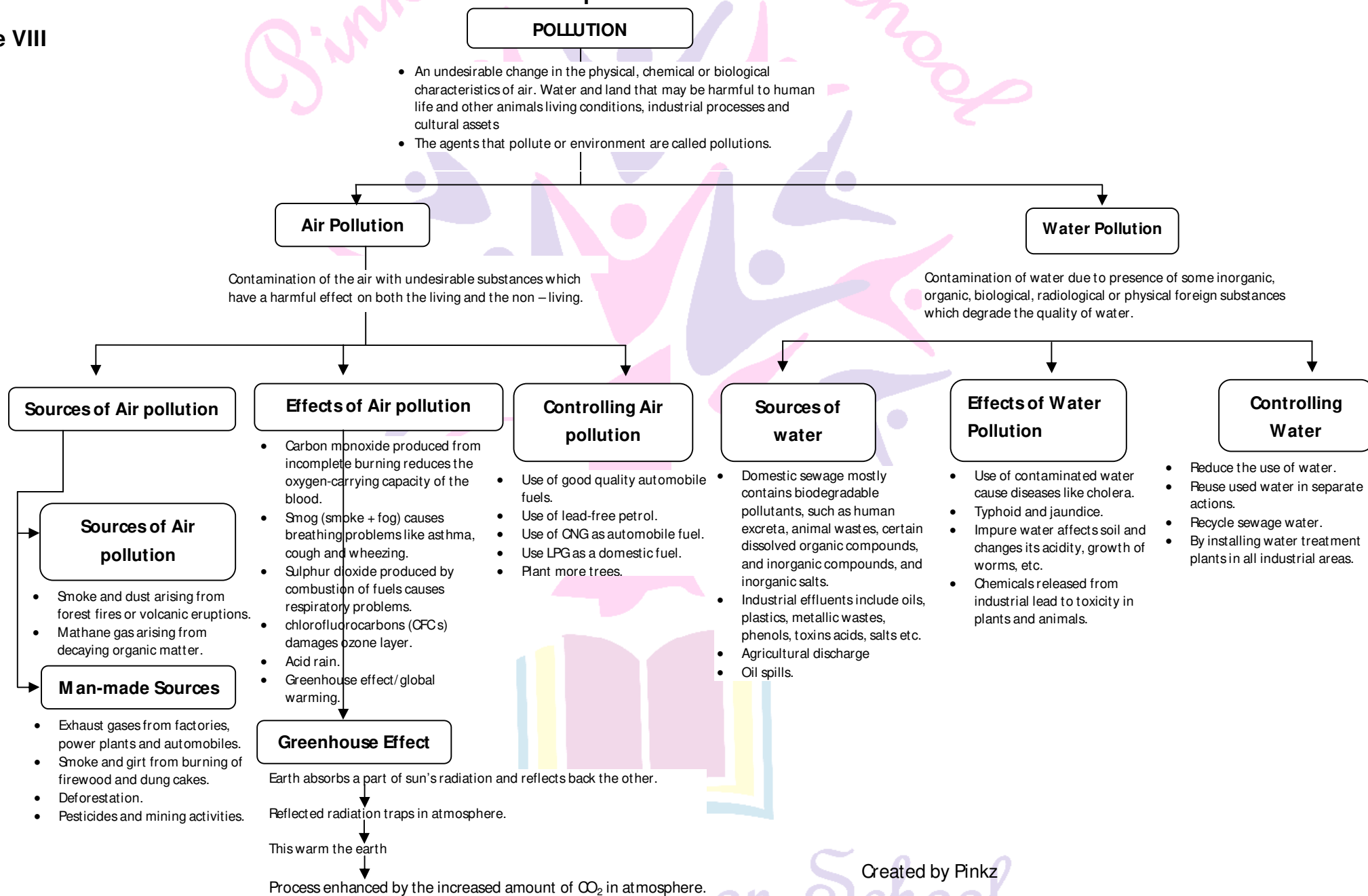


Lesson 18. Pollutions of Air and Water

Grade VIII

Basic concepts – A Flow Chart





Know the Terms

- **Pollution** : The presence of unusually high concentration of harmful or poisonous substances in the environment (air, water) is called pollution. The substances that pollute something, especially atmosphere and water are called pollutants.
- **Green House Effect** : The warming up of the earth's atmosphere due to trapping of the sun's heat rays by gases like carbon dioxide, methane, etc in the atmosphere is called green house effect.

Objective Type Questions

(1 Marks)

I. Multiple Choice Questions

1. Air is a mixture of various gases. One of the gases is 21% part of the air and is essential for the survival of human beings. This gas is : **(NCERT Exemplar)**
(a) nitrogen (b) oxygen (c) ozone (d) argon
2. Which of the following is not a source of air pollution? **(NCERT Exemplar)**
(a) automobile exhaust (b) burning of firewood
(c) windmill (d) power plant
3. Boojho wishes to contribute in reducing air pollution. Which vehicle should he use for going to school? **(NCERT Exemplar)**
(a) car (b) school bus (c) auto rickshaw (d) scooter
4. Which of the following is not a way to conserve water? **(NCERT Exemplar)**
(a) replace (b) reduce (c) reuse (d) recycle
5. The type of pollution which is likely to affect Taj Mahal in Agra to a greater extent is : **(NCERT Exemplar)**
(a) air pollution (b) water pollution (c) soil pollution (d) noise pollution
6. Incomplete combustion of fuel such as petrol and diesel gives : **(NCERT Exemplar)**
(a) nitrogen oxide (b) sulphur dioxide (c) carbon monoxide (d) carbon dioxide
7. The phenomenon of marble cancer is due to : **(NCERT Exemplar)**
(a) soot particles (b) CFCs (c) fog (d) acid rain



8. Potable water is the water which is :

(NCERT Exemplar)

- (a) obtained from a river (b) obtained from a lake
(c) pure and fit for drinking (d) used only for washing clothes

9. Which of the following procedures will give you water free from all impurities?

(NCERT Exemplar)

- (a) adding chlorine tablets (b) distillation
(c) boiling (d) filtration

10. A pond contains clean water. Which of the following activities will produce least pollution of water?

(NCERT Exemplar)

- (a) washing clothes in the pond (b) animals bathing in the pond
(c) washing motor vehicles in the pond (d) swimming in the pond

11. Trees help in reducing the pollution of our environment. Lakhs of trees are planted by people in the month of July every year. The occasion is called :

(NCERT Exemplar)

- (a) Forest conservation day (b) Plantation month
(c) Van mahotsav (d) Wildlife week

12. Which of the following is not a greenhouse gas? (NCERT Exemplar)

- (a) nitrogen gas (b) water vapour
(c) methane gas (d) carbon dioxide

1. (b)	2. (c)	3. (b)	4. (a)	5. (a)	6. (c)
7. (d)	8. (c)	9. (b)	10. (d)	11. (c)	12. (a)

II. Multiple Choice Questions

1. The Taj Mahal is being affected due to

- a. Noise pollution b. Air pollution
c. Water pollution d. None of these

2. Highest percentage of air consists of

- a. Oxygen b. Carbon dioxide
c. Nitrogen d. Argon

3. Most polluted river in the world is

- a. Yamuna b. Cavery
c. Chenab d. Ganga



4. Air pollution causes
- Global warming
 - Respiratory diseases
 - Soil erosion
 - None of these
5. Green house gas is
- Nitrogen
 - Oxygen
 - Methane
 - Carbon dioxide
6. The percentage of nitrogen in air is
- 21%
 - 78%
 - 12%
 - 87%
7. Ganga Action Plan was launched to reduce the pollution levels in the
- Ocean
 - River
 - Lake
 - Pond
8. CNG is a
- Polluted fuel
 - Pollution free fuel
 - Harmful fuel
 - None
9. Which of these are responsible for water pollution?
- Oil refineries
 - Paper factories
 - Sugar mills
 - All
10. Chlorofluorocarbon is used in
- Refrigerators
 - Air conditioners
 - Aerosol sprays
 - All

1. b	2. c	3. d	4. b	5. d	6. b	7. b	8. b	9. d	10. d
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I. Fill in the blanks

1. When air is contaminated by _____ substances which have a _____ effect on both the _____ and _____, it is referred to as (air pollution, harmful, living, unwanted, non living, pollutants).
2. Many _____ are responsible for causing pollution. Petroleum _____ are a major source of _____ pollutants like _____ and _____ (Sulphur dioxide, refineries, industries,



nitrogen dioxide, gaseous, liquid, people, air).

