

# 10

## Air Pollution

Raju and Riaz are fast friends. Raju lived in a village while Riaz lived in a city. Raju went to Riaz's house in the city during Vacation. Both friends went for a walk in the evening. Raju saw many vehicles running on the road. Smoke was coming out of industrial chimnies. Raju felt the heat. He felt irritation in his eyes and nose. When they moved further Raju started sneezing and suffocating suddenly. Do you know, why did it so happen to Raju?

There are different gases and microorganisms in the atmosphere. The harmful changes that are burnal to environment are known as pollution. The factors responsible to spread pollution are known as pollutants. Pollutant may be in solid, liquid or gaseous form. Out of these, the gaseous pollutants are more in proportion in the atmosphere. Do you know what are the reasons which spread air pollution? Let us see.



Figure 10.1

- Write reasons for air pollution on basis of the above picture



- **Smoke exhausting vehicles :**

Smoke exhausted by scooters, trucks, motor cars etc. spreads pollution in air. Now a days, the upper layer of the air also gets polluted because of the poisonous gases produced from the fuels used for jet planes, rockets and missiles



**Figure 10.2**



**In the sky, we see a big strap behind some aero planes, what is it?**

- **Smoke coming out of industries :**

The pollution of air has reached to dangerous level because of industries. Because of use of chemical substances in the industries, carbon particles and poisonous gasses like carbon monoxide (CO) sulphur dioxide and hydrogen sulphide ( $H_2S$ ) are produced and mix with the air, and so they pollute the air. In addition, woods and coal are used as fuel in many industries. Because of this, the carbon dioxide ( $CO_2$ ) and carbon monoxide (CO) are produced and they spread pollution of air.



**Figure 10.3**

*Collect the book "Industries of district" from the school library and discuss the air pollution.*

- Deterioration of substance :**

When the vegetables, fruits, foods excreta of animals, dead bodies of animals lie for a long time, get deteriorated and gases like Ammonia ( $\text{NH}_3$ ) Carbon dioxide ( $\text{CO}_2$ ) and hydrogen sulphide ( $\text{H}_2\text{S}$ ) with very foul smell as well as the microorganisms are produced and they spread pollution in air.

- Dust Particles :**

The dust particles, carbon particles, pollen grains, hair, wool and fine threads of cotton etc. mix in the air and pollute the air. In addition, the flying particles present at the place like industries producing cement and lime and pottery (ceramic) industries, coal mines mix in the air and spreads pollution.

- Radiation :**

In the present time, atomic energy is used in different works and so radioactive pollution has increased. Harmful (Hazardous) radiations spread in the atmosphere because of the experiments of armaments like atom bomb. There is a possibility of spreading of this type of pollution from the waste produced by atomic electric power and atomic reactors.



**Figure 10.4**



**Figure 10.5**



**Figure 10.6**



**Discuss the incident happened at Fukushima reactor, Japan with your teacher and note down.**



*Collect the book "problems of district" and collect more information regarding pollution and its effects*

- **Exhalation of living beings :**



Which type of gas is exhaled by living beings?

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Why do we feel suffocation in the closed hall where many people gather?

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Why do doctors and nurses cover their mouth and nose with masks?

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Thus, living beings exhale carbon dioxide during their respiration. Hence the proportion of carbon dioxide increases in the atmosphere. Then Raju and Riaz saw people moving on the road. They had tied handkerchieves on their face. Raju and Riaz also tied handkerchief on nose.



**Why do Raju and Riaz cover their face with handkerchieves?**

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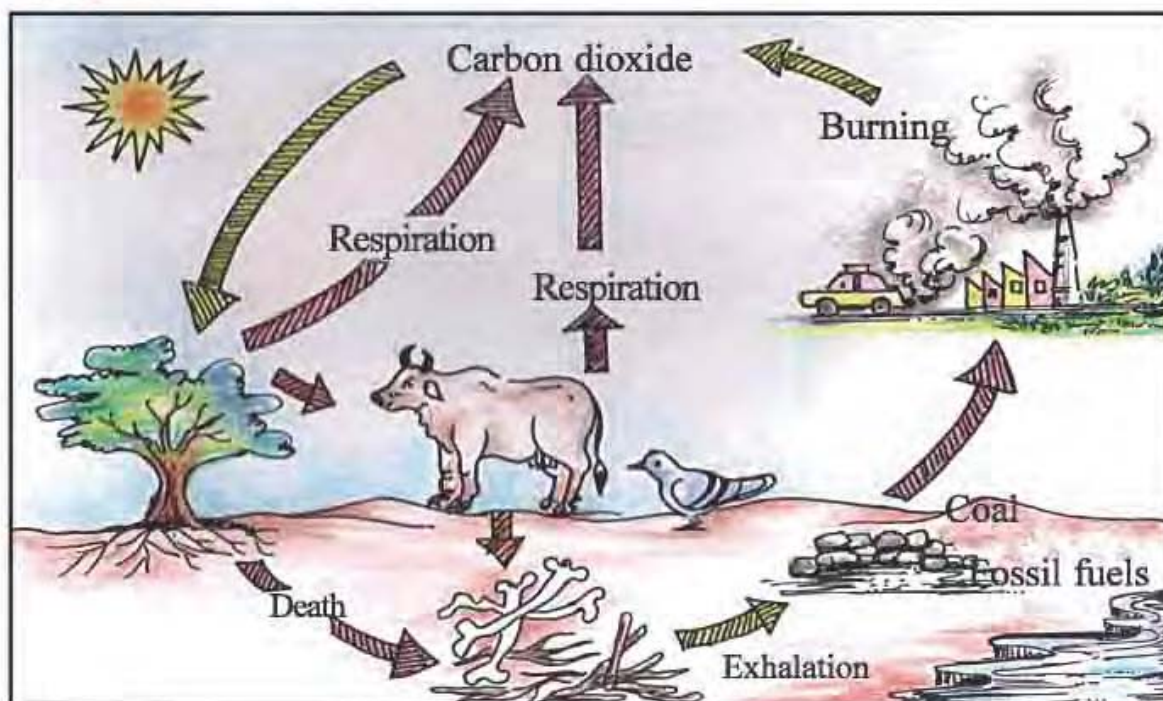
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- **Effects of Air pollution?**

