

STEPPING STONE
SCHOOL (HIGH)

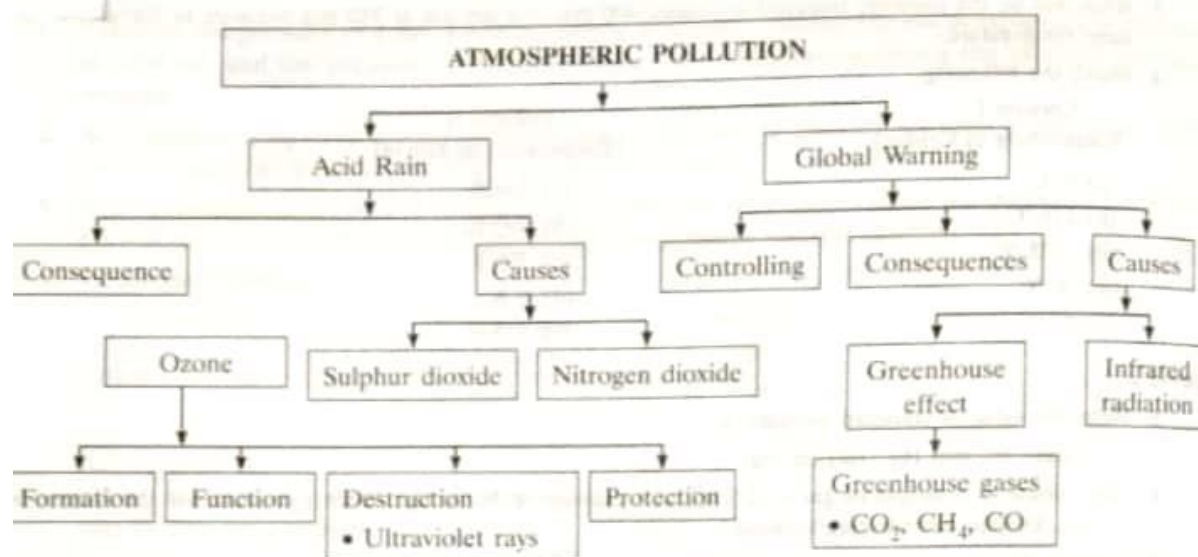
CLASS :IX

Subject: Chemistry
Topic: Atmospheric Pollution

Date:16/06/2020
Time Limit:40 min.

Worksheet No.10

CHAPTER AT A GLANCE



IMPORTANT TERMS AND DEFINITIONS

1. **Atmosphere:** The gaseous envelope surrounding the earth is called **atmosphere**. The atmosphere extends about 50 km above the sea level.

The atmosphere of the earth may be divided into several distinct layers.

(a) The troposphere (b) Stratosphere and the ozone layer

Troposphere: It is the lowest portion of earth's atmosphere. It contains approximately 75% of earth's atmosphere more and 99% of its water vapour and aerosol.

Stratosphere is the second major layer of earth's atmosphere, just above the troposphere. It is situated between about 10 km and 50 km above the sea level.

2. **Ozone Layer:** It absorbs 97-99% of sun's UV light, which is damaging the life on the earth. It is mainly located in the lower portion of the stratosphere from approximately 13 to 40 km above the sea level.

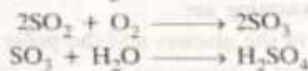
3. **Causes of Air Pollution:** The tropospheric pollution or the air pollution is caused by the following pollutants:

(i) **Gaseous air pollutants:** This includes mainly oxides of sulphur, oxides of nitrogen, oxides of carbon, ozone, hydrogen sulphide, etc.

(ii) **Particulate air pollutants:** This includes smoke, dust, fumes, etc.

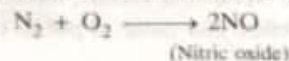
4. **Atmospheric Pollutants:** Sulphur dioxide is one of the major atmospheric pollutants. Sulphur dioxide is added into our environment by various activities like by burning of sulphur containing fuels, by burning of oils and during the roasting of sulphide ore in metallurgy. The presence of sulphur dioxide in the atmosphere badly affects the human physiology. It causes severe headache, nausea, vomiting and in some cases it can prove fatal.

5. **Acid Rain:** Sulphur dioxide is oxidized by atmospheric oxygen to form sulphur trioxide which combines with water to form sulphuric acid. This acid gets washed down with the rain and causes **acid rain**.

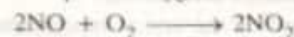


The acid corrodes the limestone and metals of the buildings, bridges, etc.

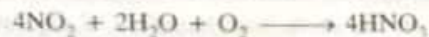
6. Oxides of nitrogen are another major air pollutants which are introduced into the atmosphere by the burning of the fossil fuels in internal combustion engines which produce a very high temperature and thus nitrogen and oxygen of air combine to form nitric oxide.



Nitric oxide further combines with atmospheric oxygen to form nitrogen dioxide.



Nitrogen dioxide combines with rain water and oxygen to form nitric acid which comes to the earth in the form of acid rain.



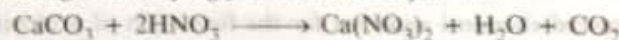
7. Nitrogen dioxide is a major atmospheric pollutant and adversely effects the human beings, plants and animals. The adverse effects of NO_2 are as follows:

- It causes irritation in mucous membrane.
- Large quantities of NO_2 can lead to serious lung congestion and in some cases can prove fatal.
- The presence of nitrogen dioxide severely damages the leaves of the plants.
- Nitrogen dioxide in the presence of light oxidizes hydrocarbon leading to the formation of photochemical smog which cause irritation in eyes, asthma attack and other respiratory tract infections.