3. While _____ your teeth, leaving the _____ running may waste several _____ of water. (tap, litres, brushing, washing, drops).
4. Water which is suitable for _____ is called (washing, bathing, drinking, water. potable, soft).
5. Water which looks clean still has disease carrying _____ and _____ impurities. (insects, micro-organism, particles, dissolved, harmful).

1. unwanted, harmful, living, non-living, air pollution.	2. industries, air, refineries, gaseous, sulphur dioxide, nitrogen dioxide.
3. brushing, tap, litres	4. drinking, potable
5. micro-organisms, dissolved.	

II. Fill in the blanks

1. Air contains the highest percentage of _____.
2. Cholera is a _____ borne disease.
3. Substances causing pollution are called _____.
4. Increasing levels of greenhouse gases like _____ causes global warming.
5. Water which is suitable for drinking is called _____.
6. _____ per cent of the world's population is without safe drinking water.
7. _____ is one of the most famous rivers of India.
8. Vehicles produce high levels of pollutants like _____.
9. Other kinds of pollutants are _____ which are used in refrigerators and air conditioners.
10. _____ per cent of oxygen is present in air.
11. Ozone layer protects us from harmful effect of _____ rays.
12. Pollutants are the substances which contaminate _____ and _____.
13. Water is a precious _____ resource.
14. Full form of LPG is _____.
15. _____ is produced from incomplete burning of fuel.

1. Nitrogen	2. Water	3. Pollutants	4. CO ₂
5. Potable water	6. 25	7. Ganga	8. Carbon monoxide



9. Chlorofluorocarbon	10. 21	11. Ultraviolet	12. Air, water
13. Natural	14. Liquefied Petroleum Gas	15. Carbon monoxide	

I. Match the following.

1. Match the items given in Column A with those in Column B suitably.

Column A		Column B	
(i)	CO ₂	(a)	Smoke and fog
(ii)	SO ₂ and NO ₂	(b)	Corrosion of marble
(iii)	Smog	(c)	Reduce, Reuse and Recycle
(iv)	Marble cancer	(d)	Global warming
(v)	Our mantra	(e)	Acid rain

(i) . (d)	(ii) . (e)	(iii) . (a)	(iv) . (b)	(v) . (c)
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II. Match the following.

I. Column I	Column II
1. Sulphur dioxide	(i) damage ozone layer
2. Carbon dioxide	(ii) reduces oxygen carrying capacity of blood
3. Carbon monoxide	(iii) acid rain
4. Chlorofluorocarbons	(iv) greenhouse effect

1. (iii)	2. (iv)	3. (ii)	4. (i)
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II. Column I	Column II
1. Air pollution	(i) CO ₂ gas trapping in excess
2. Chemical contamination	(ii) Contaminated air and water
3. Global warming	(iii) Safe drinking water
4. Greenhouse effect	(iv) River Ganga

5. Pollut ant s	(v) Air pollution
6. Pot able wat er	(vi) Smoke and Dust
7. Wat er pollution	(vii) I ndust rial wast e
8. Taj Mahal	(viii) CO

1. (vi)	2. (vii)	3. (viii)	4. (i)	5. (ii)	6. (iii)	7. (iv)	8. (v)
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I. True or False

- Ganga Action Plan aims to reduce cutting of trees.
- Corrosion of marble is also known as marble cancer.
- Global warming is a serious threat for life on earth.
- Carbon monoxide is a green house gas.
- Potable water is translucent.
- Carbon monoxide reduces the oxygen, carrying capacity of the blood.
- Acid rain corrodes the marble of monuments.
- Acid rain does not affect the soil and plants.
- Increasing levels of greenhouse gases like CO₂ causes global warming.
- Sun's rays do not warm the earth's surface.

1. False	2. True	3. True	4. False	5. False	6. True	7. True	8. False	9. True	10. False
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Quiz Time

- What is air pollution?
- Which pollutants damage the ozone layer?
- Which two gases cause the acid rain?
- What is full form of the terms CNG and LPG?
- Name one of the gases which causes greenhouse effect.
- Except CO₂, which other gases contribute to greenhouse effect?
- When was Ganga Action Plan launched?
- Decrease in the oxygen in a water body is harmful. Why?



9. What indicates that water is contaminated?

10. What percentage of world's population is without safe drinking water?

Answers:

1. Mixing up of unwanted substances in the air which have a harmful effect on both the living and non-living things is called air pollution.
2. Chlorofluorocarbons (CFCs).
3. Sulphur dioxide and nitrogen dioxide.
4. CNG stands for Compressed Natural Gas, LPG stands for Liquefied Petroleum Gas.
5. Carbon dioxide (CO_2).
6. Methane, nitrous oxide and water vapour.
7. 1985.
8. Decrease in the oxygen level in the water body may cause killing of aquatic organisms (because organisms may not get oxygen dissolved in the water).
9. Presence of bacterial found in faeces of mammals.
10. 25%

NCERT CORNER

Intext Questions

1. How is CO_2 added to the atmosphere in excess?

CO_2 is continuously being released because of human activities and on the other hand, forest area is decreasing. Plants utilize CO_2 from the atmosphere for photosynthesis, thereby decreasing the excess of CO_2 in the air. Deforestation leads to an increase in the amount of CO_2 in the air, because the number of trees which consume CO_2 becomes lesser. Human activity thus contributes to the accumulation of CO_2 in the atmosphere.

2. Does acid rain affect the soil and plants also ?

Yes, acid rain affects the soil and plants also. It decreases the pH value of soil which is harmful for plants.



3. What are the factors responsible for pollution of the river?

Factors responsible for pollution of the river are-(i) Increase in industrial and agricultural activities. (ii) Many activities like washing clothes, bathing, etc. occur near the bank of the river. (iii) By mixing of toxic chemicals and sewage in water.

4. What steps can be taken to restore the river Ganga to its past glory?

We can take the following steps to restore river Ganga :

- (i) Industries are supposed to treat the waste produced before discharging it into the water.
- (ii) Pesticides and weedicides should not be allowed to flow into the river.
- (iii) Untreated sewage should not be thrown directly or indirectly into the river.

5. How would the disposal of garbage, etc. affect the living organisms in the river ?

The disposal of garbage increases the pollution level. It gets so high that the aquatic life cannot survive as the water is not suitable for breathing.

6. How can ground water get polluted by sewage ?

Untreated or inadequately treated sewage is a major source of ground water pollution. Sewage contains food wastes, detergents, micro-organisms, etc. which seep into the ground to pollute groundwater.

7. Why do we need to filter water before drinking?

Water contains many disease carrying microbes and dissolved impurities. So, we need to filter water before drinking.

8. What will happen, if we drink polluted water?

If we drink polluted water, we may be affected from diseases such as cholera, typhoid, and jaundice as the polluted water contains many pathogens.

Textbook Questions

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

Whenever substances such as sewage, toxic chemicals, silt, etc., which are harmful to life, get mixed with water, the water is said to be polluted water. The substances that pollute water are called water pollutants.