Life is not possible without air, but harmful gases produce many harmful effects like,

- Irritation in eyes, nose and throat
- Sneezing
- Difficulty in breathing
- Cancer of trachea and lungs
- Infertility, disease of skin and eyes.
- Death of animals
- Decrease in growth of leaves, flowers and fruits of plants.
- Green house effect
- Acid Rain

• **Carbon cycle :**



**Figure 10.7**

The proportion of  $\text{CO}_2$  is 0.04% in the atmosphere.  $\text{CO}_2$  is released by organisms during exhalation. Plants absorb this carbon dioxide for photosynthesis. When animals feed upon plants or products of plants, carbon dioxide enters into their bodies.  $\text{CO}_2$  is liberated into the air and water during respiration and by the burning of their dead bodies. The burning of coal and fossil fuels also adds carbon dioxide in the atmosphere. Thus the great carbon cycle of nature goes on continuously.

Carbon dioxide possesses the property to absorb heat. When solar radiation enters our atmosphere, our soil absorbs some radiation and convert those radiation to heat, rest of the radiation is reflected back but that is absorbed by atmosphere carbon dioxide. Thus it maintains the atmospheric temperature. But due to increased  $\text{CO}_2$  temperature of our earth is also increased. This effect is known as Green House Effect.

**Due to effect of green house :**

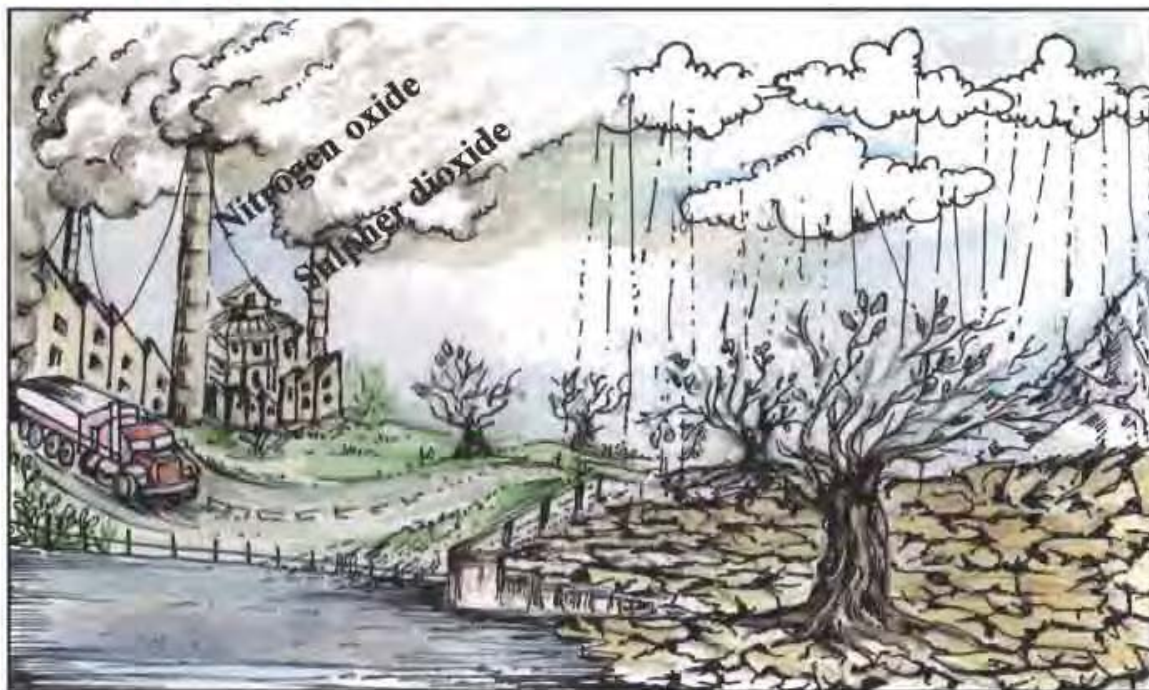
Melting of polar ice caps results into increased sea level which leads the sinking of cities and villages situated on sea shore.

