CBSE Class 12 Biology Notes Chapter 16: CBSE Class 12 Biology Notes for Chapter 16 Environmental Issues are essential for students preparing for their board exams. These notes simplify complex concepts related to the interaction between humans and the environment, making it easier to grasp topics like pollution, climate change and conservation efforts.

They provide a clear understanding of how human activities impact ecosystems and provide insights into addressing environmental challenges. By studying these notes students not only enhance their knowledge of environmental science but also build a foundation for future studies and contribute to a more sustainable society.

CBSE Class 12 Biology Notes Chapter 16 Environmental Issues Overview

CBSE Class 12 Biology Notes for Chapter 16 Environmental Issues are prepared by subject experts of Physics Wallah.

By simplifying complex concepts the notes help students understand the impact of human activities on the environment and the measures to address these issues. These notes are a valuable resource for students as they prepare for their exams and develop a deeper understanding of environmental conservation.

CBSE Class 12 Biology Notes Chapter 16 Environmental Issues PDF

CBSE Class 12 Biology Notes for Chapter 16 Environmental Issues are available in PDF format through the link provided below.

These PDF notes are a helpful resource for exam preparation and provide students with a deeper insight into environmental conservation.

CBSE Class 12 Biology Notes Chapter 16 Environmental Issues PDF

CBSE Class 12 Biology Notes Chapter 16 Environmental Issues

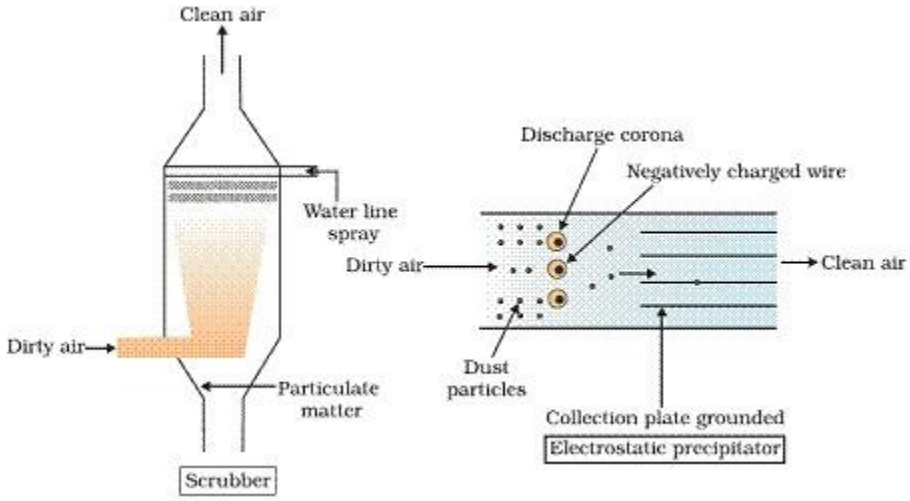
Below we have provided CBSE Class 12 Biology Notes Chapter 16 Environmental Issues-

Environmental Issues

With the increase in human population, the demand for food, shelter, water, electricity, roads and automobiles is rising rapidly, putting immense pressure on the environment and disrupting the natural balance of ecosystems. People around the world are encountering a wide range of new and challenging environmental issues daily. Some of the most significant concerns include pollution, the greenhouse effect, ozone depletion and deforestation.

Pollution refers to any undesirable change in the physical, chemical or biological properties of air, land, water or soil. The substances responsible for these harmful changes are known as pollutants.

Air Pollution and Its Control



Air is crucial for respiration in all living organisms, and air pollutants can negatively affect crop growth lead to premature death of plants and harm all living beings. The impact of pollution on organisms depends on:

- The concentration of pollutants.
- The duration of exposure.
- The organisms involved.

Thermal power plants, smelters, and other industries release particulate and gaseous pollutants along with harmless gases like nitrogen and oxygen. To protect the environment, these pollutants should be filtered before the harmless gases are released into the atmosphere. Various methods are used to remove particulate matter with the most common being the **electrostatic precipitator**.

