



UNIT-9

ENVIRONMENT AWARENESS AND CONSERVATION

Knowledge	Understanding	Application Skills	Evaluation
The issues that affect the ecological balance and environment.	The students will understand the importance of waste management and water conservation.	The students will apply the skills and techniques for waste management and rain water harvesting.	Activities, work sheets and assignments
Pollution and its control mechanism.	They will understand the causes for pollution and his role to prevent it as a responsible citizen.	They will appreciate and apply the methods for keeping the pollution at bay.	Activities, work sheets and assignments





Waste Management

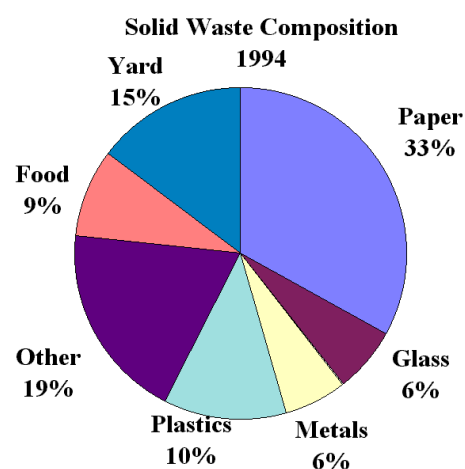


'Management' refers to the collection, transport, processing or disposal, managing and monitoring of waste materials. Waste materials usually relate to materials produced by human activity and the process is generally undertaken to reduce their effect on health, environment or aesthetics. All waste materials, whether they are solid, liquid, gaseous or radioactive, fall within the gamut of waste management

Types

(a) **Solid Waste:** This can be further classified into different types depending on their source as under:

- (i) Household waste is generally classified as 'municipal'.
- (ii) Industrial waste is hazardous waste.
- (iii) Biomedical waste or hospital waste is infectious waste.
- (iv) Electronic wastes such as TV's, refrigerators and computers.



(b) **Liquid Waste:** This can be classified into following types:-

- (i) Chemicals released by industries.



(ii) Waste water released by households through the sewer lines.

- (c) **Radioactive Waste:** These are wastes that contain radioactive material. Radioactive wastes are usually the by-products of nuclear power generation and other applications of nuclear fission or nuclear technology, such as research and medicine. Radioactive waste is hazardous to most forms of life and the environment and is regulated by government agencies in order to protect human health and the environment.

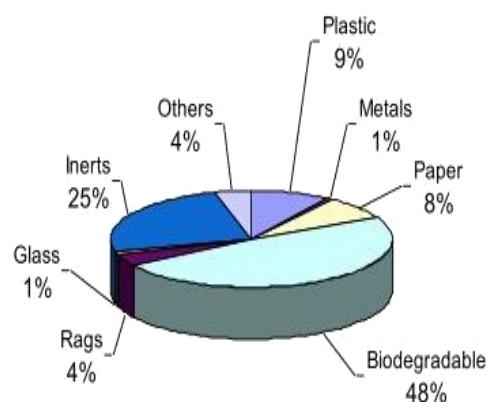


- (d) **Municipal Solid Waste:** Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue and waste from the streets. This garbage is generated mainly from the residential and commercial complexes which comprises of:

- (i) Organic waste such as vegetable and fruit peels, leftover foodstuff, etc.
- (ii) Paper
- (iii) Cotton and woollen clothes
- (iv) Wood
- (v) Plastic bags
- (vi) Tin, aluminium and other metal items such as cans
- (vii) Glass bottles



- (e) **Hospital or Bio-Medical Waste:** Hospital waste is generated during the diagnosis, treatment, or immunization of human beings or animals or in research activities in these fields or in the production or biological testing. It may includes soiled waste, disposables, anatomical waste, discarded medicines and chemical wastes.





- (f) **e-Waste:** Electronic waste or e-waste as it is popularly called, is a collective terminology for the entire stream of electronic wastes such as Used TV's, refrigerators, telephones, air conditioners, computers, mobile phones etc.
- (g) **Hazardous Waste:** Sources of hazardous waste mainly include industries like textile, tannery, petrochemicals, pharmaceuticals, pesticides, paint and dye, petroleum, fertilisers, asbestos, caustic soda, inorganic chemicals and general engineering industries. Hazardous wastes contain heavy metals, cyanides, pesticides, complex aromatic compounds (such as PCBs), and other chemicals which are toxic, reactive, corrosive or have a serious damaging effect on the environment.