Evaporation of water due to heat will increase 5% to 7% of total rainfall. But this will imbalance the distribution of rain and will result in to flood and draught at different places. We have suffered this situation during last few years frequently.



Due to the increased temperature, days and nights of summer and winter has lost their naturality. You many feel two-three seasons at a time. We have also noticed the increased numbers of days of summer and also intensity of summer.

• **Acid rain and its effects :**



**Figure 10.8**

When the moisture in the atmosphere increases, the dry particles in the form of acidic gases like sulphur dioxide and nitrogen oxide etc. dissolve in the moisture and produce sulphuric acid ( $\text{H}_2\text{SO}_4$ ) and nitric acid ( $\text{HNO}_3$ ) respectively, it falls on the land with the rain water and it is called acid rain, which effects,

- Deforestation
- Decrease in the soil nutrients and fertile lands become barren.
- Big monumental buildings get damaged



**Do aquatic animals and plants get any effects of acid rain ? How? Note down.**

Raju and Riaz came back to home and get asleep Riaz saw a devil in his dream. He introduced him as air pollution. He said that he will destroy the world by increasing the temperature. He said, "I will create a dangerous situation for life with the help of flood." The devil started squazing the earth. Riaz frightened and he lost his sleep. He told Raju about his dream and draw the picture of his dream.



Figure 10.9

- **Both friends started thinking how can the world be saved against the devil like pollution? Write five sentences looking this picture.**

- **Measures to stop air pollution**

#### **Natural factors**

1. **Plants :** Plants absorb carbon dioxide ( $\text{CO}_2$ ) and relase oxygen ( $\text{O}_2$ ) during the process of photosynthesis. It reduces the air pollution
2. **Rain:** When it rains, the gases like carbon dioxide of the air dissolve in water. Also, the dust particles in the air and certain impurities are being washed out with rain water and so the air becomes pure.
3. **Wind :** Because of the wind, polluted air is being pushed far away and it is replaced by pure air, The proportion of polluted air decreases due to this.



4. **Sunlight :** The microorganisms present in the air are killed ((destroyed) by the heat of the sun and so the air becomes pure



Visit a nearby petrol pump and discuss the following questions.

**Q.1** What is PUC?

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**Q.2** Why is PUC required?

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**Q.3** Which fuel is advisable diesel, petrol, or CNG ? Why?

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**Q.4** What type of care should be taken of vehicles to reduce pollution?

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**Following remedies can be tried and air pollution must be stopped :**

- More and more plants should be grown and should be protected
- PUC of vehicles should be obtained.
- Pure fuel should be used for vehicles.
- For cooking biogas, cooking gas (LPG) and solar energy should be used instead of wood, coal or animal dung.
- Use of solar equipments should be promoted.
- More and more biogas plants should be established.
- Efficient and less pollution producing stoves should be used.
- Rules should be followed strictly to control pollutants released by factories and mills.
- Proper design of vehicles should be invented for the complete use of fuel and release of less fumes.

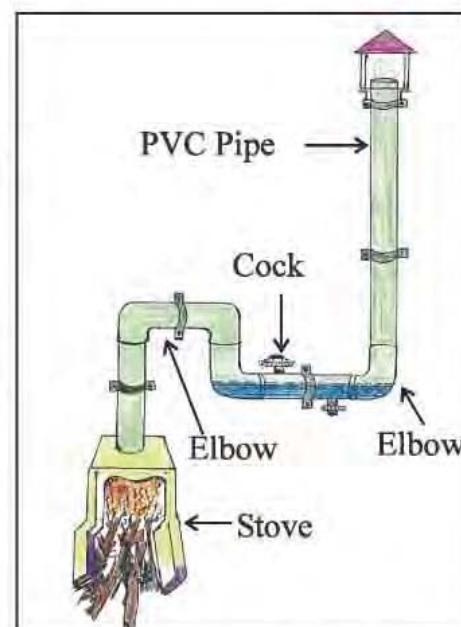


**What is required?** PVC pipe with 2 inch diameter, 4 elbows of same size, two corks,

**What to do?**

- Arrange the pieces of pipe as shown in the figure.
- Make two holes in the middle pipe and shut them with the help of corks.
- Fill the pipe with water from the upper hole.
- Put this structure above the stove from where the smoke arises. Here the carbon particles will remain in the water and purified smoke will come upward.
- Change water at certain intervals.
- You can make smokeless stove in this way.

Raju and Riaz discussed about control of pollution. They decided to grow trees in their school and then Raju went back to his village.



**Figure 10.10**





**PPM (Parts Per Million) is a unit to measure air pollution.**

Pollution control board is operative at the state level as well as at the national level to observe the rules regarding pollution. Gujarat pollution control board is situated at Environment Bhavan, Sector 10 A Gandhinagar.



**Q.1** How do the trees help us to control air pollution?

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**Q.2** Why should factories and mills be built away from residential area?

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**Q.3** What will you do to reduce air pollution ? Note down.

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