  - Shops,
  - Industries,
  - Electrical / electronics repairing center,
  - Institutions,
  - Laboratories,
  - IT centers,
  - Computer institutes, etc.

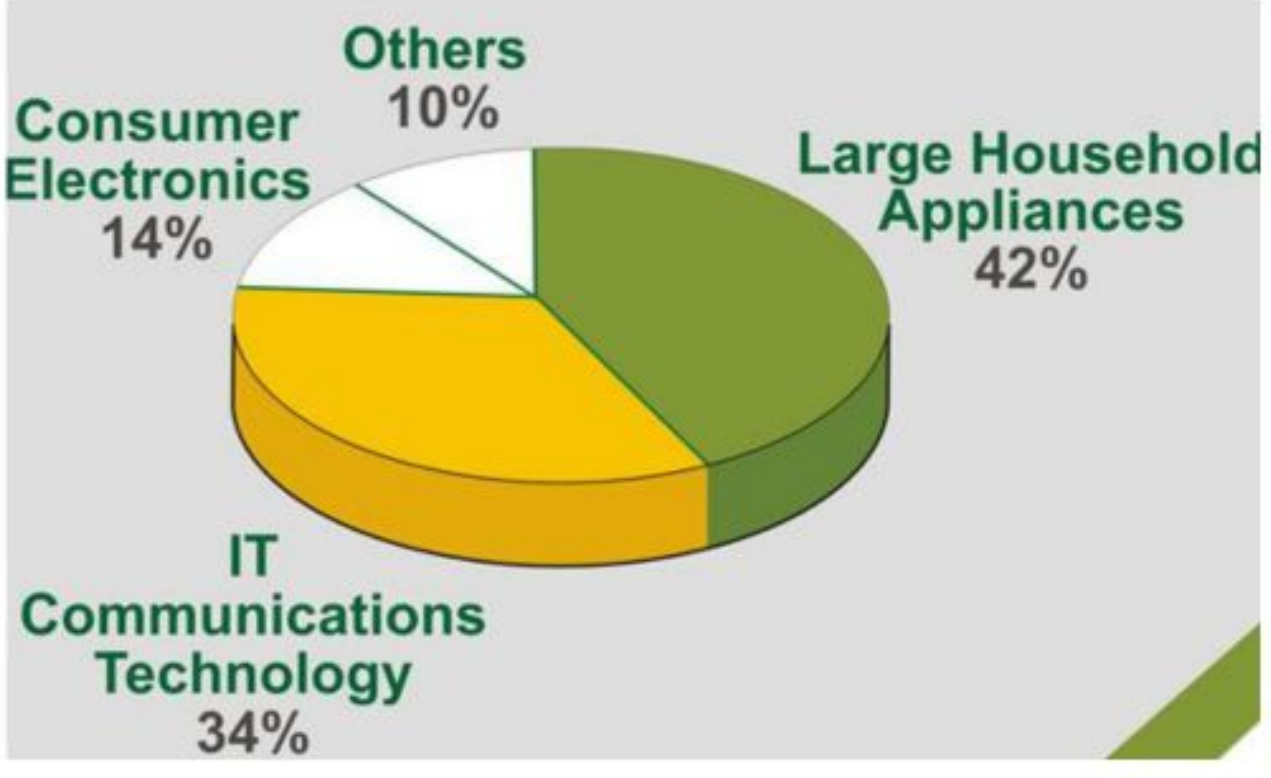
Footnotes

Sub Topic : E-Waste, cont.....

- **Generation of E-waste:**
  - According to UN's Global Monitor India ranked fifth in the world in generating E-waste.
  - India generating 1.81million tons E-waste.
  - The rate of E-waste generation increases 10 % every year.

Sub Topic : E-Waste, cont.....

Compositions of E-waste



Sub Topic : E-Waste, cont.....

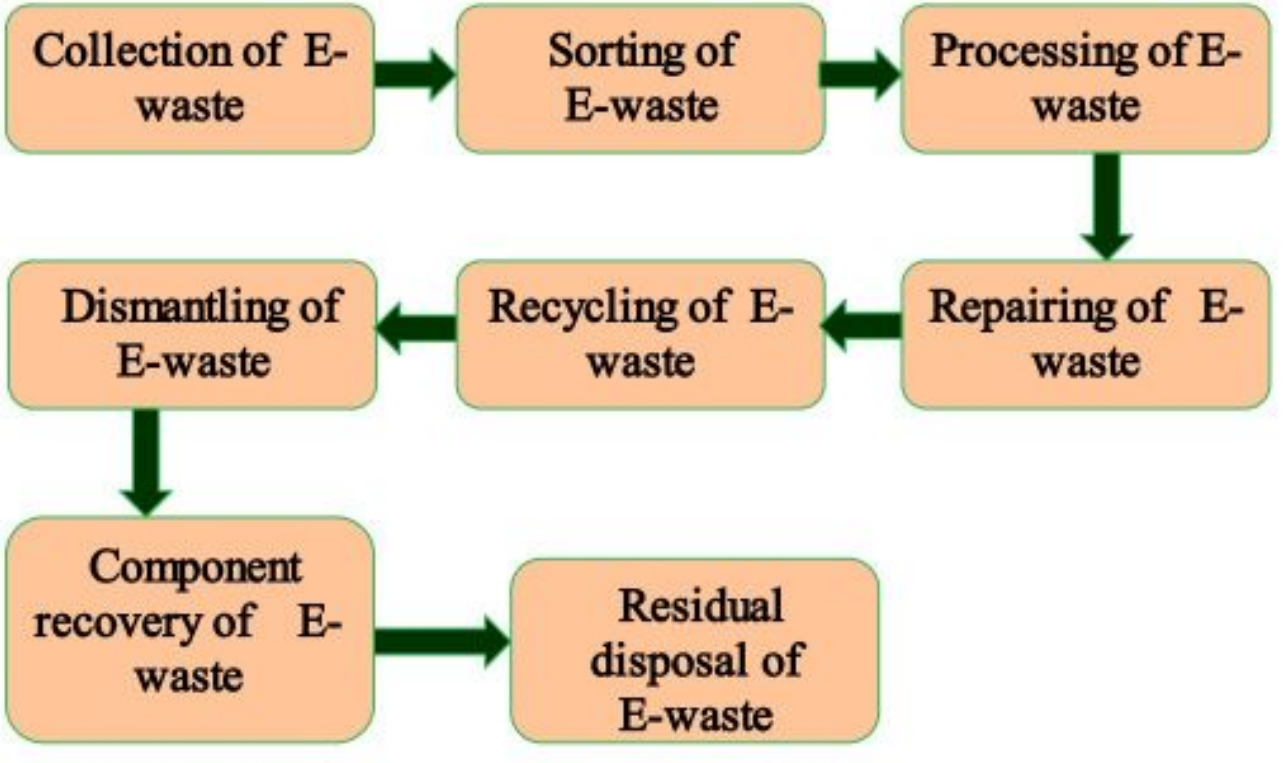
- Impacts of E-waste:

- On Public Health:
  - DNA Damage,
  - Lung cancer,
  - Damage to heart, lungs and spleen,
  - Chronic damage to brain,
  - Asthmatic bronchitis,
  - Vision failure, ulcer,
  - Breathing difficulties,
  - Birth defects,
  - Hormonal changes,
  - Damage immune system etc.

- On Environment:
  - Ground water pollution,
  - Acidification of soil, Soil pollution,
  - Air pollution,

Sub Topic : E-Waste, cont.....

Methods of E-waste management:



Revision

- **What we have learned today?**
  - E-waste waste and its sources.
  - Generation of E-waste.
  - Compositions of E-waste.
  - Methods of E-waste Management.