Household Hazardous Waste (HHW)



Process of Waste Management



Actions by Individuals: Some steps which all individuals can take whilst contributing to the waste management may include:-

- (a) Segregation of household waste into bio-degradable and non-biodegradable.
- (b) Reduce use of plastic bags and replace with paper or jute or cloth bags.
- (c) Recyclable waste such as paper, glass, cloth etc. should be segregated and disposed accordingly.
- (d) Keep the surroundings of the house clean. Do not dump waste outside the house or on the road.
- (e) Colonies could start vermin-composting and natural composting.
- (f) What is waste for you, is wealth for somebody else. There has been a tradition in India of finding an innovative use for everything - tyres, battery cases, plastic bins and what not. Think of reusing discarded objects.

Actions by Civic Bodies: The major functions of civic body may include the following:

- (a) Prohibiting littering the street.
- (b) Organizing house to house waste collection.
- (c) Conducting awareness programmes to disseminate information to public.
- (d) Providing adequate community storage facilities.
- (e) Use of colour code bins and promotion of waste segregation.
- (f) Transport of waste in covered vehicles.
- (g) Processing of wastes by adopting an appropriate combination of composting, anaerobic digestion, palletisation etc.
- (h) Upgradation of the existing dump sites and disposal of inert wastes in sanitary landfills.

Pollution Control – Water, Soil, Air and Noise

Pollution means imbalance in the atmosphere caused by pollutants. Air gets polluted with the smoke from homes, factories and vehicles. Water gets polluted by city and factory wastes. Loud noises cause sound pollution. Pollution in fact, spreads diseases and makes life uncomfortable. Human beings have played a very crucial role in destroying the very essence of life i.e., destruction of forests due to excessive urbanization. Due to increase in population and industrialization, the forests have been exploited for wood from trees and land space. Unscrupulous felling of trees has led to



the destruction of the forest cover. Hence, the air purifier i.e. the trees which give us oxygen to survive have been depleted. Depletion of greenery and forests and the pollution of the earth's atmosphere have led to reduction of the protective ozone layer and increase in global warming.

Types

Soil Pollution: Today's industrialised society produces a huge amount of garbage; the disposal of such wastes is a major problem, especially in the urban centres'. Non-biodegradable wastes such as polythene bags, which cannot be decomposed by natural agents like bacteria have become a menace to the environment besides being health hazards. Use of chemical fertilizers and pesticides containing harmful substances that contaminate the soil. Soil may also become deficient in nutrients due to excessive cultivation or if the same crop is grown repeatedly on the same plot.

Water Pollution: Waste-water from our homes, hospitals and factories is usually discharged in to the water bodies. Such water contains excreta, disease-causing micro-organisms and harmful chemicals. It makes water unfit for drinking and may even kill aquatic plants and animals. Harmful substances seeping through earth rainwater contaminate groundwater. Plant nutrients derived from fertilizers and organic wastes like dead bodies thrown into water sometimes cause excessive growth of weeds. Many aquatic organisms die as a result of oil spills from tankers. Leaking pipelines also pollute water bodies. Many species of birds and fish die from contact with oil as it makes feathers and gills inactive.





Causes of Contamination

Types

Air Pollution: Air pollution is caused mainly by harmful substances emitted into the atmosphere by industries and automobiles. It causes respiratory diseases and affects the skin and eyes. Some of the gases emitted by industries dissolve in rainwater to produce acid rain, which can damage vegetation. Atmospheric ozone which protects us from harmful ultra-violet rays is depleted due to release of certain carbon compounds called chlorofluorocarbons (CFCs) into the atmosphere. This also increases the risk of skin cancer and eye damage in humans.

Sound Pollution: Sound produced from motor vehicles, trains, aero planes, factories, and sound during religious and political public meetings, noise produced by the masses and other living creatures also plays an important role in producing sound pollution. It also affects the health of human beings. Loud sound affects the human heart; create auditory problems and causes mental stress.