Electrostatic Precipitator

An electrostatic precipitator can remove over 99% of particulate matter from the exhaust of thermal power plants. It works by using electrode wires maintained at several thousand volts to generate a corona, which releases electrons. These electrons attach to dust particles, giving

them a net negative charge. The grounded collecting plates attract the charged dust particles allowing clean air to pass through the precipitator.

Scrubber

A scrubber is another method that can remove gases like sulfur dioxide. The exhaust is passed through a spray of water or lime, which helps in cleaning the air.

According to the **Central Pollution Control Board (CPCB)**, particulate matter with a size of 2.5 micrometers or less in diameter (PM 2.5) poses the greatest risk to human health. These fine particles can penetrate deep into the lungs, causing respiratory issues, irritation, inflammation, lung damage and even premature death.

Automobiles and Air Pollution

Automobiles are a major contributor to air pollution in metro cities. Regular maintenance of vehicles and the use of lead-free petrol or diesel can help reduce harmful emissions. **Catalytic converters**, containing platinum-palladium and rhodium as catalysts, are fitted in vehicles to reduce emissions. They convert unburnt hydrocarbons into carbon dioxide and water, while carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen gas. Vehicles with catalytic converters must use unleaded petrol, as lead in petrol can inactivate the catalyst.

In Delhi, the public transport fleet was converted to **Compressed Natural Gas (CNG)** to tackle increasing pollution levels. CNG is more efficient than diesel since it burns completely without leaving any residue, is cheaper, and cannot be adulterated. However, the main challenge with CNG is laying pipelines for distribution and ensuring an uninterrupted supply.

Auto Fuel Policy

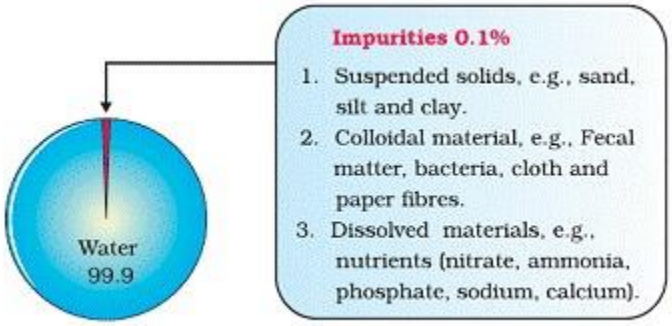
The Government of India introduced the **Auto Fuel Policy** to reduce vehicular pollution in Indian cities. The policy aims to lower sulfur levels to 50 ppm in petrol and diesel and reduce aromatic hydrocarbons to 35% of fuel content. The **Bharat Stage II** emission standards were implemented for all vehicles across Indian cities on April 1, 2005, while cities like Delhi, Mumbai, Chennai, and Kolkata adopted **Euro III** norms on the same date with **Euro IV** norms coming into effect on April 1, 2010.

Air (Prevention and Control of Pollution) Act

In India, the **Air (Prevention and Control of Pollution) Act** was enforced in 1981 and amended in 1987 to include **noise** as an air pollutant. Noise, defined as undesirable high-level sound, can cause severe hearing damage when it exceeds 150 dB, such as from jet plane takeoffs or rocket launches. Excessive noise also leads to sleeplessness, increased heart rates altered breathing patterns, and overall stress in humans.

Noise pollution in industries can be reduced using sound-absorbent materials or by muffling loud noises to minimize their harmful effects.