The industrial units discharge toxic wastes like chromium and other solid waste into the water. Fertilizers, pesticides and weedicides are important for agricultural process. However,



all these chemicals dissolve in water and are washed into water bodies from the fields. These seep into the ground to pollute groundwater.

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

The quality of air at various locations is monitored regularly by government and other agencies. We can access this data and generate awareness about air pollution by talking to our family members and friends. There is a need to switch to alternative fuels instead of the fossil fuels for our energy requirements. These could be solar energy, hydropower and wind energy. Small contributions on our part can make a huge difference in the state of the environment. We can plant trees and nurture the ones already present in the neighbourhood.

3. Clear transparent water is always fit for drinking. Comment.

Water, which looks clean may still have disease carrying micro-organism and dissolved impurities. So, it is essential to purify water before drinking, for example, by boiling.

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.

- (i) Laws for industrial units should be strictly implemented so that polluted water is not disposed off directly into rivers and lakes.
- (ii) Water treatment plants should be installed in all industrial areas.
- (iii) At an individual level, we should consciously save water and not waste it.
- (iv) Reduce, Reuse and Recycle should be our mantra.
- (v) Municipal bodies should treat the water before supplying it to households.

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

Pure air may contain all its constituent gases in fair ratio. Pure air does not possess, dust, smoke, or harmful gases as sulphur dioxide, carbon monoxide etc. While polluted air may contain dust, smoke and fair amount of harmful gases like sulphur dioxide, carbon monoxide, smog etc. which leads to diseases like asthma, cough etc. chemical

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

Air pollutants like SO_2 and NO_2 react with the water vapour present in the atmosphere and forms sulphuric acid and nitric acid. These acids drop down with rain as acid rain. Acid rain affects us in the following ways :

- (i) It corrodes the marble of the monuments such as Taj Mahal.
- (ii) It damages our crops and also makes it poisonous.



(iii) It causes damage to fresh water life, e.g., decreases in fish population of lakes.

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

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

(b) Sulphur dioxide.

8. Describe the 'Green House Effect' in your own words.

After the Sun's rays pass through the atmosphere, they warm the earth's surface. A part of the radiation that falls on the earth is absorbed by it and a part is reflected. The radiations which are trapped by the atmosphere are not allowed to go out of the earth's atmosphere. These trapped radiations further warm the earth. As in a nursery, sun's heat is allowed to get in but is not allowed to go out of the green house. The trapping of radiations by the earth's atmosphere performs a similar function. That is why it is called the greenhouse effect. Without this process, life would not have been possible on the earth because of the low temperatures. CO₂ is one of the gases responsible for this effect.

9. Prepare a brief speech on global warming that you have to make in your class.

Global warming Serious Threat! CO₂ forms a blanket in the upper layers of atmosphere, trapping heat and not allowing it to escape into space. So it leads to enhancement in the natural green house effect. As a result, the average temperature of the earth's atmosphere is generally increasing. This is called global warming. Global warming can cause sea levels to rise dramatically. In many places, coastal areas have already been flooded. Global warming could result in wide ranging effect on rainfall patterns, agriculture, forests, plants and animals. Majority of people living in such regions are in Asia. A recent climate change report gives us only a limited time to stabilize the green house gases. Otherwise the rise in temperature could be more than 2° C, a level considered dangerous. Global warming has become a major concern for governments worldwide. Many countries have reached an agreement to reduce the emission of greenhouse gases. The Kyoto protocol is such an agreement under the United Nations Convention, which has been signed by many countries.

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

Over the past 4 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 discoloring the white marbles. 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. Acid rain has resulted in corrosion of the marble of



the monuments. The phenomenon is also called "Marble cancer". Suspended particulate matter, such as the soot particles emitted by the Mathura oil refinery, has contributed to the yellowing of the marble.

The Supreme Court has taken several 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 Taj Zone.

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

The ponds look green due to lot of algae growing in them. This is caused by excessive quantities of chemicals like nitrates and phosphates, which are present in fertilizers. These act as nutrients for algae to flourish. Once these algae die, they serve as food for decomposers like bacteria. They use up a lot of oxygen. This results in a decrease in the oxygen level which is harmful for the survival of other aquatic organisms.

I. Very Short Answer Type Questions.

1. What is the percentage of nitrogen in atmosphere?

78%

2. What is the percentage of oxygen in atmosphere?

21 %

3. Which problem arises by air pollution?

Respiratory problem.

4. What is smog?

A thick fog-like layer in the atmosphere is called smog.

5. Which gases are responsible for acid rain?

Sulphur dioxide and nitrogen dioxide.

6. Which gas is responsible for greenhouse effect?

CO₂ (carbon dioxide).

7. What is global warming?

Increasing temperature in atmosphere is called global warming.

8. Which phenomenon causes global warming?

Greenhouse effect.



9. What is air pollution?

Addition of pollution in air is called air pollution.

10. Which gas is responsible for depletion of ozone layer?

Chlorofluorocarbons (CFCs).

11. Which fuel are pollution free?

CNG and LPG.

12. What pollutes Ganga?

Untreated sewage, dead bodies, garbage, etc.

13. What do you mean by potable water?

Water which is suitable for drinking is called potable water.

14. Which chemical is used to purify water?

Chlorine.

15. What radiation is absorbed by CO₂?

Infrared radiation.

16. Which rays are harmful for us?

Ultraviolet rays.

17. Which gas is called greenhouse gas?

CO₂, Methane.

18. What are alternative renewable fuels?

Solar energy, hydropower and wind energy.

19. What do you mean by 'Van Mahotsav'?

When lakhs of trees are planted in July every year, this is called Van Mahotsav.

20. When was Ganga Action Plan launched?

In 1985.

21. Name one of the poisonous elements present in the exhaust of automobiles.

Lead.

22. Where is the Taj Mahal situated?

Taj Mahal is situated in Agra.

23. What is environment?

The surrounding in which life is called environment.

24. What do you mean by pollution?

The contamination of air, water and soil is called pollution.



25. What are pollutants?

The substances which contaminate the air, water or soil are called pollutants.

26. Name two Natural Pollutants.

(i) Smoke

(ii) Dust

II. Very Short Answer Type Questions.

1. Name any two water pollutants which are toxic for both plants and animals.

(NCERT Exemplar)

Lead and arsenic are two water pollutants which are toxic for both plants and animals.

2. Name the chemicals which are used in refrigerators and air conditioners and damage ozone layer when released in air.

(NCERT Exemplar)

Chlorofluorocarbons (CFCs) are the chemical compounds which are used in refrigerators, air conditioners and aerosol sprays, and damage ozone layer when released in air.

3. Name two gases which are mainly responsible for acid rain.

(NCERT Exemplar)

Sulphur dioxide and nitrogen dioxide are the two gases mainly responsible for acid rain.

4. Combustion of fossil fuels generates a lot of air pollution. Can you suggest any two alternative sources of energy which do not cause any pollution?

(NCERT Exemplar)

Combustion of fossil fuels generates a lot of air pollution. Solar energy and wind energy are two alternative sources of energy which do not cause any pollution.

5. The quality of air at various locations is monitored regularly by government and other agencies. In what way can you use these data ?

(NCERT Exemplar)

The quality of air at various locations is monitored regularly by government and other agencies. These data can be used to generate awareness about air pollution among people.

6. We were imagining a time when clean air and water may no longer be available . Why ?

Due to environmental pollution.

7. Write the composition of air by volume.

78% is nitrogen and about 21% of oxygen, 0.9% argon, 0.3% CO₂, rest other gases.

8. What are air pollutants ?

The substances that contaminate the air are called air pollutants.



9. How are vehicles responsible for air pollution ?

Vehicles produce high level of pollutants such as carbon monoxide, carbon dioxide, nitrogen oxide and smoke.