Now, let's have a Quiz.....

References

1. Asnani P.U., 2004. United states Asia Environmental Partnership Report, US Agency for International Development, Centre for Environmental Planning and Technology, Ahmadabad.
2. Asnani, P.U., 2006. Indian Infrastructure Report, Solid Waste Management. http://www.3inetwork.org/report/IIR2006/solid_waste.pdf.
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Program – CIVIL ENGINEERING
Program Code – CE

MSBTEs E-CONTENT

Expert-Dr. B. R. Ambade, LCE, G P Bramhapuri

19/07/2020

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

Unit Outcome- UO 4l,4m, and 4n

MSBTE LEAD- STUDY AT YOUR DOORSTEP

Written by

Br. B. R. Ambade
Course Expert and Coordinator

Ms. Swati Ingale
Course Expert

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI,
Nagpur

Topic 4- ENVIRONMENTAL POLLUTION

Sub Topics – Biomedical Waste

19/07/2020

CO-d: Apply techniques to reduce environmental pollution.

What we will learn today ?

1. **Agenda point** – Biomedical Waste
2. **Agenda point** – Generation of BMW
3. **Agenda point** – Characteristics
4. of BM Waste
5. **Agenda point** – Impacts of B Wa
   Agenda point – Manageme of BM Waste

Dr.B.R.Ambade
Course Expert and Coordinator

Ms. Swati Ingale
Course Expert

Content

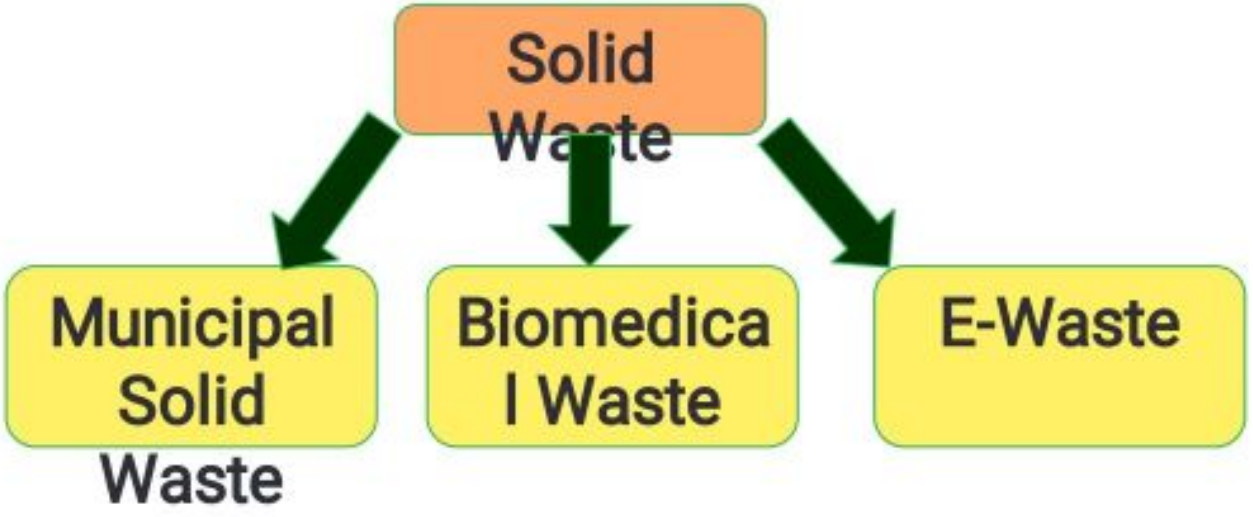
4.7 Municipal Solid Waste, Biomedical Solid Waste, E-Waste.
Sources, generation, characteristics, effects and methods to manage.

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

Learning Objective/ Key learning

- 4l. State characteristics of solid waste.
  - 4m. State the impacts of solid waste.
    - 4n. Describe Incineration, RDF and Sanitary Landfilling.

Concept Map of Solid Waste



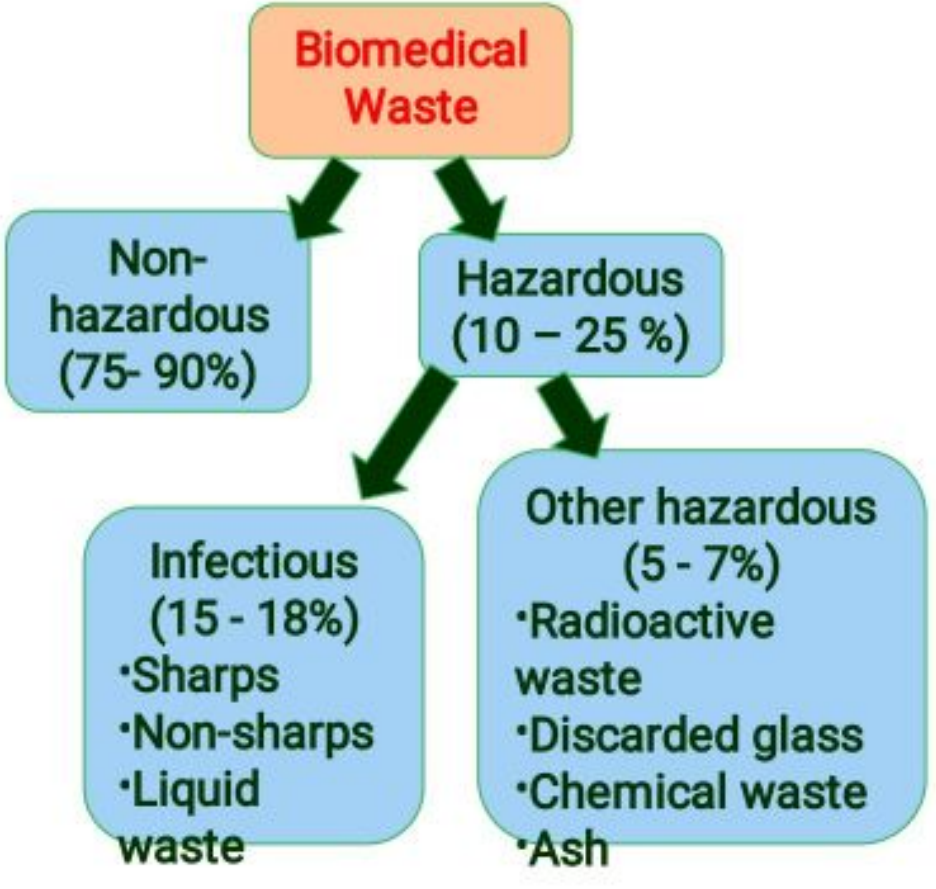
Sub Topic : Biomedical Waste

- **Biomedical Waste (BMW)** – The waste which is generated from *health care facilities* during diagnosis and treatment is called as Biomedical waste.

- **Sources of BMW**:
  - Hospitals
  - Clinics,
  - Path Labs.
  - Blood banks,
  - Nursing Homes.
  - Mortuaries,
  - Funeral services,
  - Dental clinics,
  - Animal research etc.

