

NCERT Solutions for 12th Class Biology: Chapter 16- Environmental Issues



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Exercises (NCERT 12th Biology Chapter 16)

1. What are the various constituents of domestic sewage? Discuss the effects of sewage discharge on a river.

Answer

The various constituents of domestic sewage are:

- (i) dissolved salts such as nitrates, phosphates, etc., from detergents.
- (ii) toxic metal ions from paints, varnishes, etc.
- (iii) biodegradable organic matter from kitchen and toilet.
- (iv) pathogenic microorganisms in the faecal matter.

The effects of sewage discharge on a river:

When organic wastes from the sewage enter the water bodies, it serves as a food source for micro-organisms such as algae and bacteria. As a result, the population of these micro-organisms in the water body increases. Here, they utilize most of the dissolved oxygen for their metabolism. This results in an increase in the levels of Biological oxygen demand (BOD) in river water and results in the death of aquatic organisms. Also, the nutrients in the water lead to the growth of planktonic algal, causing algal bloom. This causes deterioration of water quality and fish mortality.

2. List all the wastes that you generate, at home, school or during your trips to other places. Could you very easily reduce the generation of these wastes? Which would be difficult or rather impossible to reduce?

Answer

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- Waste generated at home is paper, old clothes, shoes, bags, broken glass, polythene packaging material, plastic bottles, cans and left over or spoil food.
- At school Mainly paper, refills, cardboard, thermocol, pens/ pencils. In school canteen Paper or plastic plates and glasses, bottles, cans, ice cream wrappers, sticks, etc.
- During trips, mainly the food wrappers, plastic/paper plates, napkins, etc.

Yes, wastes can be easily reduced by the judicious use of the above materials. Wastage of paper can be minimized by writing on both sides of the paper and by using recycled paper. Plastic and glass waste can also be reduced by recycling and re-using. Also, substituting plastics bags with biodegradable jute bags can reduce wastes generated at home, school, or during trips. Domestic sewage can be reduced by optimizing the use of water while bathing, cooking, and other household activities.

Non- biodegradable wastes such as plastic, metal, broken glass, etc are difficult to decompose because micro-organisms do not have the ability to decompose them.

3. Discuss the causes and effects of global warming. What measures need to be taken to control global warming?

Answer

Long term rise in temperature of the Earth's surface is called global warming. Causes

Increase in the atmospheric levels of gases (CO_2 , CH_4 , NO_2 , etc.) due to extensive burning of fossil fuels. Accumulation of these gases in higher concentration does not allow the Earth's heat to escape in the outer atmosphere, thus leading to increase in its surface temperature.

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Effects of global warming: Global warming is defined as an increase in the average temperature of the Earth's surface. It has been observed that in the past three decades, the average temperature of the Earth has increased by 0.6°C . As a result, the natural water cycle has been disturbed resulting in changes in the pattern of rainfall. It also changes the amount of rain water. Also, it results in the melting of Polar ice caps and mountain glaciers, which has caused a rise in the sea level, leading to the inundation of coastal regions.

Control measures for preventing global warming:

- (i) Reducing the use of fossil fuels
- (ii) Use of bio-fuels
- (iii) Improving energy efficiency
- (iv) Use of renewable source of energy such as CNG etc.
- (v) Reforestation: Planting of trees saplings.
- (vii) Recycling of materials

4. Match the items given in column A and B:

Column A

Column B

- | | |
|--------------------------------|--|
| (a) Catalytic converter | (i) Particulate matter |
| (b) Electrostatic precipitator | (ii) Carbon monoxide and nitrogen oxides |
| (c) Earmuffs | (iii) High noise level |
| (d) Landfills | (iv) Solid wastes |

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Answer

Column A	Column B
(a) Catalytic converter	(ii) Carbon monoxide and nitrogen oxides
(b) Electrostatic precipitator	(i) Particulate matter
(c) Earmuffs	(iii) High noise level
(d) Landfills	(iv) Solid wastes

NCERT 12th Biology Chapter 16**5. Write critical notes on the following:****(a) Eutrophication****(b) Biological magnification****(c) Groundwater depletion and ways for its replenishment****Answer**

(a) Eutrophication: It is the natural ageing process of a lake caused due to nutrient enrichment. It is brought down by the runoff of nutrients such as animal wastes, fertilizers, and sewage from land which leads to an increased fertility of the lake. As a result, it causes a tremendous increase in the primary productivity of the ecosystem. This leads to an increased growth of algae, resulting into algal blooms. Later, the decomposition of these algae depletes the supply of oxygen, leading to the death of other aquatic animal life.