10. What is smog ?

A thick fog like layer in the atmosphere especially during winters, which is made of smoke and fog is called smog.

11. What steps are taken by the Supreme Court to save Taj Mahal ?

It has ordered industries to switch to cleaner fuels like CNG and LPG. The automobiles should switch over to unleaded petrol in Taj zone.

12. Define greenhouse effect.

The trapping of radiations from sun rays by earth's atmosphere is called greenhouse effect.

13. What is Kyoto Protocol ?

Kyoto Protocol is an agreement to reduce the emission of greenhouse gases.

14. Who organized 'Say no to cracker' campaign ?

Children from many schools organized "Say no to cracker" to reduce air pollution during Diwali.

15. Define potable water.

Water that is suitable for drinking.

16. What is chlorination?

Chlorination is commonly used chemical method for purifying water.

III. Very Short Answer Type Questions.

1. Name any two sources which cause air pollution due to suspended particulate matter.

- a. Combustion of fuel
- b. Industrial activities

2. The quality of air at various locations is monitored regularly by government and other agencies. In what way can you use these data?

These data can be used to generate awareness about air pollution among people



3. What is potable water?

Water which is purified and fit for drinking is known as potable water.

4. What is meant by chlorination?

Chlorination is commonly used chemical method in which chlorine is added for purifying water to kill germs

I. Short Answer Type Questions.

1. A lot of dry leaves are collected in a school garden and are burnt every day. Do you think that it is right to do so? If not, what should be done to dispose off the dry leaves?

It is not right to burn dry leaves as it causes air pollution. The right way to dispose off the dry leaves is to convert them into compost.

2. The level of air pollution is higher at a busy traffic intersection. Why?

A large number of automobiles stop for a short period at red light throughout the day and release a large quantity of gases which create air pollution.

II. Short Answer Type Questions.

1. What do you mean by air pollution?

When air is contaminated by unwanted substances which have a harmful effect on both living and non-living things, it is referred to as air pollution.

2. Name the pollutants produced by vehicles.

Vehicles produce high levels of pollutants like carbon monoxide, carbon monoxide, carbon dioxide, nitrogen oxide and smoke.

3. Write some human activities, which cause water pollution.

Some human activities are;

- (i) Waste of industries
- (ii) Agricultural wastes
- (iii) Washing clothes
- (iv) Bathing



4. What is acid rain?

Sulphur dioxide and nitrogen dioxide react with water vapour and form sulphuric acid and nitric acid. This acid drops down with rain, making the rain acidic. This is called acid rain.

5. What do you mean by Marble cancer?

Acid rain corrodes the marble of monuments. This phenomenon is called Marble cancer.

6. Write full form of CNG and LPG.

CNG → Compressed Natural Gas

LPG → Liquefied Natural Gas

7. What is Greenhouse effect?

The reflected sun rays are trapped by the earth's atmosphere. The trapped radiation warms the earth. It also warms the greenhouse. This is called Greenhouse effect.

8. Describe global warming.

The increasing population and human activities cause the increase in the carbon dioxide in the atmosphere. CO₂ is a warm gas, which increases the temperature of the earth's atmosphere. This is called global warming.

9. Write some effects of global warming.

The following are the effects of global warming;

- (i) It affects the greenhouse.
- (ii) The Gangotri glacier in the Himalayas has started melting.
- (iii) It causes flood on earth.
- (iv) It increases the temperature in the atmosphere.

10. What is water pollution?

The mixing of harmful substances such as sewage, toxic, chemicals, salt, etc, with water is called water pollution.

11. Write the causes of air pollution.

Causes of air pollution;

- (i) Emitting smoke by forest fire.
- (ii) Poisonous gases expelled by the various industries.
- (iii) Poisonous gases emitted by vehicles.
- (iv) Smoke and dust arising due to human activities.



12. How is acid rain caused?

Different industries produce sulphur dioxide and nitrogen dioxide. Those gases react with water vapour and form sulphuric acid and nitric acids. These acids fall on earth with rain and cause acid rain.

13. What is ozone? How is it helpful for our environment?

Ozone is a layer of gases around the earth. It is tri-atom of oxygen atom. It protects the earth from the ultraviolet rays of the sun. The ultraviolet rays cause many disease and damage to our earth. Thus ozone layer is helpful for our environment.

14. How does water get polluted?

Water gets polluted when unwanted and harmful chemical substances are added to the water. Untreated sewage and garbage is added to water resources to pollute water.

15. Why is Taj Mahal losing its beauty?

Taj Mahal is a historical monument situated to Agra. Due to air pollution and acid rain Taj Mahal becomes dull. A dull layer covers the beautiful layer of white marble. In this way Taj Mahal is losing its shining and beauty.

16. Write some human activities, which cause air-pollution.

Some human activities are;

- (i) Industrialisation
- (ii) Power plants
- (iii) Automobile exhausts
- (iv) Burning of fire wood and dung cakes
- (v) Cutting of trees

III. Short Answer Type Questions- I

1. What has been done to reduce pollution in Delhi?

Delhi is one of the most polluted cities in the world. It was choked by fumes released from automobiles running on diesel and petrol. A decision was taken to switch to fuels like CNG and unleaded petrol. These measures have resulted in cleaner air for the city.



2. What is recent climate change report?

The recent climate change report gives us only a limited time to keep greenhouse gases at the present level. Otherwise, the temperature may rise by more than 2°C by the end of the century, a level considered dangerous.

3. How can hot water also be a pollutant?

Hot water can also be a pollutant. This is usually the water from the power plants and industries. It is released into the rivers. It raises the temperature of water body, adversely affecting the animals and plants living in it.

4. How is untreated sewage the major cause of water pollution?

Sometimes untreated sewage is thrown directly into the rivers. It contains food wastes, detergents, micro-organisms etc. Thus, water gets contaminated with bacteria, fungi, virus, parasites which can cause diseases such as cholera, typhoid, jaundice etc.

5. Explain the Ganga Action Plan in short.

The Ganga is said to be the only holy river in India. It sustains most of the northern, central and eastern Indian populations. Recently a study by World Wide Fund (WWF) reports that the Ganga is an endangered river. The towns and cities through which it passes throw large quantities of garbage, untreated sewage, dead bodies etc. which make river dead. A plan launched in 1985 to save this river is Ganga Action Plan.

6. Why does Kanpur city in Uttar Pradesh have one of the most polluted stretches of the Ganga river ?

Kanpur city is situated at the bank of the river Ganga. Many people can be seen bathing, washing clothes, throwing garbage, idols of Gods, non-biodegradable polythenes. In addition, Kanpur has more than 5000 industries. They discharge toxic chemical waste into the river. Hence, Kanpur really makes the Ganga polluted.

7. Industries causes water pollution, describe its effect.

Industries, oil refineries, paper factories produce toxic chemicals that are often discharged into rivers or streams, thereby polluting the water. The chemicals include pollutants such as arsenic, lead, fluorides, mercury etc. which lead to toxicity in plants and animals.

Effects : The water polluted with toxic industrial wastes can kill aquatic animals. On reaching human body, it can damage nervous system and cause diseases such as cancer.



III. Short Answer Type Questions- I I

1. The level of air pollution is higher at a busy traffic intersection. Why?

(NCERT Exemplar)

A large number of automobiles stop for a short period at red light and release a large quantity of gases (due to burning of petrol and diesel) which leads to air pollution. Motor vehicles are the major cause of air pollution in big cities.

2. Name any two sources which cause air pollution due to Suspended Particulate Matter

(SPM)?

(NCERT Exemplar)

Two sources which causes air pollution due to SPM are as follows :

(i) Automobiles which burn diesel and petrol, produce SPM that remains suspended in air and reduces visibility. When inhaled, they cause diseases.

(ii) Industrial activities like manufacturing of steel and mining give out SPM which also pollutes the atmosphere.