Footnotes

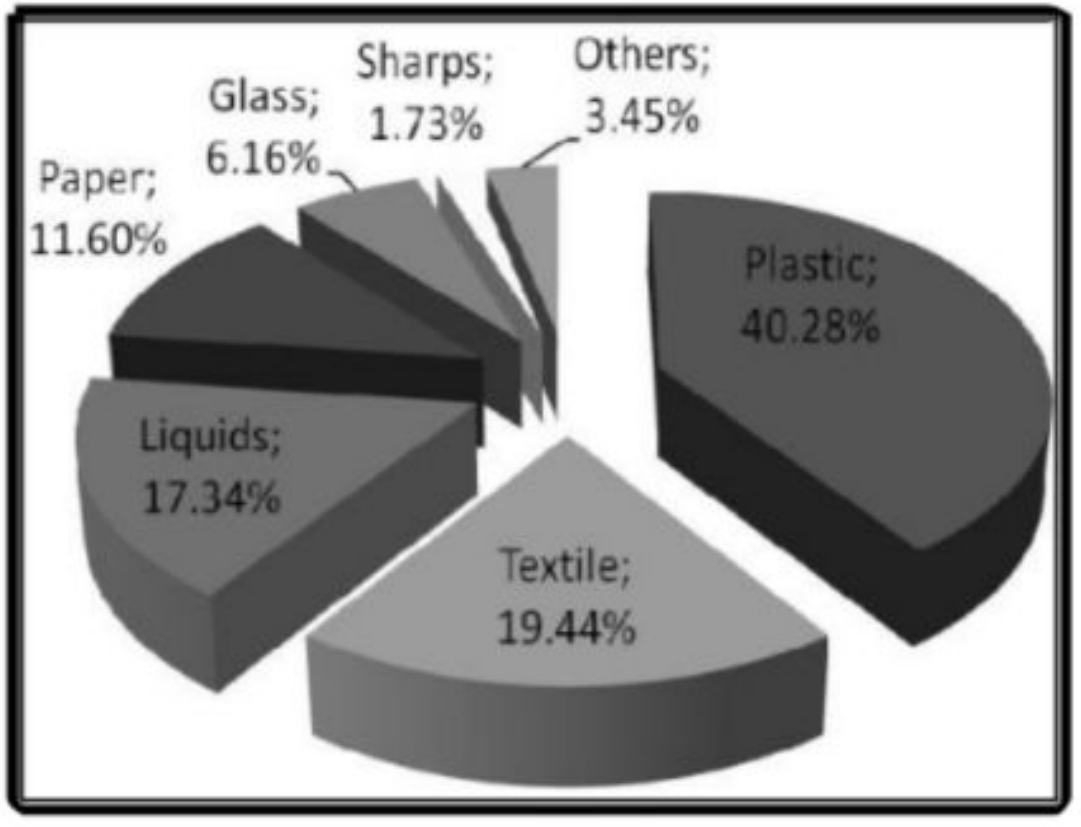
Sub Topic : Biomedical Waste, cont.....



- **Generation of BMW:**
  - The generation of BMW in India is 1 to 2 Kg/bed /day.
  - About 484 t of BMW are generated per day in India out of which 447 t are treated.

Sub Topic : Biomedical Waste, ~~cont.....~~

Compositions of BMW:



Sub Topic : Biomedical Waste, ~~cont.....~~

- Impacts of BMW:

- **On Public Health:**
  - Nausea and vomiting
  - Low birth weight
  - Airborne diseases
  - Chemical poisoning
  - Neurological diseases
  - Contagious diseases
  - Cancer
  - Effects on animals

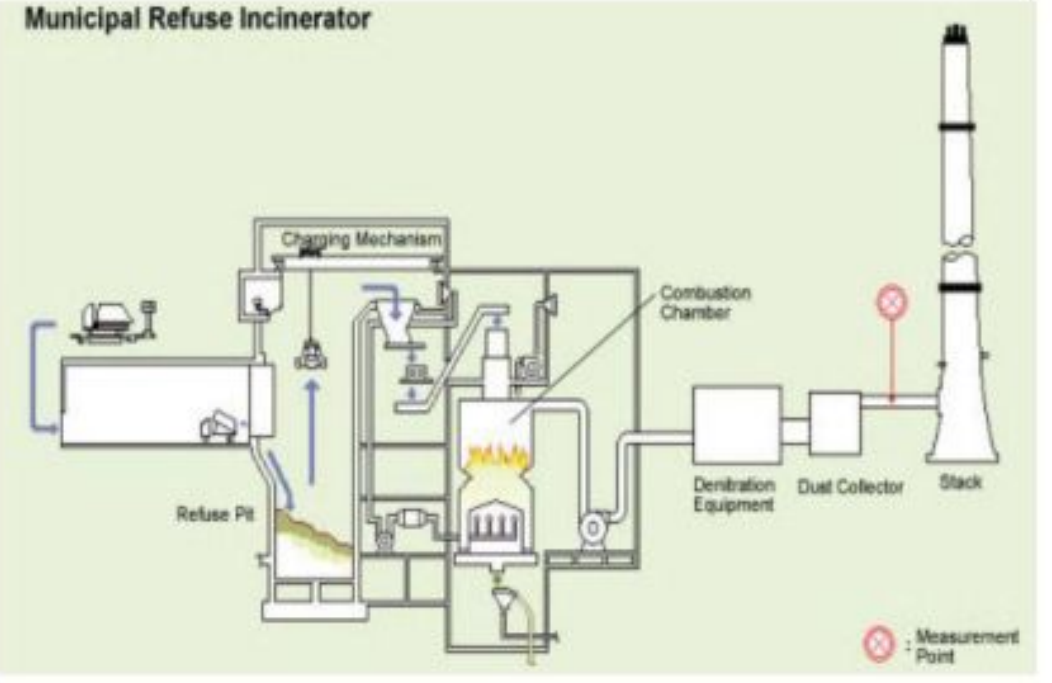
- **On Environment:**
  - Ground water contamination
  - Radioactive pollution
  - Airborne Pollutants
  - Air pollution
  - Soil pollution

Sub Topic : Biomedical Waste, ~~cont.....~~

- Methods of BMW management:
  - Secured landfilling,
  - Incineration,
  - Shredding,
  - Deep Burial
  - Autoclaving
  - Microwaving
  - Chemical treatment

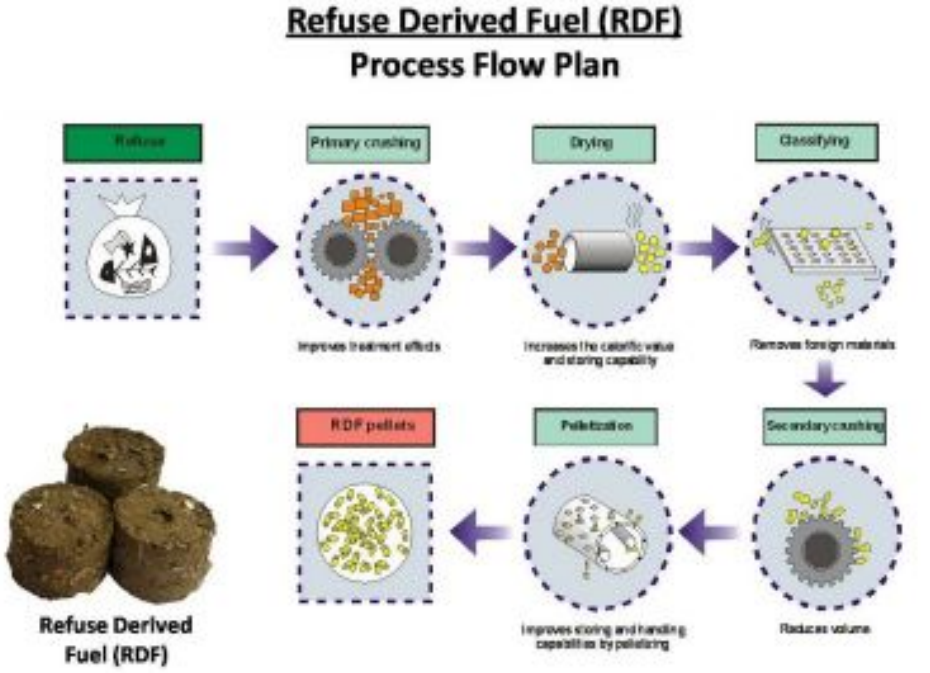
Sub Topic : Biomedical Waste, cont....