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(b)Biomagnification: It refers to the increase in concentration of the toxic substance at successive trophic level, in the food chain. The toxic substances accumulated by an organism cannot be metabolised or excreted. When this organism is eaten up by another animal of higher trophic level, it is passed on to this and then to the next

higher trophic level and so on.Biomagnification Disturbs calcium

metabolism in birds, which causes thinning of egg shell

and their premature breaking, eventually causing

decline in bird populations.

(c) Ground water depletion and ways for its replenishment: The level of ground water has decreased in the recent years. The source of water supply is rapidly diminishing each year because of an increase in the population and water pollution. To meet the demand of water, water is withdrawn from water bodies such as ponds, rivers etc. As a result, the source of ground water is depleting. This is because the amount of groundwater being drawn for human use is more than the amount replaced by rainfall. Lack of vegetation cover also results in very small amounts of water seeping through the ground. An increase in water pollution is another factor that has reduced the availability of ground water.

Replenishment

(i) Rainwater harvesting making water traps so that rainwater does not go down the drains but is directed towards large pits dug up underground.

(ii) Drainage wells can be made to collect drainage water from agricultural and industrial runoff. It may be treated to remove toxic substances before being allowed to seep underground.

6. Why does ozone hole form over Antarctica? How will enhanced ultraviolet radiation affect us?

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Answer

The ozone hole is more prominent over the region of Antarctica. It is formed due to an increased concentration of chlorine in the atmosphere. Chlorine is mainly released from chlorofluorocarbons (CFC's) widely used as refrigerants.

(i) When released in stratosphere, these substances drift towards poles and get accumulated on the ice clouds formed at high altitudes.

(ii) Ice provides a surface on which breakdown of all the CFC compounds takes place to release chlorine atom.

(iii) These chlorine atoms breakdown ozone resulting in thinning of the ozone layer. Normally, the ozone layer plays a protective role by absorbing harmful UV radiations but reduction in its thickness allows UV rays to reach Earth's surface

Effects of ultraviolet radiation on humans:

(i) Early ageing of skin.

(ii) Increased incidences of cancer of the skin.

(iii) Cataract of the eyes.

(iv) Inflammation of cornea of the eye (known as snow blindness).

(v) Weakened immune system.

7. Discuss the role of women and communities in protection and conservation of forests.

Answer

Communities have played an important role in protecting the trees and in conserving the forests.

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(i) Bishnoi community women and many others had sacrificed their lives in an effort to save the trees. The Bishnoi community in Rajasthan strictly believes in the concept of living peacefully with nature. In 1731, the king of Jodhpur ordered his ministers to arrange wood for the construction of his new palace. For this purpose, the minister and the workers went to Bishnoi village. There, a Bishnoi woman called Amrita Devi along with her daughter and hundreds of other Bishnois showed the courage to step forward and stop them from cutting trees. They embraced the trees and lost their lives at the hands of soldiers of the king. This resistance by the people of the village forced the king to give up the idea of cutting trees.

(ii) Chipko movement: The Chipko movement was started in 1974 in the Garhwal region of the Himalayas. In this movement, the women from the village stopped the contractors from cutting forest trees by embracing them. Gaura Devi of village Gopeshwar in Chamoli district had led a movement, where in village people hugged the trees to save them from being cut. Many other people in different villages under the leadership of Chandi Prasad and Sunder Lal Bahuguna participated in similar protests.

Later such movements spread to South of India as well.

Now, village and tribal communities are being involved in development and protection of damaged forest area to resurrect them and share profits with the government. Such activities are conducted under the Joint forest management schemes.

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8. What measures, as an individual, would you take to reduce environmental pollution?

Answer

The following initiatives can be taken to prevent environmental pollution:

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Measures for preventing Air pollution:

- (i) Planting more trees.
- (ii) Use of clean and renewable energy sources such as CNG and bio-fuels.
- (iii) Reducing the use of fossil fuels.
- (iv) Use of catalytic converters in automobiles.

Measures for preventing water pollution:

- (i) Optimizing the use of water.
- (ii) Using kitchen waste water in gardening and other household purposes

Measures for controlling Noise pollution:

- (i) Avoid burning crackers on Diwali
- (ii) Plantation of more trees

Measures for decreasing solid waste generation:

- (i) Segregation of waste
- (ii) Recycling and reuse of plastic and paper
- (iii) Composting of biodegradable kitchen waste
- (iv) Reducing the use of plastics

9. Discuss briefly the following:

(a) Radioactive wastes

(b) Defunct ships and e-wastes

(c) Municipal solid wastes

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Answer

(a) Any discarded material that emits radiations is called radioactive waste. Radiations, emitted by nuclear waste is extremely damaging to biological organisms. It causes mutations to occur at a very high rate, resulting in various disorders like cancer. At high doses, nuclear radiation is lethal. The Defunct ships are dead ships that are no longer in use. Such ships are broken down for scrap metal in countries such as India and Pakistan. These ships are a source of various toxicants such as asbestos, lead, mercury etc. Thus, they contribute to solid wastes that are hazardous to health.