Causes

- (a) **Discharge of Domestic Waste:** Discharge of untreated domestic wastes like human excreta, urine, washing of kitchen and laundry flow directly into reservoirs of water courses. The problem is particularly true of unsewered small towns or cities situated close to the flowing rivers.
- (b) **Discharge of Industrial Waste:** Industrial wastes comprise of organic and inorganic chemical substances in minute or colloidal suspension which undergo microbial decomposition resulting in products odoriferous or unacceptable in tastes or appearance and are harmful to human beings.
- (c) **Discharge of Agricultural Waste:** The agricultural wastes are primarily due to barnyard drainage or washing of chemical fertilizers, insecticides, pesticides and herbicides into surface or ground water sources with the impetus on agricultural



development. The increasing use of such chemicals without forethought of health hazard involved is bound to accentuate the pollution problems.

Air

- (a) Smoke is produced due to incomplete combustion of coal in industrial plants, locomotives, furnaces etc. About 45% of smoke comes from industrial plants alone.
- (b) Dust, salt particle from oceans, pollens, spores, rust etc remain suspended in air and is affected by large air movement, dispersing them into vast areas.
- (c) Gaseous impurities from chemical manufacturing industries like sulphur dioxide, benzyl, carbon monoxide acid vapour, fumes etc. often combine with the aqueous vapour of the air and then intermingle with the smoke already present in the air.
- (d) Chlorofluorocarbons (CFCs) used in air conditioning is responsible for depletion of ozone layer of atmosphere.
- (e) Automobile exhaust gases in particular, exhaust from trucks and buses, contain products of incomplete combustion, carbon monoxide, hydrogen, methane and unburnt carbon.

Sound

- (a) Increase in number of vehicles on the road, excessive use of horns, increase in number of aircraft in the air.
- (b) Use of loudspeakers of extremely high wattage at night.
- (c) Excessive use of fire crackers.
- (d) Increase in ultrasonic and electromagnetic sound waves from mobile towers.