- **Incineration:** Incineration is a process of complete combustion of solid waste under controlled environment.
- Incinerators are designed to operate at high temperature @ more than 850^0 C.
- It reduce the volume of waste from 80 to 95 %.
- It leads to energy recovery and complete destruction of toxic wastes.
- The by-products are Ash, Heat and Gases.
- Ash is used as filler material or manufacturing of bricks; Heat is used to generate energy.



Sub Topic : Biomedical Waste, cont.....

- Refuse Derived Fuel (RDF):
- The combustible fraction of MSW is shredded into smaller, more uniform size particles for burning this is called as RDF.
- The RDF thus produced may be burned in boilers on-site, or it may be shipped to offsite boilers for energy conversion.
- If the RDF is used off-site, it is usually densified into pellets through the process of pelletization.
- The calorific value of RDF pellets can be around 4000 Kcal / Kg.
- The RDF is used as a substitute of coal in industries.



Revision

- **What we learned today?**
  - Biomedical waste and its sources.
  - Generation of BMW.
  - Compositions of BMW.
  - Methods of BMW Management.

Now, let's have a Quiz.....

References

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MSBTE LEAD- STUDY AT YOUR DOORSTEP

Dr. B. R. Ambade

Course Expert and
Coordinator

Unit IV: **ENVIRONMENTAL POLLUTION**

CO 4: Apply techniques to reduce environmental pollution

UO 4e: State the needs of water conservation.

27/07/2020

Topic:

Water Pollution and Water Conservation

Written by

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic, Nagpur

Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

What we will learn today?

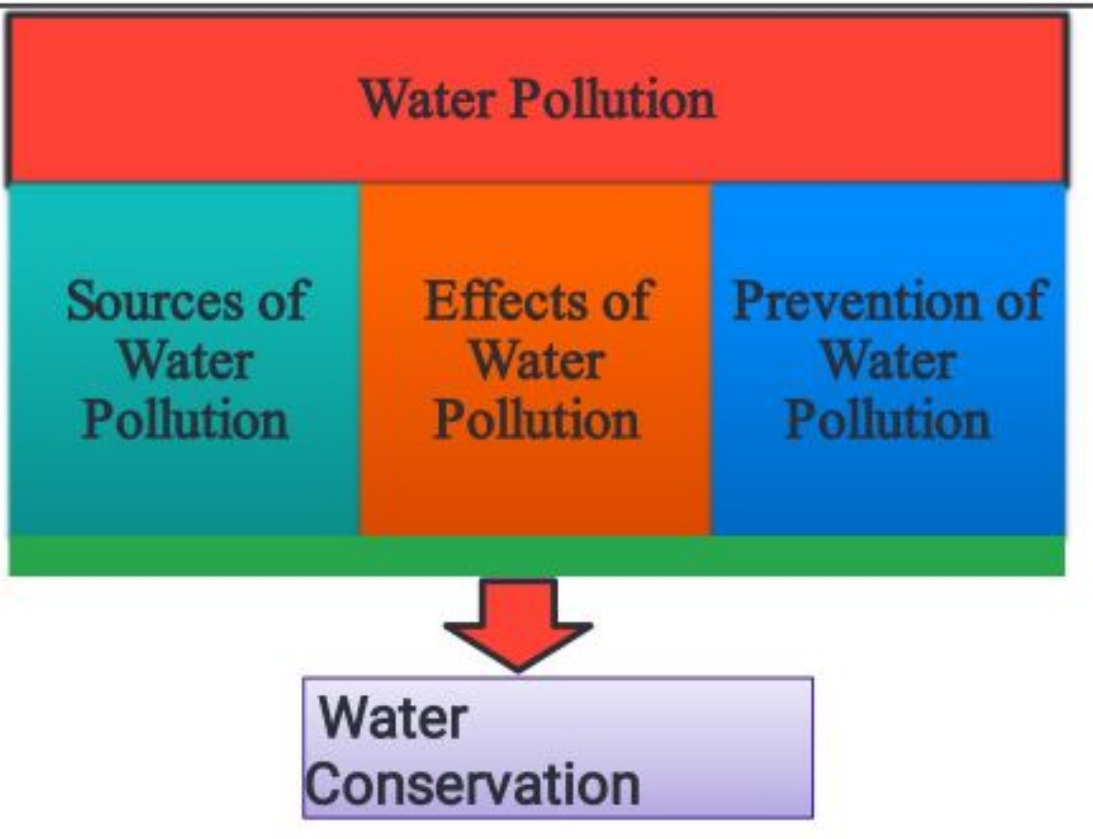
Learning Objective/ Key takeaways

- Students will able to understand sources and effects of water pollution
- Students will know water treatment process

Content: 4.3:

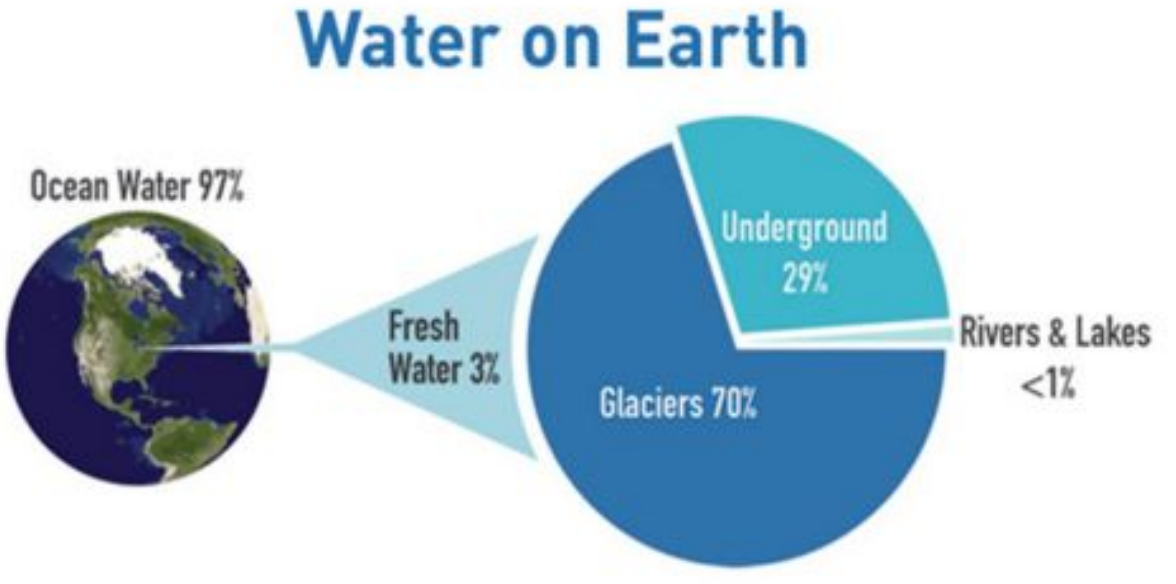
1. Sources of Water Pollution
2. Effects of Water Pollution
3. Prevention of Water Pollution
4. Water Conservation

