

Lesson at a Glance

- By volume, air consists of about 78% nitrogen and about 21% oxygen. Carbon dioxide, argon, methane, ozone and water vapour are present in very small quantities.
- When air is contaminated by unwanted substances which have a harmful effect on both the living and non-living, it is known as **air pollution**.
- The substances which contaminate the air are known as **air pollutants**.
- The sources of air pollutants are factories, power plants, automobile exhausts and burning of firewood and dung cakes.
- Vehicles produce pollutants such as carbon monoxide, carbon dioxide, nitrogen oxides, oxides of sulphur and smoke.
- Carbon monoxide is a poisonous gas. It reduces the oxygen-carrying capacity of the blood.
- **Smog:** This is a thick fog-like layer in the atmosphere, especially during winters, made up of fog and smoke.
- Sulphur dioxide is mainly produced by burning fuels such as coal. It causes *respiratory problems*, including permanent lung damage.
- **CFCs (chlorofluorocarbons)** used in refrigerators, air conditioners and aerosol sprays cause depletion of ozone layer. Ozone layer protects us from *ultraviolet rays* of the sun.
- **Acid Rain:** Pollutants like sulphur dioxide and nitrogen dioxide react with water vapour present in air to form sulphuric acid and nitric acid. The acid drops come down with rain which is known as *acid rain*.
- **Marble Cancer:** Acid rain corrodes the marble, especially marble monuments. This phenomenon is called *marble cancer*.
- **Greenhouse Effect:** A part of radiation of the sun that falls on the earth is absorbed by it and a part is reflected back into space. A part of the reflected radiation is trapped by the atmosphere. This trapping of radiations of the earth's atmosphere causes warming of the earth, which is known as *greenhouse effect*.

Note: Green houses are made of glass, especially in cold region, in which potted plants are placed. During day, the heat waves of the sunlight enter into the green house through glass walls and roofs but all the heat radiation effected are not allowed by the glass walls to go back into the atmosphere. So, the temperature of green house remains much higher than the temperature of the atmosphere outside the green house. So, this phenomenon is called green house effect.

Like CO_2 , methane, nitrogen oxide and water vapours are also called **green house gases**.

- **Global Warming:** Due to human activities there is accumulation of CO_2 in the atmosphere. Carbon dioxide traps heat and does not allow it to escape into space. As a result, the average temperature of atmosphere of the earth gradually increases. This gradual increase in temperature is known as *global warming*.
- The substances such as sewage, toxic chemicals, slit, agricultural chemical etc. that pollute water are called water pollutants.
- **Ganga Action Plan** was launched in 1985 to reduce the pollution levels in the river.
- Agricultural chemicals such a fertilizers, pesticides and weedicides dissolve in water in the crop fields. From there they are washed to water bodies such as pond, lake etc. These substances act as nutrients for algae and growth of algae enhances.

After sometimes algae start dying due to over growth. *Dead mass of algae is decomposed* by decomposers like bacteria.

In this process a lot of *oxygen dissolved* in the water gets used up. This results in a *decrease in the oxygen level* that may cause the death of aquatic organisms.

- Water contaminated with sewage may contain viruses, bacteria, fungi, eggs of worms and parasites which cause diseases like cholera, typhoid and jaundice.
- **Potable Water:** Water which is purified and suitable for drinking is known as *potable water*.
- **Chlorination:** By adding chlorine tablets to water for purification is a common chemical process. *We should not use more chlorine tablets than specified.*
- Water is a precious natural resource. We should conserve it and should follow the mantra—**reduce, reuse and recycle**.

TEXTBOOK QUESTIONS SOLVED

Q. 1. *What are the different ways in which water gets contaminated?*

Ans. Water gets contaminated by the following ways:

- (i) Many industries discharge harmful chemicals to rivers and streams.
- (ii) Water gets contaminated when sewage is disposed off in rivers.
- (iii) Pesticides, weedicides and other chemicals also dissolve in water and get contaminated.
- (iv) Breeding of microorganisms makes water polluted.