CAUSES



EFFECTS

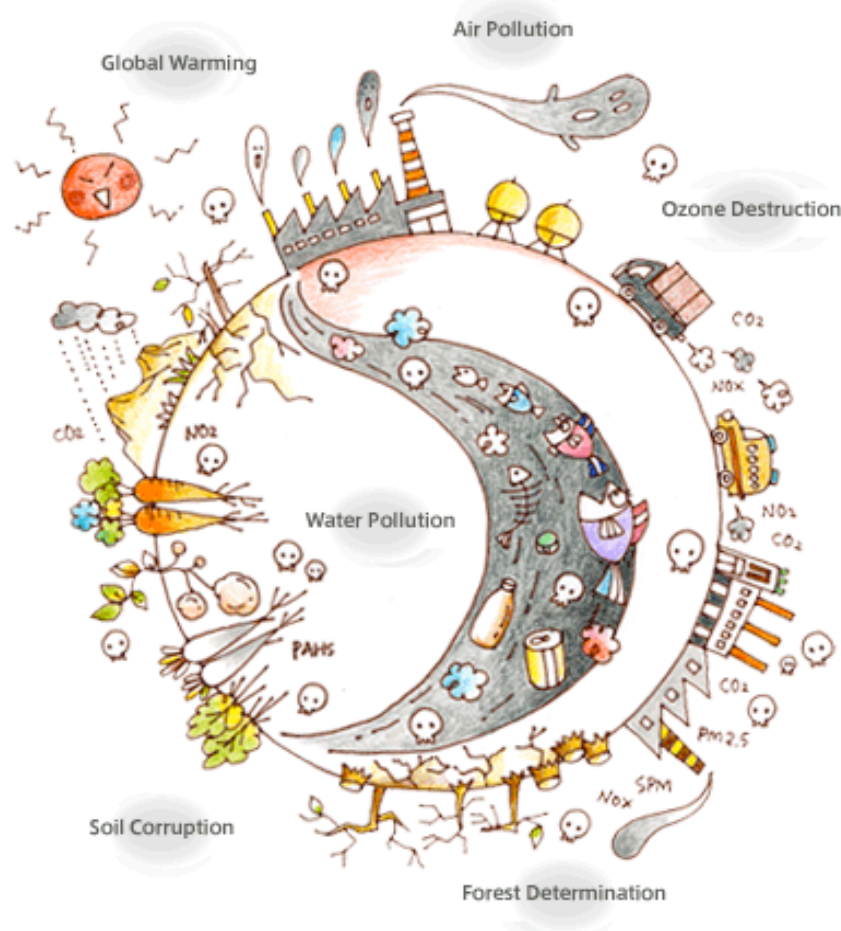


Effects of Pollution

- (a) The principal effect of pollution depletion of the excessive organic load, the dissolved oxygen content of receiving water to a point that the stream becomes incapable of exercising the self-purification process. The de-oxygenation may be sufficient to destroy practically all the aquatic life.



- (b) Pollution of streams by causing suspended solids to deposit on the stream bed leading to silting, and the organic matter undergoing purification with the solid matter buoyed up by gas rising to the top, thus resulting in floating masses of sludge.
- (c) Use of polluted water downstream by communities for their daily requirements causes sporadic outbreaks of water-borne diseases.
- (d) Polluted waters are also difficult to be treated and it is found that treatment plants have to incur increased costs in handling such waters.
- (e) Agricultural soil becomes unfit for agriculture due to excessive poisonous chemicals.
- (f) Crop produced in contaminated soil or soil irrigated with contaminated water is unfit for human consumption. If consumed, it has short-term as well as long-term serious health effects.



Cycle of Contamination

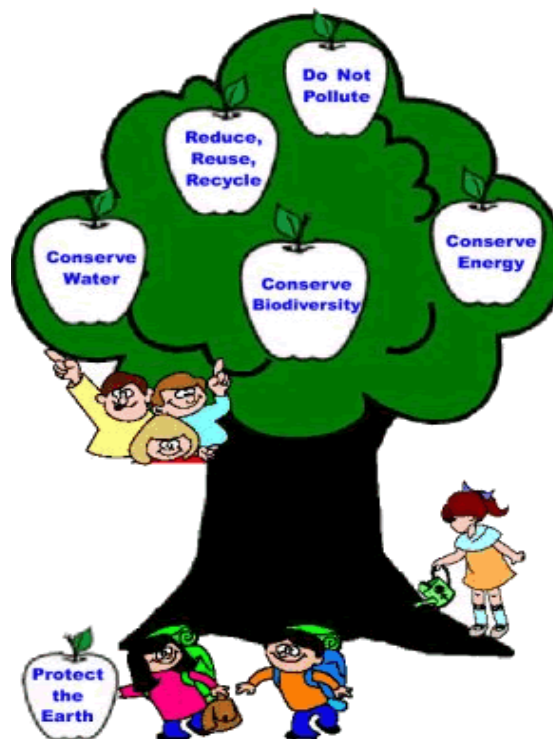


Air

- (a) Occurrence of diseases like silicosis (respiratory disease), rickets, dental caries.
- (b) Deterioration of health in the form of nausea, headache, loss of appetite and irritation due to high sulphur dioxide content in air.
- (c) The incidence of cancer is being increasingly related with the smoke and fumes from industrial plants.
- (d) Smoke severely interferes with normal course of sunshine and visibility resulting in the possibility of untoward accidents.
- (e) Due to sound pollution from mobile towers, many birds like the sparrows have vanished from the cities, disturbing the ecological balance.

Measures to Control Pollution:

- (a) Develop consciousness among public people to control all pollution. Plant more and more trees.
- (b) Ban the use of loud horns or mindless blowing of horns by motor vehicles to be banned.
- (c) The water bodies not to be used as waste reservoirs.
- (d) Various sources of drinking water, and water resources to be well protected so that dirty water does not enter these water bodies.
- (e) Environmental education to be made compulsory in all educational institutions.
- (f) The excessive use of pesticides and insecticides should be avoided.
- (g) In all towns and cities, to have proper arrangement of dustbins to collect household waste.
- (h) Strict precaution should be instituted to avoid pollution of various types in factories.
- (j) Ban running of old and pollution emitting vehicle.
- (k) The pollution control authorities must have independent powers to implement penalties.