Concept Map



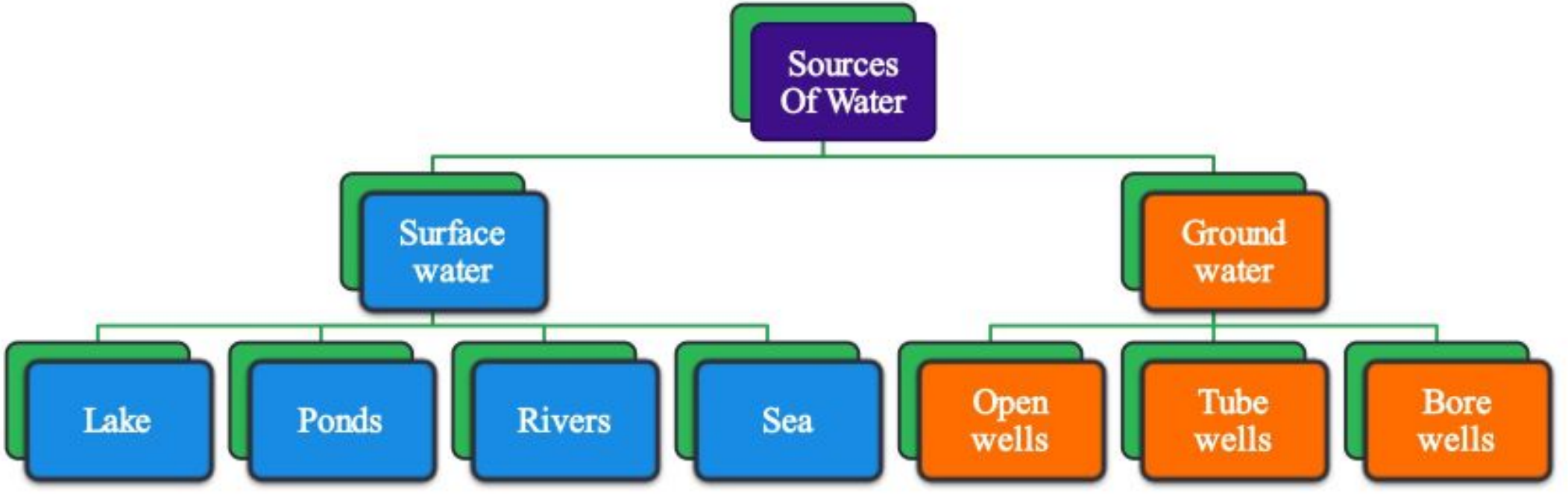
Water

- Water is a vital natural resource which forms the basis of all life.
- Earth is known as the **"Blue Planet"** because 71 % of the Earth's surface is covered with water.
- About 97% of the earth's water is strong saline.
- The rest 3% is freshwater.



www.google.com/url?sa=i&url=http%3A%2F%2Fwww.conservationsolutions.com

Sources Of Water



Sources Of Water

Surface water: Water on the surface of the planet such as in a river, lake, wetland, or ocean.

Sources Of Water

Ground water: Water present beneath Earth's surface in soil pore spaces and in the fractures of rocks

Open wells

Tube wells

Bore we

Water Pollution

Water pollution occurs when harmful substance like chemicals or microorganisms contaminates a stream, river, lake, ocean, or water bodies, degrading water quality and rendering toxic effects to humans or the environment.

Sources of Water Pollution

- **Domestic waste** :-
- Residential **waste** containing disposable materials generated by households containing waste food, detergent, soap water, flushes from sink, bathrooms. As it contains pathogens, disease producing microbes it is very harmful.
- **Industrial waste:-**
- Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process. This waste contains toxic chemicals and pollutants.

Sources of Water Pollution

- **Accidental Oil leakage:-**
- Oil spill from ships in sea causes adverse effects on local marine wildlife such as fish, birds because oil do not get dissolve with water.

- **Marine dumping:-**
- Garbage such as plastic, paper, aluminum, food, glass, or rubber are deposited into the sea. These items take weeks to hundreds of years to decompos cause for water pol

Sources of Water Pollution

- **AGRICULTURE**
- Agriculture has an impact on water pollution. The chemicals such as fertilizers, pesticides, fungicides, herbicides or insecticides used in farming run off with water and pollute nearby water bodies.

- **RADIOACTIVE WASTE**
- Waste generated by power plants and uranium mining can pollute the water and environment for thousands o years

Effects of Water Pollution

- **On The Environment**
- Water pollution truly harms biodiversity and aquatic ecosystems.
- Thermal pollution, defined by a rise in the temperature of water bodies, contributes to global warming
- The main problem caused by water pollution is that it kills fish, crabs, birds, sea gulls, dolphins, and many other animals that depends on these water bodies.

Effects of Water Pollution

- **On Human Health**
- Water pollution has very negative effects on public health.
- A lot of diseases result from drinking or being in contact with contaminated water, such as diarrhea, cholera, typhoid, dysentery or skin infections.
- In zones where there is no availability of drinking water is subjected to the high risk of dehydration.

Prevention of Water Pollution

1. Wastewater treatment

- Wastewater treatment consists of removing pollutants from wastewater through a physical, chemical or biological process.

2. Green agriculture

- Globally, agriculture depends on water resources, so it is essential to have climate-friendly crops, efficient irrigation that reduces the need for water and energy-efficient food production.

Prevention of Water Pollution

3. Air pollution prevention

- It has a direct impact on water contamination as human induced CO2 emissions are absorbed by oceans. This pollution causes a rapid acidification of our oceans, and threatens marine life and corals.

4. Plastic waste reduction

- 80% of plastic in our oceans is from land sources. In order to reduce the amount of plastic entering our ocean, we need to reduce our use of plastic globally and to improve plastic waste management.

Water Conservation

- Rapid population growth and increasing water consumption for agriculture, industry and domestic purposes have strained the world's fresh water resources.
- Hence, there is immediate need of Water conservation.

1. Domestic conservation

- Verify taps at your home is leak free.
- Use waste water in flush.
- Keep overflow valve in the overhead tank.
- Use sprinkle irrigation in your garden.

Water Conservation

2. Industrial conservation

- Install waste water treatment plant in the factory.
- Reuse cooling water for gardening or irrigation.
- Develop new techniques which require less water.

3. Agricultural conservation

- Improved methods of irrigation like drip irrigation and sprinkler irrigation must be used.
- Reducing losses from canals.
- By constructing structures like: check dames, khet talawadi, pala, gully plugging etc.

Conclusion: What we learnt today?

Water conservation includes all the policies, strategies and activities made to manage fresh water as a sustainable resource, to protect the water environment, and to meet current and future human demand.

Rain Water Harvesting

Summary

We have studied

1. Sources of Water Pollution

2. Effects of Water Pollution

3. Water treatment Process

4. Water Conservation

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
3. Dr. J. P. Sharma, 2009. Environmental Studies, 2nd Edition, Laxmi publications, New Delhi, India.
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Program Code – CE

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

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MSBTE LEAD- STUDY AT YOUR DOORSTEP

Unit IV: ENVIRONMENTAL POLLUTION

CO d: Apply techniques to reduce environmental pollution

UO 4d: State various units and their functions of water treatment plant.

27/07/2020

Topic:
4.3:Water Pollution

Written by

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic, Nagpur

Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

What we will learn today?