Water Pollution and Its Control



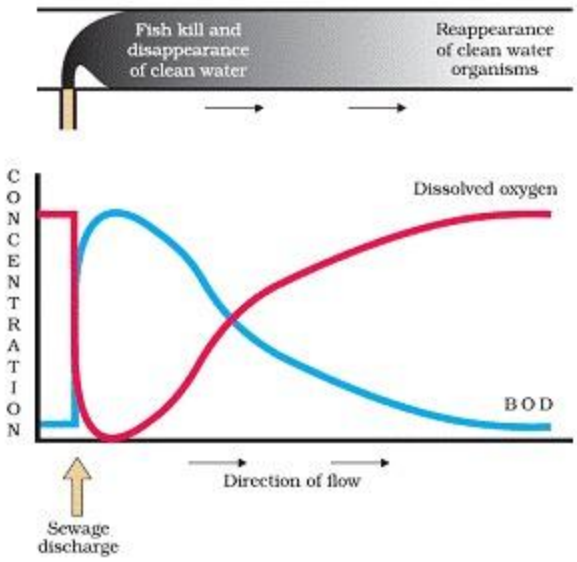
Water bodies are essential for the survival of humans and animals. However, due to the disposal of various wastes and other human activities, ponds, lakes, streams, rivers, estuaries, and oceans are becoming increasingly polluted in many parts of the world. To address this issue, the Government of India passed the **Water (Prevention and Control of Pollution) Act, 1974** to protect and conserve water resources.

Domestic Sewage and Industrial Effluents

Domestic sewage refers to the waste discharged from homes and offices. Even a small amount, just 0.1% impurities, can make domestic sewage unfit for human use. While solid wastes are relatively easy to remove, dissolved salts like nitrates, phosphates, toxic metal ions, and organic compounds are much more difficult to filter out.

Domestic sewage contains a large amount of biodegradable organic matter, which is broken down by microorganisms such as bacteria and fungi. These microbes use organic wastes as nutrients, but in the process, they consume significant amounts of oxygen.

Biological Oxygen Demand (BOD)



The decomposition of organic matter by microbes in water bodies can lead to a sharp decline in dissolved oxygen levels, particularly downstream from sewage discharge points. This drop in oxygen can result in the death of fish and other aquatic creatures.

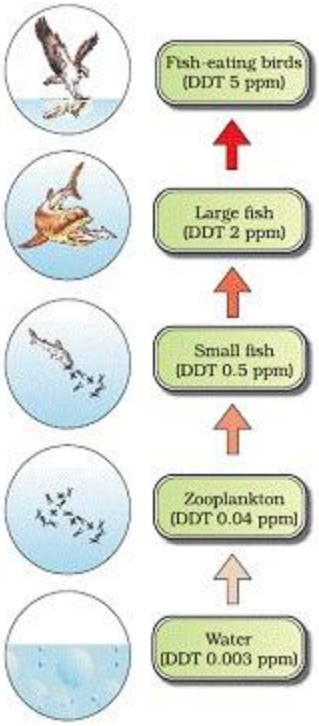
Biological Oxygen Demand (BOD) is a measure of the amount of oxygen required to oxidize all the organic matter in one liter of water. It tests the rate at which oxygen is consumed by microorganisms in a water sample. Higher BOD levels indicate more organic pollution in the water, making it more harmful to aquatic life.

Algal Bloom

When water contains a high concentration of organic nutrients, it leads to the rapid growth of planktonic or free-floating algae, a phenomenon known as **algal bloom**. This excessive algal growth changes the color of the water and can severely degrade water quality, often leading to fish deaths.

One of the most problematic aquatic weeds, the **water hyacinth (Eichhornia crassipes)**, was introduced into India for its attractive flowers but has since caused significant problems by rapidly spreading and blocking water bodies. This invasive weed is commonly referred to as the **'Terror of Bengal'** due to its detrimental impact on water ecosystems.

Biomagnification or Biological Magnification



Toxic wastes, especially from industrial sources and pesticide-laden water from farms, enter aquatic food chains and accumulate as they move up trophic levels. This process is called **biomagnification** or **biological magnification**. Toxicants like **DDT** and **mercury** are common examples. As their concentrations increase at each successive trophic level, they cause significant harm to wildlife. For instance, **high concentrations of DDT** disrupt calcium metabolism in birds, resulting in thinning of eggshells and premature breaking, leading to a decline in bird populations.