3. Explain the difference between pure air and polluted air.

Pure air is free from unwanted particles such as germs, harmful gases, smoke, and excess dust. It should have correct composition of air whereas impure air contains smoke and dust from forest fire, power plants, automobiles exhausts and burning of fire wood and cowdung cakes.

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

The industries located in area release many gases such as sulphur dioxide, carbon dioxide, nitrogen dioxide etc. These oxides react with water vapour present in the atmosphere to form acids such as sulphuric acid, nitric acid, etc. The acid drops with rain water on Earth called acid rain. Acid rain corrodes the monuments, buildings, vehicles, and also pollutes the land.

5. How are industries responsible for the water pollution?

Many industries discharge harmful chemicals into rivers and streams. For example, oil refineries, paper factories, textile, sugar mills and chemicals factories. The chemicals released include arsenic, lead and fluorine which lead to toxicity in plants and animals. Soil is also affected by impure water, causing changes in acidity, growth of worms etc.

6. How can water be made safe for drinking? Explain in brief.

Water can be made safe for drinking by following ways :

(i) Water is filtered. Many filters available in the markets are used by people.



(ii) Some use boiling as a method for obtaining safe drinking water because boiling kills the germs present in the water.

(iii) Chlorination is a chemical method for purifying water.

7. What are the measures being taken by people for generating awareness to reduce water pollution?

Laws for industrial units should be strictly implemented so that polluted water is not disposed of directly into rivers and lakes. Water treatment plants should be installed in all industrial areas. We should individually follow a mantra Reduce, Reuse and Recycle. We can think of creative ideas like water used for washing can be reused for other tasks. Discharge of kitchen can be done in kitchen garden etc.

8. Level of air pollution is higher in metro cities. Mention the major causes responsible for this increase.

Major causes of air pollution are :

- (i) Emissions from automobile exhaust.
- (ii) Effluents from thermal power plants.
- (iii) Smoke from forest fires, volcanic eruptions etc.
- (iv) CFCs used in refrigerators, ACs etc.
- (v) Industrial processes such as steel making, mining etc.

I. Long Answer Type Questions.

1. What do CFCs stand for? Name some devices where CFCs are used. Why are CFCs considered as pollutants? (NCERT Exemplar)

CFCs stands for Chlorofluorocarbons. CFCs are used in refrigerators, air conditioners, aerosol sprays. CFCs are considered as pollutants because these are depleting the useful ozone layer of the upper atmosphere. This happens as follows : CFCs released into the air, go up and ultimately reach high into the atmosphere where the protective ozone layer exists. The chlorofluorocarbons react with ozone gas of ozone layer and destroy it gradually. This allows the harmful ultraviolet rays of the sun to reach on the earth and cause damage.

2. It is said, "CO₂ contributes to global warming". Explain.

Plants utilise CO₂ from the atmosphere for photosynthesis, thereby decreasing the amount of CO₂ in the air. Deforestation leads to an increase in the amount of CO₂ in the air



because the number of trees which consume CO_2 is reduced. Human activities thus contribute to the accumulation of CO_2 in the atmosphere. CO_2 traps heat and it doesn't allow it to escape into space. As a result, the average temperature of the atmosphere is gradually increasing. This is called global warming. Thus, increased CO_2 contributes to global warming.

3. We should plant trees and nurture the ones already present in the neighbourhood.

Why?

We should plant more trees and also nurture the existing trees in our neighbourhood because trees reduce air pollution by absorbing excess carbon dioxide from the air. Thus, planting more trees will mitigate global warming. All of us should participate in programmes such as Van Mahotsav in which lakhs of trees are planted in the month of July every year.

4. Why is it advised that industries should switch over to cleaner fuels such as CNG and LPG in the Taj Mahal Zone in Agra ?

Pollutants in air are discolouring white marble of Taj Mahal. The Mathura Oil Refinery near Agra as well as various industries in and around Agra are emitting gaseous pollutants such as sulphur dioxide and nitrogen dioxide into the air which cause acid rain. Acid rain corrodes the marble (CaCO_3) of the monuments. Suspended particulate matter such as the soot particles emitted by Mathura Oil refinery has contributed towards the yellowing of the Marble. The Supreme Court of India ordered all the industries in Agra area to switch over to cleaner fuels like CNG and LPG to reduce air pollution.

5. Explain traditional ways of purifying water to make it fit for drinking.

The traditional ways of purifying water to make it fit for drinking are as follows :

(i) By filtering : This is a physical method of removing impurities. A popular household filter is a candle type filter.

(ii) By boiling : When water is heated, it boils at a temperature of 100°C . At this high temperature, all the harmful micro-organisms or germs present in water are killed and it becomes absolutely safe for drinking. Many households use boiling as a method for obtaining safe drinking water.

(iii) Chlorination : It is commonly used chemical method for purifying water. It is done by adding chlorine tablets or bleaching powder to the water.

6. Read the paragraph and answer the questions following it. Water is essential for life.

Without water there would be no life. We usually take water as granted for its purity, but we must ensure the quality of water. Pollution of water originates from human



activities. Through different paths, pollution reaches to ground water. Easily identified source or place of pollution is called as point source, e.g., - municipal and industrial discharge pipes, where pollutants enter the water source. Non-point sources of pollution are those where a source of pollution can not be easily identified, e.g., - agricultural run off, acid rain etc.

(i) How do you classify the various sources of water pollution?

(ii) What are the point sources of water pollution?

(iii) Name any two non-point sources of water pollution? (NCERT Exemplar)

(i) Various sources of water pollution are classified as point sources and non-point sources.

(ii) The sources or places of pollution which are easily identifiable are point sources of water pollution e.g., factories, power plants etc.

(iii) Agricultural run-off and acid rain are non-point sources of water pollution.

7. How does air get polluted ? Explain.

Air gets polluted by many reasons. Few of them are as follow :

(i) Vehicles produce high level of pollutants like carbon monoxide, carbon dioxide, nitrogen oxide, smoke etc. These are very poisonous gases. Burning of fuel from vehicles also produces pollution.

(ii) Many industries are also responsible for causing air pollution. Petroleum refineries release polluted gases such as sulphur dioxide, nitrogen dioxide etc. They cause respiratory problems, including lung damage.

(iii) Other kinds of pollutants are CFCs which are largely used in refrigerators, air conditioners and aerosol sprays. Those protect us from ultraviolet rays of the Sun.

(iv) Some human activities like forest fire, burning of fire wood, cow dung cakes, burning of chaff etc. cause air pollution.

(v) Some natural phenomenon like fast dust storms, volcanic eruption produce smoke and dust particles.

8. What is water pollution? How is it caused ?

Water Pollution : The mixing of harmful substances such as sewage, toxic chemicals, silt etc. in water is called water pollution.

Causes of water pollution :

(i) Domestic discharge.

- (ii) Industrial discharge.
- (iii) Religious rituals.
- (iv) Human activities.

II. Long Answer Type Questions.

1. What is air pollution? Write its causes.

When air is contaminated by unwanted substances which have a harmful effect on both the living and non-living, it is called air pollution.

(i) **Vehicles** : Vehicles produce high level of pollutants like carbon dioxide, carbon monoxide, nitrogen oxides and smoke. Carbon monoxide is produced from incomplete burning of fuels such as petrol and diesel. It is a poisonous gas. It reduces the oxygen carrying capacity of the blood.



(ii) **Industrial emissions** : Different poisonous and dangerous gases are emitted by factories. Industries used coal and petroleum products as fuel. These fuels emit various poisonous gases.

(iii) **Natural pollutants** : Natural sources like forest fire, and volcanic eruptions produce smoke and dust particles.

(iv) **Human activities** : Uses of fuels like cow dung, coal, wood produce air pollution. Agricultural practices like burning chaff after cultivation also pollute air.