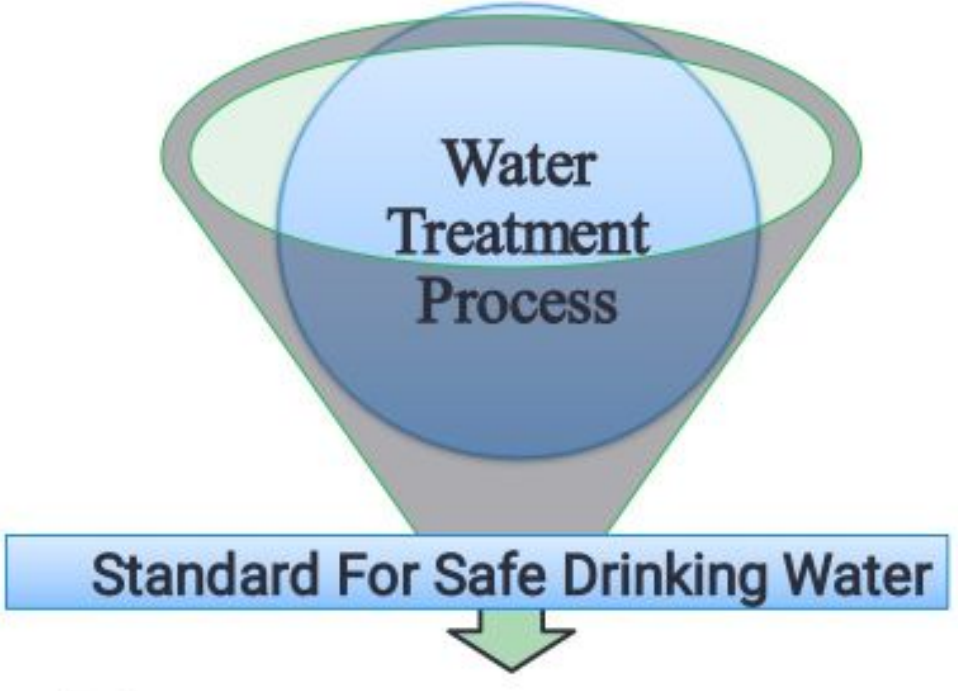
Concept Map

Learning Objective/ Key takeaways

- Students will know about water treatment process.

Content: 4.3:

1. Water treatment Process
2. Standard For Safe Drinking Water



Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Water: A Precious Gift of Nature

- Water carries nutrients to all cells in our body and oxygen to our brain.
- Water allows the body to absorb minerals, vitamins etc.
- Water flushes out toxins and waste. Water helps to regulate body temperature.
- Drinking water, also known as potable water. It must be free from all types of impurities.

Types of Impurities in water:

1. Suspended Impurities
2. Dissolved Impurities
3. Colloidal Impurities
4. Biological Impurities

Types of Impurities in water

1. Suspended Impurities
The visible and floating impurities.

3. Colloidal Impurities
The impurities of fine silt and clay

2. Dissolved Impurities
The soluble salts of Ca and Mg, minerals etc.

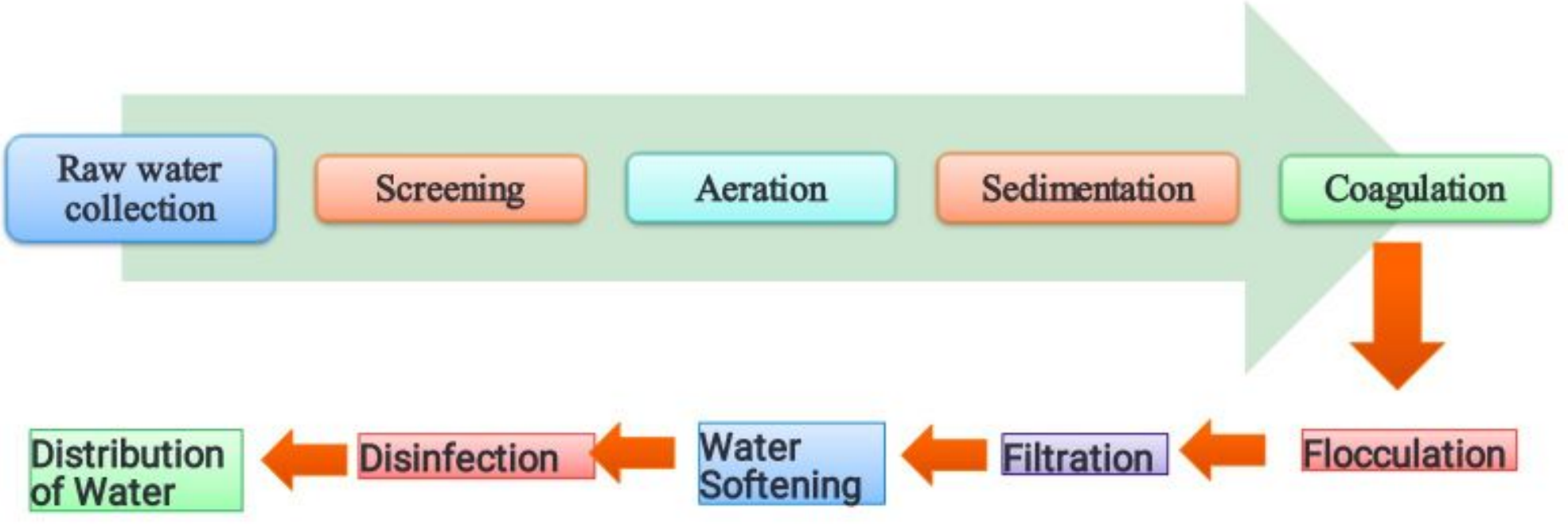
4. Biological Impurities
The invisible disease causing germs, bacteria etc.

Water treatment Process

Need of water treatment:

- To remove the unpleasant and objectionable taste and odors from the water.
- To remove dissolved gases and color of water.
- To remove all types of impurities present in water.
- To kill all pathogenic germs, which are harmful to human health.
- To make water fit for domestic, industrial, and commercial uses.

Flow Chart Of Water Treatment Process



Water Treatment Process: Initial Stages

1. Raw water collection:

- Raw water is collected from different water sources like rainwater, ground water and water from bodies like lakes and rivers.

2. Screening:

- The removal of any floating objects like leaves, branches, fishes , weeds, etc. from the water.
- It is carried out by Bar Screening or Mechanical Screening.

Water Treatment Process: Initial Stages

3. Aeration:

- The process of bringing the water in intimate contact with atmospheric air. It dissolve oxygen into the water to remove gases, odour and taste.
- It precipitate unwanted metals like iron and manganese.
- It is carried out by Cascade and spray aerator.

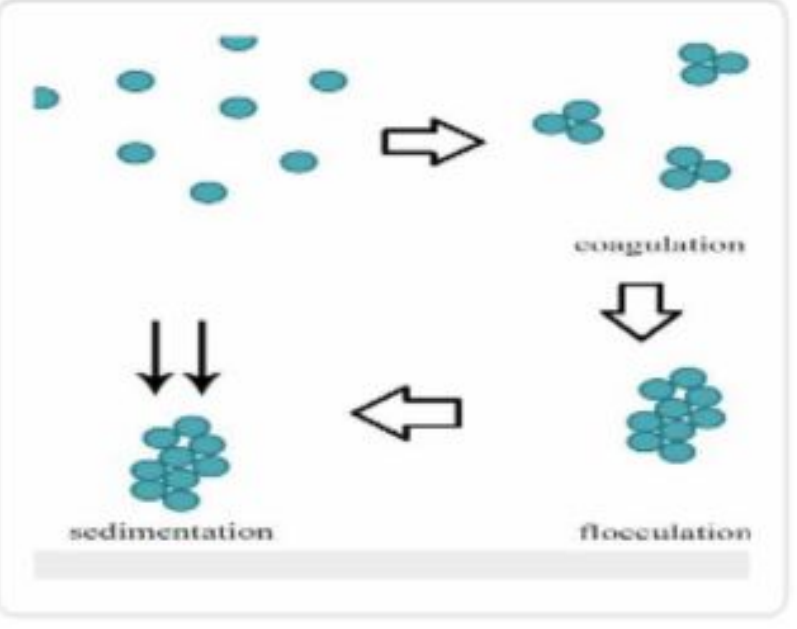
4. Sedimentation:

- Removal of Suspended matters having higher specific gravity than water and also fine suspended matter by keeping water in stand by position for 2-3 hours.