Eutrophication

Eutrophication refers to the natural aging of a lake due to the accumulation of nutrients such as nitrogen and phosphorus. These nutrients encourage the growth of aquatic organisms, causing organic matter to build up in the lake, which over time leads to its shallowing. Eventually, silt and debris fill the lake, turning it into land.

However, human activities, such as the release of effluents from industries and homes, have accelerated this process. This phenomenon is known as **cultural or accelerated eutrophication**. The excess nutrients, mainly nitrates and phosphates, lead to an overgrowth of algae, causing scum, foul odors and oxygen depletion, which harms aquatic life.

Integrated Waste Water Treatment

Integrated waste water treatment combines artificial and natural processes to treat sewage. A notable example is the town of **Arcata, California**, where the community and **Humboldt State University** developed a treatment system involving two stages:

1. **Conventional treatment**: Sedimentation, filtering, and chlorination.
2. **Natural marsh system**: Wastewater passes through a series of marshes, where plants, algae, fungi, and bacteria help neutralize pollutants like heavy metals.

As the water flows through these marshes, it undergoes natural purification, while the area also becomes a sanctuary for diverse wildlife. A citizens' group, **Friends of the Arcata Marsh (FOAM)**, oversees the safety and success of this project.

Ecological Sanitation

Ecological sanitation (EcoSan) is a sustainable approach to human waste management. It uses **dry composting toilets**, which provide a hygienic, efficient, and cost-effective way to dispose of human waste while recycling it into natural fertilizer. These toilets are in use in regions like **Kerala** and **Sri Lanka**.

Solid Waste Management

Municipal solid wastes come from homes, offices, schools, and hospitals, and consist of materials like paper, plastic, glass, and metals. While burning reduces waste volume, it often doesn’t complete the process, leading to hazardous open dumps that attract rodents and flies.

Sanitary landfills are a safer alternative, where wastes are compacted and covered daily with dirt. However, chemical seepage from landfills can pollute underground water resources.

Municipal wastes are categorized into:

1. **Biodegradable**: Can decompose naturally (e.g., food waste).
2. **Recyclable**: Can be processed for reuse (e.g., paper, plastics).
3. **Non-biodegradable**: Cannot break down naturally (e.g., certain plastics).

In India, **kabadiwallahs** and **rag-pickers** play an important role in sorting and recycling materials.

Polyblend and Road Construction

Polyblend is a powder made from recycled plastic, which, when mixed with bitumen and used in road construction, enhances the water-repellent properties of the roads and extends their lifespan by up to three times. This innovation helps address the growing plastic waste problem.

Hospital and Electronic Wastes

Hospital waste includes hazardous materials like disinfectants, chemicals, and pathogens, requiring careful disposal, often through **incineration**.

Electronic waste (e-waste) refers to discarded electronics like computers. Developed countries often export e-waste to countries like India, China, and Pakistan, where metals like copper, iron, and gold are recovered. While recycling is an effective solution, it must be done in an environmentally safe manner.

Agro-chemicals and Their Effects

The use of **inorganic fertilizers** and **pesticides** has surged due to the **Green Revolution**, aimed at boosting crop yields. However, these chemicals can harm non-target organisms in the soil, disrupting ecosystems. In the aquatic environment, they contribute to **eutrophication** and are subject to **biomagnification** in the food chain, posing risks to both ecosystems and human health.