2. What is acid rain? How does it affect the Taj Mahal?

The industries located in and around Agra like rubber processing, automobile, chemicals and especially Mathura Oil Refinery produce pollutants like sulphur dioxide and nitrogen dioxide. These gases react with water vapours present in the atmosphere to form sulphuric and nitric acids. These acids mix with rain water. Such type of rain is called acid rain. Acid rain corrodes the marble of the Taj Mahal. This phenomenon is also called marble cancer.

3. What is greenhouse effect? How does it cause global warming?

The process of trapping of radiation by the earth's atmosphere is called greenhouse effect. By this process the warming of the earth takes place. Without this process life would not have been possible on earth. But now it threatens life.

CO₂ is one of the components of air. As the amount of CO₂ increases in the atmosphere due to which more greenhouse effect takes place. As a result the average temperature of the earth's atmosphere is gradually increasing. This is called global warming.

4. What is water pollution? How is water pollution caused?

The mixing of harmful substances such as sewage, toxic chemicals, slits, etc. in water is called water pollution.

Causes of water pollution:

(i) **Domestic discharges** : The sewage from homes is collected and disposed off in rivers which cause water pollution.

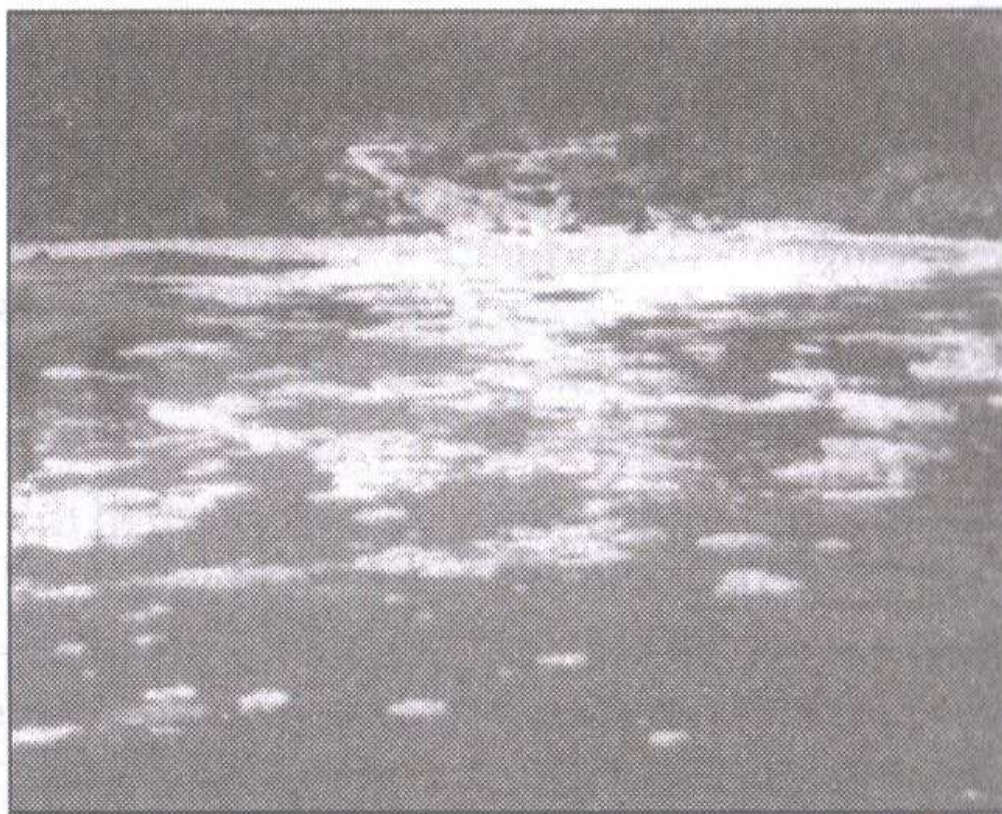
(ii) **Industrial discharges** : Various harmful and toxic chemicals are discharged by various industries directly into the water. These chemicals spoil the water and make it unfit for drinking.

(iii) **Religious rituals** : Various religious rituals also cause the water pollution. Dispersion of dead bodies or remains in river causes water pollution.

(iv) **Human activities** : The bathing, washing and other human activities also cause water pollution.

5. Explain Ganga Action Plan.

An ambitious plan to save the river is called Ganga Action Plan. It was launched in 1985 to reduce the pollution level in the river. However, the increasing population and industrialisation have already damaged this mighty river beyond repair. Now, the government of India has launched a new initiative known as National Mission for Clean Ganga (NHCG) in 2016.



Ganga at Kanpur in Uttar Pradesh has one of the most polluted stretches of the river. Kanpur is one of the most populated town in U.P. People can be seen bathing, washing, clothes and defecating in the river. They also throw garbage, flowers, idols of gods and goddesses and non-biodegradable polythene bags into the river. The industrial units discharge toxic chemicals and wastes into the river. Due to these activities the water in Ganga is polluted. Ganga Action Plan is related to reduce pollution in Ganga.

6. What is potable water? Write its properties.

The water which is suitable for drinking is called potable water.

Properties :

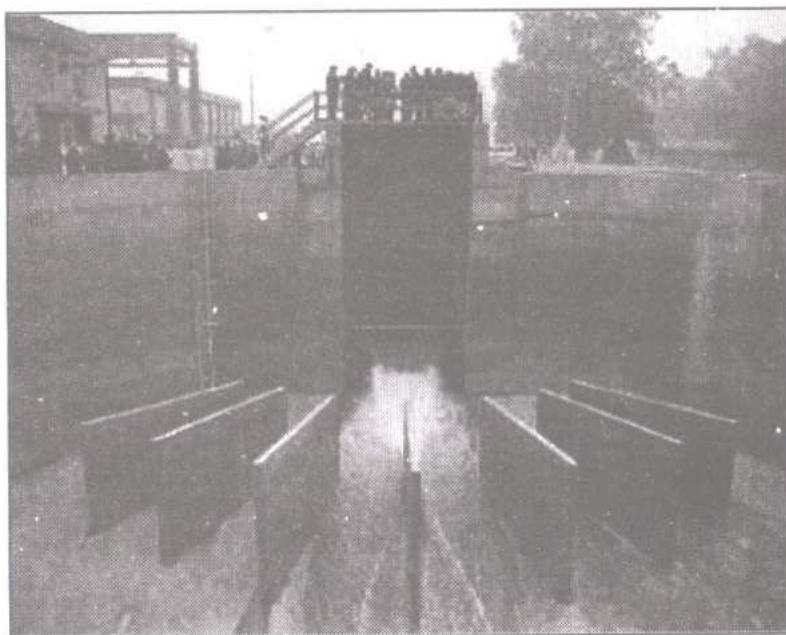
- (i) It is colourless.
- (ii) It is odourless.
- (iii) It is transparent.
- (iv) It is germless.



7. Explain the process of water treatment to make it drinkable.

The water obtained from various sources is not safe for drinking. It requires purification before being supplied for drinking. Water is pumped from a source such as river or lake and is collected in a tank. The water is then cleaned in water works by allowing it to filter through layers of gravel and sand. It removes the dirt from water. Then water is treated with

some chemicals like chlorine to kill the germs. The water is then supplied to the localities where it is to be used for drinking purposes.



III. Long Answer Type Questions.

1. It is said, ; “CO₂ contributes to global warming.” Explain.

Burning of fossil fuels, deforestation and agricultural activities release a lot of carbon dioxide in air. The increased amount of carbon dioxide gas in the air traps the heat radiated from the earth. This trapping of heat by CO₂ layer in air is called greenhouse effect. This leads to an overall increase in the temperature of the earth. This is called global warming. Global warming results in melting of polar ice which causes a rise in the sea level, leading to floods in the low lying coastal areas having fertile land.