Role of the NCC Cadets in Curbing of Pollution: NCC being one of the largest youth organisations has to play a significant role towards the pollution control. A youth can guide and contribute by educating others about the dangers of pollution. We have to respect our environment and natural resources and not pollute the same. Rivers and water bodies must be kept clean as water is an essential resource and it cannot be wasted. In fact, every drop has to be saved. Cadets can visit villages and guide the farmers regarding the use of natural manure instead of chemical fertilizers produced from industrial waste.

SUMMARY

Waste Management refers to the collection, transport, processing or disposal, managing and monitoring of waste materials.

Types of Waste

- Solid waste
- Liquid waste
- Radioactive waste
- Municipal solid waste
- Bio-medical waste
- e-Waste
- Hazardous waste

Management of waste is an essential and an inescapable requirement today. We as individuals also have to play our part in handling our household waste and help the government in addressing this major problem.

- Actions by individuals
- Actions by civic bodies

Pollution means imbalance in the atmosphere caused by pollutants. Depletion of greenery and forests and the pollution of the earth's atmosphere have led to reduction of the protective ozone layer and increase in global warming.

Types of Pollution

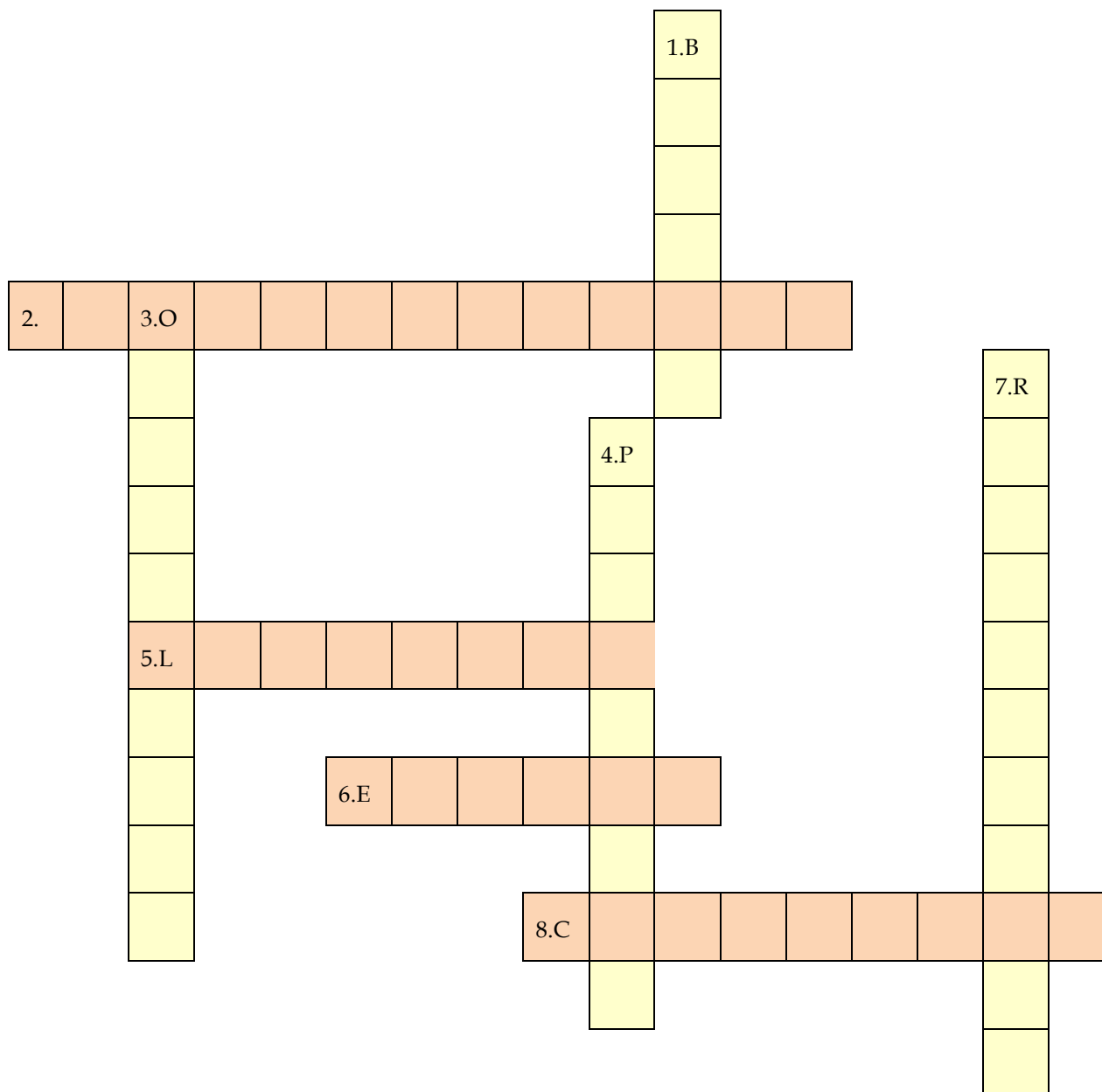
- Soil pollution
- Water pollution
- Air pollution
- Sound pollution