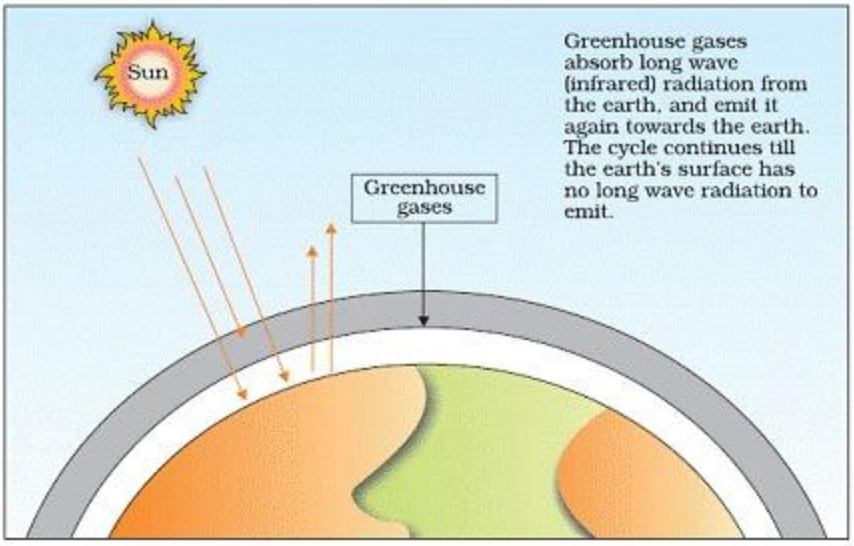
Organic Farming

- **Integrated Organic Farming**: A cyclic, zero-waste process where waste from one part of the system is reused as nutrients for others. This maximizes resource efficiency. Practices include beekeeping, dairy management, water harvesting, composting, and agriculture.
- **Chemical-free**: No chemical fertilizers or pesticides are used, ensuring an environmentally sustainable farming approach.

Radioactive Wastes

- **Concerns**:
    1. **Accidental leakage**
    2. **Safe disposal** of radioactive waste
- **Biological Damage**: Radiation from these wastes is dangerous, causing genetic mutations.
- **Storage Recommendations**: Nuclear waste should be stored in shielded containers, buried deep underground (about 500 meters).

Greenhouse Effect and Global Warming



- **Greenhouse Effect**: Naturally heats Earth, but excess carbon dioxide (CO_2) and methane (CH_4) increase this effect, leading to **global warming**.
- **Climate Consequences**: This contributes to irregular climatic patterns, like the El Niño effect, and melting polar ice caps.
- **Solutions to Control Global Warming**:
    1. Reduce fossil fuel use
    2. Improve energy efficiency
    3. Reduce deforestation
    4. Increase tree planting
    5. Manage human population growth

Ozone Depletion in the Stratosphere

- **Ozone Layer**: Protects life on Earth by absorbing harmful UV rays. The depletion of this layer, especially due to **Chlorofluorocarbons (CFCs)**, creates an "ozone hole."
- **Consequences of UV Exposure**: Increased risk of skin cancer, cataracts, and damage to the cornea.
- **Steps Leading to Ozone Depletion**: UV rays break CFCs, releasing chlorine atoms that prevent the reformation of ozone.

Deforestation

- **Causes**: Human activities like agriculture (e.g., **Jhum cultivation**), industrialization, and urbanization.
- **Consequences**:
    1. Increased carbon dioxide levels
    2. Biodiversity loss
    3. Disrupted water cycles
    4. Soil erosion

5. Desertification

- **Reforestation**: Restoring forests that were removed.
- **Amrita Devi Bishnoi Award**: Recognizes rural individuals or communities for protecting wildlife.
- **Chipko Movement (1974)**: Women in the Garhwal Himalayas protected trees by hugging them, which helped promote forest conservation worldwide.
- **Joint Forest Management (JFM)**: An initiative by the Government of India (1980s) to involve local communities in forest protection and management.

Benefits of CBSE Class 12 Biology Notes Chapter 16 Environmental Issues

Summarized Content: These notes provide a quick summary of important topics like pollution, global warming and waste management helping students revise the key points before exams.

Saves Time: Instead of reading the entire textbook, students can quickly go through the notes, making it easier for them to prepare in less time, especially during last-minute study sessions.

Easy to Understand: Complex topics like biomagnification, eutrophication and ozone depletion are explained in simple terms, making it easier to understand and remember for the exam.

Improves Answer Writing: These notes help students learn how to structure their answers properly, which is important for scoring well in both short and long-answer questions.

Increases Confidence: Since the notes focus on important points, students feel more confident and prepared for the exam, knowing they have covered the essential topics.

Better Memory Retention: With focused key points, the notes help students remember information easily, which is useful for quick recall during the exam.