2. We should plant trees and nurture the ones already present in the neighborhood. why?

Trees make their own food from carbon dioxide (CO₂) in the atmosphere, water, sunlight and a small amount of soil elements, in the process, they release oxygen (O₂) for us to breathe. Thereby maintaining the carbon dioxide level in the atmosphere. This prevents global warming. Trees purify the air and reduce air pollution.

3. Explain the traditional way of purifying water to make it fit for drinking.

Water is purified before it is used in cooking, washing, drinking and for farming. Purification of water involves the following steps;



- a. Alum is added in water containers and water is left undisturbed for few hours. The suspended impurities settle down through the process known as loading. The clean water is then separated by decantation.
- b. Water is boiled before drinking. If water is boiled for about 20 minutes at about 100°C , the germs present in it are killed.
- c. The water from rivers and lakes is pumped and collected in a reservoir or water tank. Heavy particles (such as rocks, stones, etc.) are allowed to settle down through a process called sedimentation in a container, this tank is known as sedimentation tank.
- d. The water is allowed to pass through a container which has gravel and sand acting as a sieve to filter impure substances. The water gets free from dirt and various other impurities by the process called filtration.

4. How can we reduce, reuse and recycle water?

- a. while brushing teeth, bathing etc., we should not keep our taps on.
- b. Mopping the floor instead of washing it.

Reuse

- a. Water used for washing vegetables, rice etc, can be used for gardening.
- b. Use the water after washing clothes for toilet flushing and floor cleaning.

Recycle

Dirty water can be recycled after purification.

5. a. How do you classify the various sources of water pollution?

b. What are the point sources of water pollution?

c. Name any two non-point sources of water pollution.

- a. point sources and non-point sources.
- b. Easily identified source or place of pollution is called point source. For example. Municipal, industrial discharge pipe, etc.
- c. Agricultural run-off, acid rain

I. High Order Thinking Skills (HOTS) Questions.

1. An alternative fuel for vehicles is CNG. Write its full form.

CNG is Compressed Natural Gas.



- 2. The use of excessive fertilisers and pesticides leads to the deficiency of an important substance in water. Name the substance.**

The substance is oxygen.

- 3. Groundwater also gets polluted by sewage. How?**

Untreated or inadequately treated sewage is major source of groundwater pollution. Sewage contains food wastes, detergents, micro-organisms etc, which seep into the ground to pollute groundwater.

- 4. Run-off water from a garden is not considered a point source of pollution. Give reason.**

Run-off water from a garden is not considered a point source of pollution because this water does not have a specific location for its discharge of pollutants.

- 5. By the end of 2002, public transport of Delhi switched over to a new fuel. Name the fuel. Why is this fuel considered better?**

New fuel adopted was CNG (Compressed Natural Gas). It is a better fuel because :

- (i) it is cheaper than petrol
- (ii) it burns very efficiently
- (iii) it cannot be adulterated.

- 6. The need of the hour is to take appropriate measures to control water pollution. List some of these preventive measures.**

Some preventive measures of water pollution are :

- (i) Sewage should be treated properly before discharging it into nearby rivers.
- (ii) Water treatment plants should be installed in all industrial areas.
- (iii) The use of excessive fertilisers and pesticides should be avoided.
- (iv) Laws for industrial units should be strictly implemented.
- (v) We should consciously make efforts at individual level to conserve water.

- 7. Explain the cause of algal bloom in a water body. How does it affect the water of the water body ?**

Algal bloom is caused by the enrichment of nutrients in the water body. The nutrients from the fertilisers, etc. cause rapid growth of algae.

It affects in following ways :

- (i) Deteriorates the water quality
- (ii) Leads to death of aquatic organisms.



8. There is a decline in population of fish eating birds, when the water body is near an agricultural field. Is it true? Give reasons for your answer.

Yes, there will be decline in population of fish eating birds. This is because of pesticides like DDT which are used in agricultural fields to protect the crop. These pesticides cannot be metabolised, i.e., if it gets into the body of fishes through water, it won't be excreted out. It will pass on to the other animals consuming the fish. The birds thus get poisoned on eating the fishes, leading to their death and decline in their population.

II. High Order Thinking Skills (HOTS) Questions.

1. What is fly ash?

Fly ash is the air contaminated with minute particles of silica, alumina, oxides of iron, calcium and other toxic heavy metals. These enter the air through combustion of coal.

Value Based Questions.

1. Sudhir while travelling with his father saw the same displayed at every signal. The message was "stop the vehicle engine at the red lights to save the fuel". He noticed his father turning the engine off at each signal. He was confused to see this and asked his father.

(i) It is recommended to stop the vehicle engine at the red light signals. Give reasons

(ii) Suggest the process associated when vehicle engine is ON .

(iii) What values are government trying to inculcate in people with the message

(iv) Will you support the message? why?

(v) Mention the values shown by sudhir

Ans. (i) It is recommended to stop the vehicle engine at the red light signals to minimize the emissions of poisonous gases like CO, NO, etc. from the automobile exhaust.

(ii) With the vehicle engine ON, the incomplete combustion of fuel will take place with release of gases like CO (carbon monoxide).

(iii) The government is trying to make people understand the need for reducing environment pollution and the steps that they can take for environmental protection.



(iv) Yes, I will support the message, it is for the common good cause.

(v) Sudhir is keen learner, strong observer and responsible.

2. My sister is in the habit of keeping the tap open while brushing her teeth. she loves to take bath under shower. My neighbour uses hosepipe attached to drinking water supply pipe for washing his scooter and car. According to me their way of handling the most precious source water is absolutely wrong. Do you agree with me or not? What changes in the above situation can be done to conserve water?

If my sister and neighbour are wasting the precious water, I agree with you because we have very less amount of potable water on earth. As population increases there will be scarcity of this. To control this situation we must talk with them regarding importance of water and tell them alternative methods for their tasks, such as using buckets to take bath and clean their vehicles.

3. Water is one of most precious commodities and no life can survive without it. It has been predicted that water scarcity will become the subjects of "WARS" in the near future. write any two ways in which water is getting polluted. write any two measures to stop water pollution at your level.

Water is an important and precious resource. Now a days it is polluted with many harmful substances such as sewage, toxic chemicals, silt, etc. which gets mixed with water. Many industries discharge harmful chemicals into rivers and streams. To avoid this situations many compulsory rules must be obeyed as various physical and chemical processes in the sewage treatment plant must be done before discharging sewage into water bodies. At individual level we should consciously save water and do not waste it. Reuse and recycle should be our mantra.

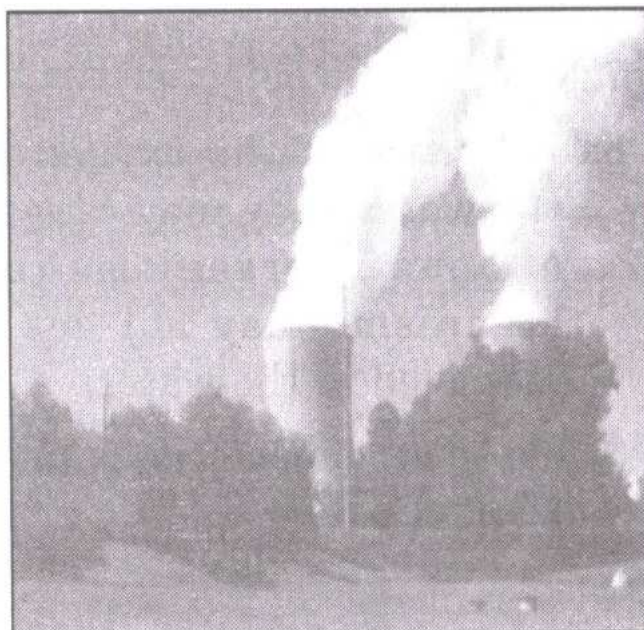
Skill Based Question

1. I identify the following figure and answer the following questions.

(i) How do such type of constructions pollute air?