In order to stop pollution, we need to seek the cooperation of every individual in society. It is the duty of every NCC cadet, to contribute towards this end through personal example and by educating others about various constitutional rights on the subject of pollution.



CROSSWORD PUZZLE - 9

Solve the crossword with the given clues:



Across:

2. A gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect
5. The disposal of waste material by burying it



6. Discarded electronic appliances such as mobile phones, computers, and televisions are known as _____
8. The process of making vegetable matter or manure into compost

Down:

1. Refers to the living factors that affect ecosystems, including the organisms that inhabit the area.
3. A layer in the earth's stratosphere, which absorbs most of the ultraviolet radiation reaching the earth from the sun
4. The presence of a substance which has harmful or poisonous effects
7. Wastes that contain radioactive material
9. The process of converting (waste) into reusable material.

Comprehension Questions

Q1. Answer the following in about 15 words:

- (i) What does waste management refer to?
- (ii) What are waste materials?
- (iii) Write the names of a few types of waste material.
- (iv) What includes hospital or bio-medical waste?
- (v) What are liquid wastes?
- (vi) What do you mean by pollution?
- (vii) How does air and water get polluted?
- (viii) What has led to the reduction of the ozone layer?
- (ix) What role is played by humans in destroying forests?
- (x) What are affected by loud sounds?
- (xi) Why do many birds and fish die due to contact with oil?
- (xii) How are air-conditioners responsible for the depletion of ozone layer?

Q2. Answer the following in about 50 words

- (i) What are the different categories of solid waste?
- (ii) What is e-waste?



- (iii) What are the sources of hazardous waste?
- (iv) What comprises hazardous waste?
- (v) What contaminates ground water? What causes excessive growth of weeds and why many aquatic organisms die?
- (vi) Write a short note on sound pollution.
- (vii) How does the discharge of agricultural waste pollute soil and water?
- (viii) Why has sound pollution increased manifold over the years?
- (ix) Write short note on the discharge of:
 - a) Domestic waste
 - b) Industrial waste

Q.3. Answer the following in about 75 words

- (i) Write short note on:
 - a) Soil erosion
 - b) State of being biotic or abiotic
- (ii) What do you understand by global warming?
- (iii) What are the advantages of rain water harvesting in urban areas?
- (iv) Why is there a need for water conservation?

Q.4. Answer the following in about 150 words

- (i) Write in detail about municipal solid waste and its management.
- (ii) What are radioactive wastes?
- (iii) What actions can be taken by civic bodies with regard to waste management?
- (iv) What are the advantages of rain water harvesting in urban areas?
- (v) Write a note on soil pollution.
- (vi) What do you understand by air pollution?

Q.5. Answer the following in about 250 words

- (i) What are the causes of air pollution?
- (ii) Bring out the effects of soil and water pollution.
- (iii) What measures should be taken to control pollution?



Let's Discuss

Q.6. HOTS (Higher Order Thinking Skills)

- (i) *"Management of waste is an essential requirement".* Explain with the help of appropriate examples.
- (ii) *"Youth can guide and contribute by educating others about the dangers of pollution."* Explain with reference to the positive role played by NCC cadets in curbing environmental pollution.



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