(b) Defunct ships are dead ships that are no longer in use. Such ships are broken down for scrap metal in countries such as India and Pakistan. These ships are a source of various toxicants such as asbestos, lead, mercury etc. Thus, they contribute to solid wastes that are hazardous to health. E-wastes or electronic wastes generally include electronic goods such as computers etc. Such wastes are rich in metals such as copper, iron, silicon, gold etc. These metals are highly toxic and pose serious health hazards. People of developing countries are involved in the recycling process of these metals and therefore, get exposed to toxic substances present in these wastes.

(c) Municipal wastes includes homes, offices, schools, hospitals etc. It is collected and disposed off by the municipality. These generally consists of paper, leather textile, rubber, glass, etc. Sanitary landfills are used to dump these wastes.

10. What initiatives were taken for reducing vehicular air pollution in Delhi? Has air quality improved in Delhi?

Answer

Delhi has been categorized as the fourth most polluted city of the world in a list of 41 cities. Burning of fossil fuels has added to the pollution of air in Delhi.

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Various steps have been taken to improve the quality of air in Delhi:

- (i) Introduction of CNG (Compressed Natural Gas): By the order of the supreme court of India, CNG-powered vehicles were introduced at the end of year 2006 to reduce the levels of pollution in Delhi. CNG is a clean fuel that produces very little unburnt particles.
- (ii) Phasing out of old vehicles.
- (iii) Use of unleaded petrol.
- (iv) Use of low-sulphur petrol and diesel.
- (v) Use of catalytic converters.
- (vi) Application of stringent pollution-level norms for vehicles.
- (vii) Implementation of Bharat stage I, which is equivalent to euro II norms in vehicles of major Indian cities.

The introduction of CNG-powered vehicles has improved Delhi's air quality, which has led to a substantial fall in the level of CO₂ and SO₂. However, the problem of suspended particulate matter (SPM) and respiratory suspended particulate matter (RSPM) still persists.

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11. Discuss briefly the following:

- (a) Greenhouse gases**
- (b) Catalytic converter**
- (c) Ultraviolet B**

Answer

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(a) Greenhouse gases refers to an overall increase in the average temperature of the Earth due to the presence of greenhouse gases. Greenhouse gases mainly consist of carbon dioxide, methane, and water vapour. When solar radiations reach the Earth, some of these radiations are absorbed. These absorbed radiations are released back into the atmosphere. These radiations are trapped by the greenhouse gases present in the atmosphere.. This helps in keeping our planet warm and thus, helps in human survival. However, an increase in the amount of greenhouse gases can lead to an excessive increase in the Earth's temperature, thereby causing global warming.

(b) Catalytic converters are fitted into the automobile exhaust. They have expensive metals (platinum-palladium and rhodium) as the catalysts, that can convert

(i) unburnt hydrocarbons into carbon dioxide and water.

(ii) carbon monoxide and nitric oxide to carbon dioxide and nitrogen gas.

Motor vehicles equipped with catalytic converters are much less polluting than the other vehicles.

(c) Ultraviolet-B is a part of ultraviolet radiation having a wavelength of 280-320 nm. It damages DNA by causing mutations that can also result in-

(i) Premature aging of skin.

(ii) Damage to skin cells and various types of skin cancers.

(iii) Inflammation of cornea, called snow-blindness cataract, etc.

Ozone layer absorbs 50% of ultraviolet-B and protects us from its harmful effects. But, with recent thinning of ozone layer, these effects are becoming more pronounced.



Chapterwise NCERT Solutions for Class 12 Biology:

- Chapter 1: Reproduction in Organisms
- Chapter 2: Sexual Reproduction in Flowering Plants
- Chapter 3: Human Reproduction
- Chapter 4: Reproductive Health
- Chapter 5: Principles of Inheritance and Variation
- Chapter 6: Molecular Basis of Inheritance
- Chapter 7: Evolution
- Chapter 8: Human Health and Disease
- Chapter 9: Strategies for Enhancement in Food Production
- Chapter 10: Microbes in Human Welfare
- Chapter 11: Biotechnology Principles and Processes
- Chapter 12: Biotechnology: and its Application
- Chapter 13: Organisms and Populations
- Chapter 14: Ecosystem
- Chapter 15: Biodiversity and Conservation
- Chapter 16: Environmental Issues

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