8. **Effect of Acid Rain:** Acid rain has a very adverse affect on the soil chemistry, the water bodies, buildings and the vegetation:

- Acid rain removes the basic essential nutrients from the soil.
- Acid rain increases the acidic character of the water bodies and thus the water becomes unfit for the survival of the aquatic animals like fishes.
- Acid rain basically damages the leaves of the plants.
- It has harmful effect on the sculptures monument and buildings made of limestone, marbles and metals.

9. Taj Mahal (one of the seven wonders of the world) made of marble which is chemically calcium carbonate is being eroded by the acid rain and if the emission of NO_2 and SO_2 are not stopped in the nearby refineries, then it can give a very ugly look to the Taj Mahal.



10. **Global Warming:** The rise in temperature of the earth's surface is called **global warming**. It is caused due to the trapping of sun's radiation by carbon dioxide in the atmosphere. This process is called **greenhouse effect**.

11. Greenhouse Gases: The gases which causes the greenhouse effect are called **greenhouse gases**. For example, carbon dioxide, methane, water vapour, ozone, chlorofluorocarbon, nitrous oxide etc.

The earth surface gets heated up by infrared radiations of the sunrays. Earth surface emits the infrared radiations and it escapes the earth's surface. During the process of emission some of the infrared rays get absorbed by the greenhouse gases and thus it remains on the earth and these trapped radiations warm the surface of the earth and lower atmosphere.

12. Effects of Global Warming:

The various effects of global warming are:

(i) It will lead to the melting of the glaciers and the polar ice caps which would lead to submerging of low lying coastal areas.

(ii) Global warming increases the water vapour in the atmosphere which will contribute further in increasing the temperature of the earth.

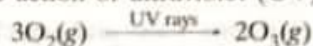
13. Ways of Reducing the Greenhouse Gases in the Atmosphere:

(i) Afforestation: Plant more trees, save forests, increase green cover.

(ii) Minimum use of automobiles: Use more of public transport, car pools, ride bicycles for shorter distances, etc.

(iii) Burning of fossil fuels should be minimized.

14. Formation of Ozone: It is formed by the action of ultraviolet (UV) rays of the sun on oxygen.



Ozone prevents the harmful ultraviolet radiations to reach the earth.

Ozone layer protects the life on the earth from harmful UV rays which would lead to several skin diseases.

15. Depletion of Ozone Layer: Decrease of the ozone in the stratosphere is called the **depletion of the ozone layer** or the **destruction of the ozone layer**.

The formation of the holes in the ozone layer causes the harmful UV rays to enter into the earth.

16. Causes of Depletion: The main causes of the depletion of ozone layer are:

(i) Excessive use of chlorofluorocarbons. (ii) Flying of supersonic planes.

PRACTICE QUESTIONS

1. Name the atmospheric pollutants.
2. How does global warming cause the change in sea-level?
3. What is the function of ozone in stratosphere?
4. Give two major causes for the destruction of ozone layer.
5. What is acid rain?
6. What is the danger to the historical monuments made of marble? Show with the help of equations.
7. State three ways of minimizing global warming.
8. What is greenhouse effect? Name the greenhouse gases.
9. What is meant by the depletion of ozone layer?
10. Why is acid rain considered a threat to Taj Mahal?
11. Fill in the blanks:
 - (i) Supersonic jets release oxides of _____ into the atmosphere.
 - (ii) _____ is due to accumulation of greenhouse gases.
 - (iii) _____ is released in large quantities by heaps of rotten and degradable matter.
 - (iv) _____ is released by burning of fuels and respiration of animals.
12. Articles made of silver metals lose lustre. Why?



Self Evaluation Test

Level 1

1. State whether the following statements are True or False.
 - (i) Ozone is formed by the action of UV rays of the sun on oxygen.
 - (ii) The major gas which causes acid rain is water vapour.
 - (iii) Global warming increases the sea-level.
 - (iv) Global warming makes the environment healthy.
 - (v) A Photochemical smog is beneficial to human beings.
2. Fill in the blanks.
 - (i) Nitric oxide is _____ toxic.
 - (ii) The gaseous material which envelopes the earth is called _____.
 - (iii) The lowest region of the atmosphere is called _____.
 - (iv) Stratosphere mainly contains _____ and ozone.
 - (v) Rain water containing H_2SO_4 and HNO_3 is called _____.
3. Define air pollution and write two major pollutants of air.
4. Describe the nature of infrared rays. Give sources of greenhouse gases.

Level 2

5. Fill in the blanks.
 - (i) Normal rain has pH between _____ and _____.
 - (ii) Metals lose _____ because of acid present in rain.
 - (iii) High flying jets and rockets release _____.
 - (iv) The bond angle in ozone is _____.
6. What are the causes of acid rain?
7. Draw a diagram to show greenhouse effect.
8. What is smog? State its damaging effects.
9. What do you understand by ppm?

Level 3

10. Write one word for the following:
 - (i) The phenomenon having higher temperature inside as compared to outside by allowing solar energy to enter but prevent it from escaping.
 - (ii) Contributes to damage of trees at high elevations.
 - (iii) Substance formed by passing silent (sparkless) electric discharge.
 - (iv) A commonly used ozoniser.
11. Define ozone layer depletion.
12. In which unit the thickness of ozone layer is measured?
13. What does CFC stand for? Write its role in the atmosphere.
14. Greenhouse effect is useful for the existence of life on the earth. Justify.

SUGGESTED LINK:

<https://youtu.be/UIuOTTR9bDM>