Q. 2. *At an individual level, how can you help reduce air pollution?*

Ans. By this process we reduce air pollution:

- (i) We can plant trees to reduce the level of carbon dioxide and air pollution.
- (ii) By using CNG and unleaded petrol in our vehicle.
- (iii) By using public transport as far as possible.
- (iv) By giving general awareness about air pollution to our family and friends.

Q. 3. *Clear, transparent water is always fit for drinking. Comment.*

Ans. Clear, transparent water is always fit for drinking. This is not true, because many microorganisms are present in it. So we clean it by boiling.

Q. 4. *You are a member of the municipal body of your town. Make a list of measures that would help your town to ensure the supply of clean water to all its residents.*

Ans. A list of measures that would help our town to ensure the supply of clean water to all its residents—

- (i) Proper cleaning of water tank.
- (ii) Chlorine tablets should be made available.
- (iii) To get clean water in every household, it is necessary that water reaching the houses should be treated.

Q. 5. *Explain the differences between pure air and polluted air.*

Ans. Pure air is free from germs and harmful gases. It contains 78% nitrogen, 21% oxygen and small amount of other gases and dust particles.

Polluted air contains harmful gases and unwanted substances.

Q. 6. Explain circumstances leading to acid rain. How does acid rain affect us?

Ans. Some pollutants like sulphur dioxide and nitrogen dioxide react with the water vapour present in the atmosphere to form sulphuric acid and nitric acid. The acid drops down with rain, making the rain acidic. This is called acid rain. Acid rain affects us in many ways.

- (i) Acid rain corrodes the marble of the monument.
- (ii) Acid rain damages building and sculptural materials.
- (iii) Acid rain damages fresh water also.
- (iv) Acid rain also damages our crops and also makes it poisonous.
- (v) Acid rain damages the leaves of plants.

Q. 7. Which of the following is not a greenhouse gas?

- (a) Carbon dioxide
- (b) Sulphur dioxide
- (c) Methane
- (d) Nitrogen.

Ans. (d) Nitrogen.

Q. 8. Describe the 'Greenhouse Effect' in your words.

Ans. Greenhouse Effect means warming the Environment. When the sun rays reach on earth, a part of the radiation that falls on the earth is absorbed by it and a part is reflected back into space. A part of the reflected radiation is trapped by the atmosphere. This trapped radiation further warms the earth. This is called Carbon House effect. CO_2 is one of the gases responsible for this effect.

Q. 9. Prepare a brief speech on global warming. You have to deliver the speech in your class.

Ans. Continuous increase in temperature of the earth is called global warming. There are many reasons for it. One of them is increase in population. Increase in the number of vehicles is also one of the causes. Pollution of air has also increased the global warming. Cutting trees, grazing the plants by animals increase the global warming.

Q. 10. Describe the threat to the beauty of the Taj Mahal.

Ans. Over the past 2 decades, India's most famous tourist attraction Taj Mahal located at Agra, has become a matter of concern. Experts have warned that air pollution is discolouring its white marble. So it is not only living organisms that get affected by polluted air but are also the non-living things like buildings, monuments and statues.

The industries located in and around Agra like rubber processing, automobiles, chemicals and especially, the Mathura Oil Refinery have been responsible for producing pollutants like sulphur dioxide and nitrogen dioxide. These gases react with the water vapour present in the atmosphere to form sulphuric acid and nitric acid. These come down with the rain, making the rain acidic. This is called **acid rain**. Acid rain has resulted in corrosion of the marble of the monument. The phenomenon is also called "Marble cancer". Suspended particulate matter, such as the soot particles emitted by the Mathura Oil Refinery, have contributed to the yellowing of the marble.

The Supreme Court has taken steps to save the Taj. It has ordered the industries to switch to cleaner fuels like CNG (Compressed Natural Gas) and LPG (Liquefied Petroleum Gas). Moreover, the automobiles should switch over to unleaded petrol in the Taj zone.

Q. 11. Why does the increased level of nutrients in the water affect survival of aquatic organisms?

Ans. Excessive quantities of chemicals get washed away from the fields. These act as nutrients for algae to flourish. Once these algae die, they serve as food for decomposers like bacteria. A lot of oxygen in water body gets used up. This results in the decrease in the oxygen level which may kill aquatic organisms.