Water Treatment Process: Major Clean Up Stages

5. Coagulation:

- Process of addition of a coagulating agent (usually Aluminum sulfate and/or Ferrous sulfate) to the raw water to remove the colloidal impurities from water by formation of flock.



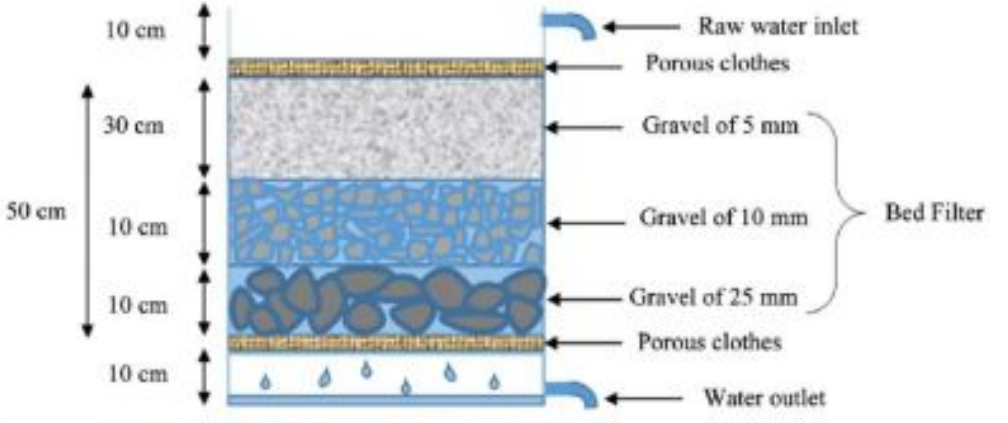
6. Flocculation

- Flocculation is the gathering of colloidal particles into a large size (Heavier than water) particles known as flocks which can be effectively removed by sedimentation or flotation.

Water Treatment Process: Major Clean Up Stages

7. Filtration

- The process of passing the water through the bed of granular materials is known as filtration.
- Gravity sand filters are used in water purification for treating raw water to produce a potable product.



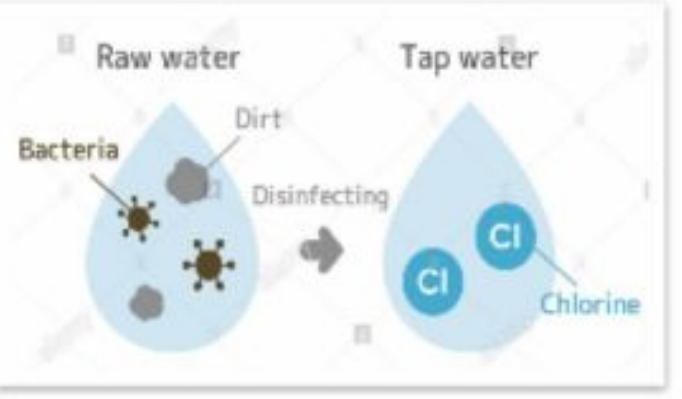
8. Water Softening-

- The dissolved impurities of Calcium and Magnesium ate removed by various water softening methods like Lime soda Process, zeolite process, and Ion exchange process.
- It makes the water fit for domestic as well as industrial use.

Water Treatment Process: Major Clean Up Stages

9. Disinfection:

- The process to kill the disease causing germs to obtain Potable water is called as disinfection.
- It is carried out by treating water either with Chlorine gas or Bleaching Powder or Chloramines called as chlorination.
- Chlorination is carried out to kill algae that would otherwise grow and clog the water filters.



10. Distribution of water:

- Water distribution systems provide an uninterrupted supply of safe drinking water to all consumers.

Standard For Safe Drinking Water

- The Bureau of Indian Standards (BIS) as per IS 10500:1991, has specified drinking water quality standards in India to provide safe drinking water to the people.

BIS Standards Set for drinking water quality

- This standard has two limits, acceptable limits and permissible limits in the absence of an alternate source.
- If any parameter exceeds the limit, the water is considered unfit for human consumption.

- https://www.kent.co.in/blog/safe-drinking-water-guidelines-in-india/

BIS Standards Set for drinking water quality, IS 10500:1991

Parameter	Acceptable limit	Permissible limit
pH value	6.5-8.5	No relaxation
Turbidity, NTU	1	5
TDS, mg/l	500	2000
Total hardness as CaCo3, mg/l, Max	200	600
E.coli presence/absence	Shall not be detectable in any 100ml sample	Shall not be detectable in any 100ml sample
Total iron as Fe, mg/l, Max	0.3	No relaxation
Fluoride, mg/l	1	1.50
Residual chorine, mg/l	0.20	1
Chloride, mg/l	250	1000
Taste	Agreeable	Agreeable
Odour	Agreeable	Agreeable

https://www.kent.co.in/blog/safe-drinking-water-guidelines-in-india/

Conclusion

- Water is an important element to regulate body so drinking water should be pure and hygienic. Otherwise, people may suffer from various water-borne diseases.
- Thus water treatment process aims at supply of high quality drinking water.

Summary

Today we have studied .....

1. Water treatment Process
2. Standard For Safe Drinking Water

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
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MSBTE LEAD- STUDY AT YOUR DOORSTEP

Unit IV: ENVIRONMENTAL POLLUTION

CO d: Apply techniques to reduce environmental pollution

UO 4a: Define pollution.
UO 4b: State the sources of pollution.
UO 4c: State the effects of land pollution on environment and lives.

27/07/2020

Topic:
4.1: Pollution
4.2: Soil Pollution

Written by

Ms. Swati Ingale
Course Expert
Lecturer, NIT Polytechnic, Nagpur

Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

Dr. N.S.Raman
Course Expert
Deputy Director, NEERI, Nagpur

What we will learn today? Concept Map

Learning Objective/ Key takeaways

Students will able to understand causes and effects of Land pollution

Content:

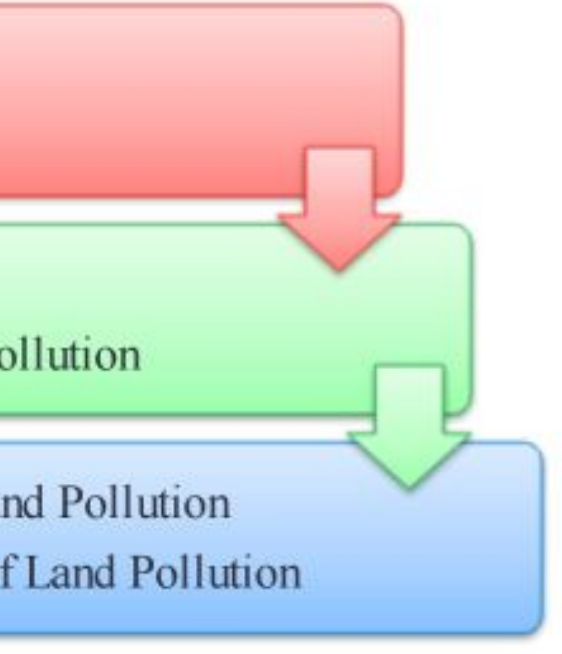
4.1: Definition of Pollution

Types of Pollution

4.2: Causes of Land Pollution

Effects of Land Pollution

Prevention of Land Pollution



Dr. B. R. Ambade
Course Expert and Coordinator
Lecturer, Government Polytechnic, Bramhapuri