(ii) Name the possible air pollution produced by these structures.

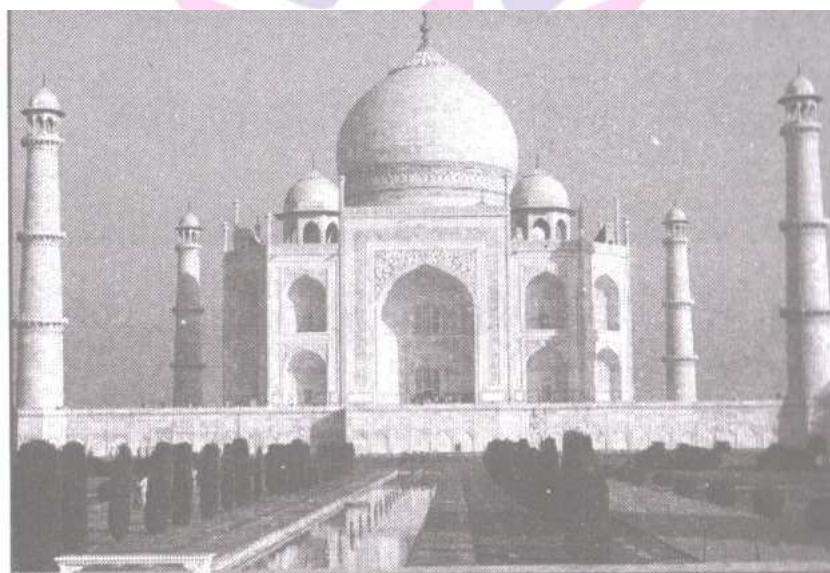
(iii) Name the gases produced by these structures causing acid rain.



This figure is of a factory.

- (i) This factory produces smoke of unburnt carbon particles and some other gases in the air.
- (ii) These factories produce various pollutant gases like : CO_2 , SO_2 , NO_2 , et c.
- (iii) SO_2 and NO_2 are the gases which are responsible for acid rain.

2. Observe the following building carefully and answer the following questions.



- (i) Where is the building?
- (ii) Name the material used to construct this building.
- (iii) Name some industries located around it.
- (iv) Write the effect of acid rain on it.
- (v) What is other name of corrosion of white marble?

This building is of the Taj Mahal.

(i) It is located in Agra.

(ii) It is made up of white marble.

(iii) Rubber processing factory, automobile, chemical industry and Mathura Oil Refinery are some industries located around the Taj Mahal.

(iv) The acid rain causes the corrosion of marble due to which it loses its beauty.

(v) The other name of corrosion of marble is 'Marble Cancer'.

3. Observe the following figure and answer the following questions;

(i) Identify the figure. What is it showing?

(ii) Name the action plan to remove pollution level in the river.

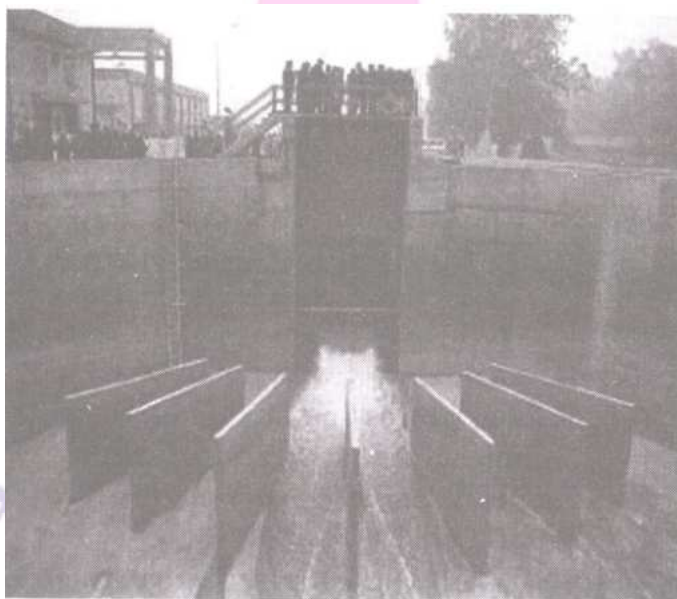


(i) This figure is showing a polluted stretch of the river Ganga.

(ii) The name of action plan to remove pollution level in the river is called Ganga Action Plan.

4. (i) Identify the following figure.

(ii) Write the steps of treatment of water.



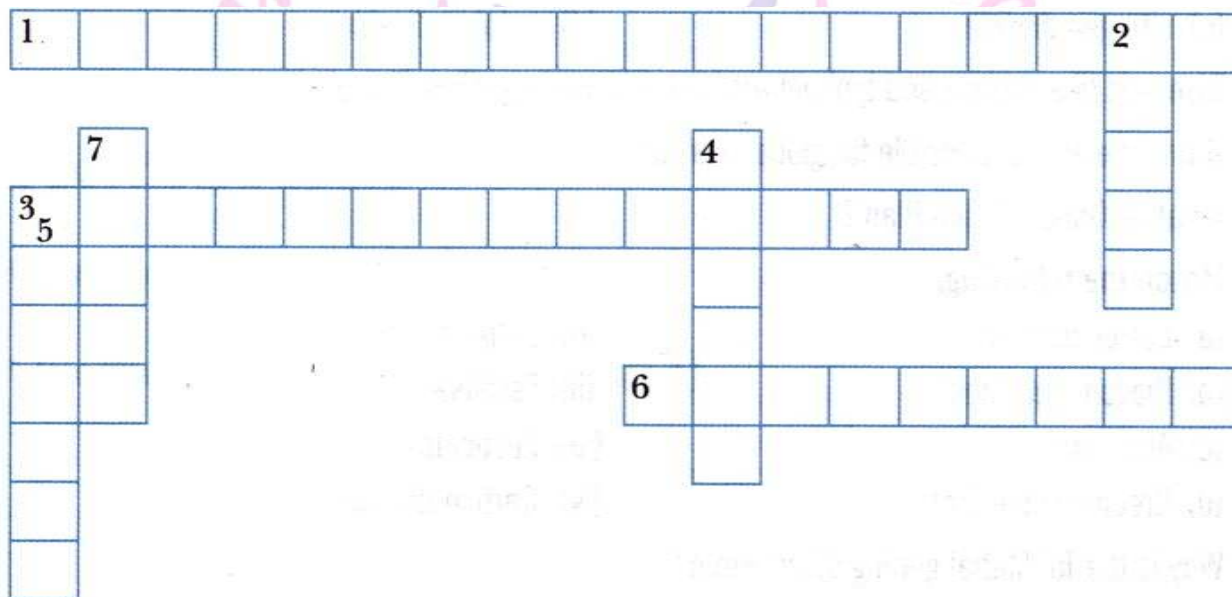
(i) This figure is of a water treatment plant.

(ii) Steps of water treatment are:



- (a) Pumping of water
- (b) Grinding tank
- (c) Filtration
- (d) Chlorination

Cross word Puzzle



Across;

- 1. Pollutant which was used in refrigerators and air conditioners.
- 3. Produced on incomplete combustion of fuels
- 6. This chemical protects our crops and is bodies from the field.

Down:

- 2. This layer protects us from harmful ultraviolet rays.
- 4. It is essential for combustion.
- 5. Disease which is caused drinking contaminated water.
- 7. River which is famous in India and sustains most of the northern, central and eastern Indian Population.

Across

- 1. chlorofluorocarbon
- 3. Carbon monoxide
- 6. Pesticide

Down

- 2. Ozone
- 4. Oxygen
- 5. Cholera
- 7. Ganga