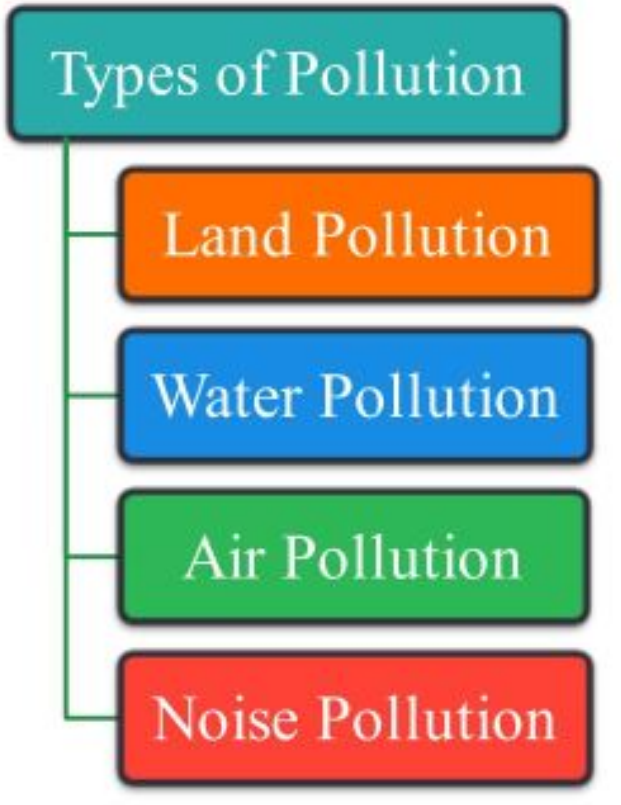
Pollution

Pollution is the undesirable changes in environment due to contamination of harmful materials that have adverse effects on living things and natural quality of environment. These harmful materials are called pollutants.

Pollutions are of two types.

The natural: The natural pollution is caused and produced naturally and will not affect our environment because of its regeneration ability. **e.g. Thunder, Volcano eruption, Forest fire, sand storms etc.**

Man Made: The Man made pollution is being made by humans and have huge affect on our environment and public health. **e.g. Automobiles, Industrialization, sewage, solid waste etc.**



Land / Soil Pollution

- The fertility and structure of land adversely altered due to contamination of undesirable materials is called as Land pollution..
- Land pollution is the demolition of Earth's land surfaces often caused by human activities and their misuse of land resources.
- It occurs when waste is not disposed properly.
- We can no more manufacture a soil. The soil is a resource for which there is no substitute.

Causes of Land Pollution

1. Industrialization

- Plastics factories, chemical plants, oil refineries, large animal farms, coal-fired power plants, metals production factories and other industries all contribute to land pollution.

2. Mining Activities

- The mining process can lead to the creation of large open spaces beneath the surface of the earth
- Heavy minerals, sulfuric acid and other toxic material leak from mining waste into soil

Causes of Land Pollution

3. Agricultural Activities

- Due to population rise, food is in higher demand and so forests are chopped down and turned into farmland
- In addition, herbicides, pesticides, artificial fertilizers, synthetic manure are washed into the soil and pollute it.

4. Sewage treatment:

- Large amount of solid waste is leftover once the sewage has been treated.
- The leftover material is sent to landfill site which end up in polluting the environment.

Causes of Land Pollution

5. Overcrowded landfills:

- Household waste produces tones of garbage each year.
- Items that can not be recycled become a part of the landfills that destroy soil quality and cause land pollution.

6. Construction activities:

- Due to urbanization, large amount of construction activities are taking place which has resulted in large waste articles like wood, metal, bricks, plastic

Causes of Land Pollution

7. Deforestation

- In search of more land for industries, agriculture, residence Deforestation is carried out.
- Land that is once converted into dry or barren land can never be made fertile again.

8. Urbanization

- Urbanization refers to the population shift from rural to urban areas
- It imparts additional pressure on **land** resources for Residence and food production

The Negative Impact Of Land Pollution

1. Ground water poisoning

- The Agricultural run off waste water from industrial sites, and landfills percolates through soil and pollute the ground water.

2. Water nutrient enrichment

- Chemicals, such as nitrogen, are used frequently on farms. Only a small portion of the nutrients end up benefitting the crops. The remainder usually ends up in water bodies populated by fish, algae, and other life forms. The nutrient-heavy water saps up most of the oxygen in the water, which leaves little for fish and other life.

The Negative Impact Of Land Pollution

3. Soil erosion

- Deforestation leads to exposer of soil to atmospheric conditions like wind, rain which wash out top soil layer resulting in soil erosion. It severely affects the fertility of land.

4. Shifting habitat

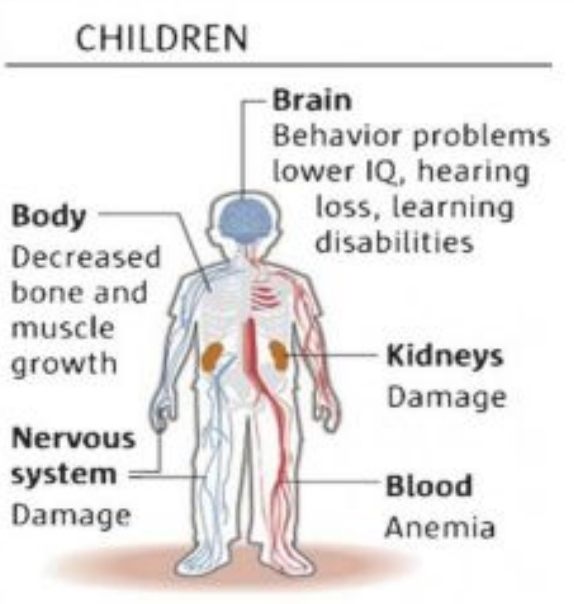
- As deforestation and soil erosion progress, animals are forced to move to find shelter and food. For some animals, the change is lethal. As a result, some species are at a greater risk of extinction.

5. Increased risk of forest fires/ wildfires

- The dry conditions created by pollutants in the soil help to create the perfect environment for forest fires/ wildfires.

Effects of Land Pollution on Humans

- Humans can also experience negative consequences that can influence quality of life and health.
- The potential consequences include birth defects, the development of breathing disorders, skin diseases, and cancer.
- Land pollution has also been linked to development of children. The e - waste Chemicals that are commonly found in contaminated soil and water, such as lead, chromium, cadmium, arsenic etc. can impact a child's cognitive development even if the exposure is very low.



Prevention For Land Pollution

1. **Proper waste disposal**
   - Focuses on treating waste and disposing it in the safest possible manner.

2. **Reduce, Reuse, Recycle and Recover**
   - Reduce the usage of non-biodegradable materials, such as plastic shopping bags.
   - Recycle the waste that can be recycled and
   - Reuse the materials that can still be used to reduce the need for harvesting of resources.

Prevention For Land Pollution

3. Buy Biodegradable Product

- Biodegradable products can be easily decomposed and not harmful.

4. Create Dumping Ground Away

- Dumping Ground or Landfills should be away from residential area so that waste product will not be seen all over the places.

5. Do Organic Garden

- Organic gardening can reduce the usage of pesticides and insecticides. Non-gardeners can help by buying organic food.

Conclusion

The negative consequences of land pollution can be greatly reduced with the cooperation of everyone. The health and well-being of all can be protected by making a continuous effort for a safer environment.

Summary

We have studied

1: Definition of Pollution

Types of Pollution

2: Cases of Land Pollution

Effects of Land Pollution

Prevention of Land Pollution

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
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