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THE PROTECTIVE COVER OF THE EARTH



Haven't you had such experiences? What are the difficulties you experience in such instances?

Smoke gets mixed up with air when litter burns. This causes uneasiness to us.

You know that air is a mixture of many substances. Which of these substances are known to you?

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Atmosphere

The components of air and its quantity:

Nitrogen	- 78%
Oxygen	- 21%
Argon	- 0.9%
Carbon dioxide	- 0.03%

Apart from these, Earth's atmosphere comprises of small quantities of water vapour, gases like helium, neon, krypton and a very small quantity of ozone.

On the outer side of a beaker

Put an ice cube in a dry and clean beaker. Examine its outer side after some time. What do you see?

Which component present in air causes this?

Polluted Air

When litter is burnt certain gases, minute particles of charred remains and cinder get mixed in air. Inhaling this air will cause uneasiness. Similarly, what other components that get mixed in air and pollute it?

- while spraying pesticides
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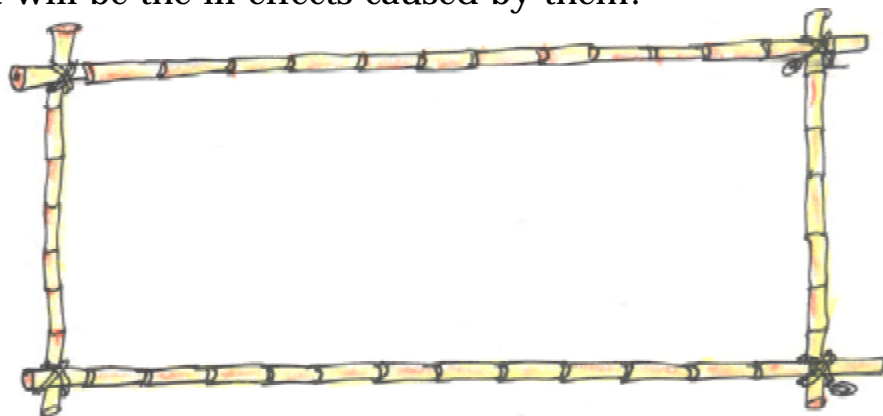
The instances by which air gets polluted by certain human activities have been discussed. This causes problems not only to man but to all living things and even to Earth.

Similarly, when the proportion of some of the natural components of air increases the structure of atmosphere is adversely affected.

Take a look at the instances given below.

- Factories emit carbon dioxide in large scale due to the use of petroleum and coal.
- Excessive deforestation results in decreasing the plant wealth on Earth.

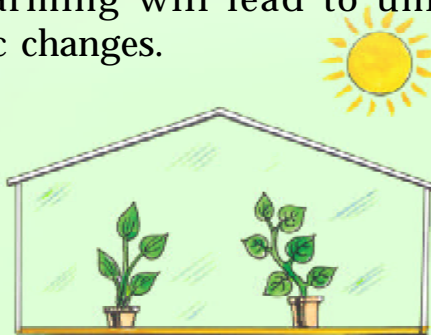
What will be the ill-effects caused by them?



Greenhouse Effect

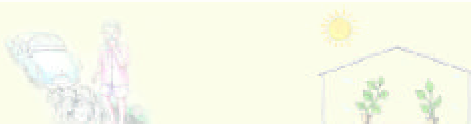
Greenhouse is a construct used in cold countries for growing tropical plants. The walls and roof of this construct are made of glass. Glass allows light to pass through it. So the interior of the house will be hot with the rays of the sun. You may have experienced heat rays radiating from hot objects. Heat rays can't go out through glass. Hence the heat energy from the rays of the sun gets trapped inside. Gradually heat increases in the interior and the plants get an atmosphere similar to that of the tropical regions. This is called greenhouse effect.

Like glass, certain gases like carbon dioxide and methane allow light rays to pass through but prevent heat rays from going out. These gases are called greenhouse gases. It is because of the presence of these gases that heat exists in Earth's atmosphere. But if the amount of these gases increases the temperature of Earth's atmosphere will also increase. This phenomenon is called global warming. Global warming will lead to unforeseen natural calamities and climatic changes.



Apart from life sustaining activities like respiration, what other human activities are responsible for increasing the amount of carbon dioxide in earth's atmosphere?

Like carbon dioxide, many other gases reach earth's atmosphere from factories and houses. This also affects the structure of earth's atmosphere.



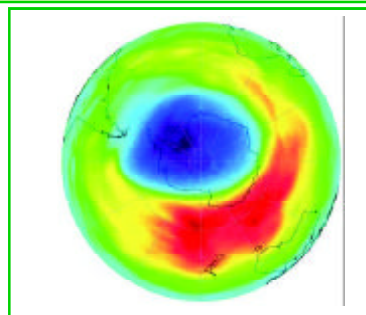
Ozone Depletion

Ozone is seen in traces in earth's atmosphere. This gas is largely found at a height of about 20 to 25 kilometres in the atmosphere. Ozone layer absorbs harmful ultra violet rays emitted by the Sun. Thus it prevents ultraviolet rays from reaching the Earth and protects the Earth. But when Chloro Fluro Carbons (CFCs) and the oxides of nitrogen reach the upper layer of earth's atmosphere, it causes the depletion of the ozone layer. Chlorine formed by the dissociation of CFCs destroys the ozone layer. CFCs are used in refrigerators, air conditioners and perfumes. Nowadays, comparatively less harmful gases are being used in refrigerators and air conditioners instead of CFCs. We observe September 16 as World Ozone Day to make people aware of the importance of ozone layer and the problems caused by ozone depletion.

Ozone Day observation in my school

What are the activities you can do in your school as the part of Ozone day celebrations?

- Preparation of pamphlets
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*Ozone is our
protective
cover.
Preserve it for
tomorrow.*

Plan your activities with the help of your friends.

Raising dust...

Haven't you come across some of the environmental issues caused by air pollution? Will this affect our health?



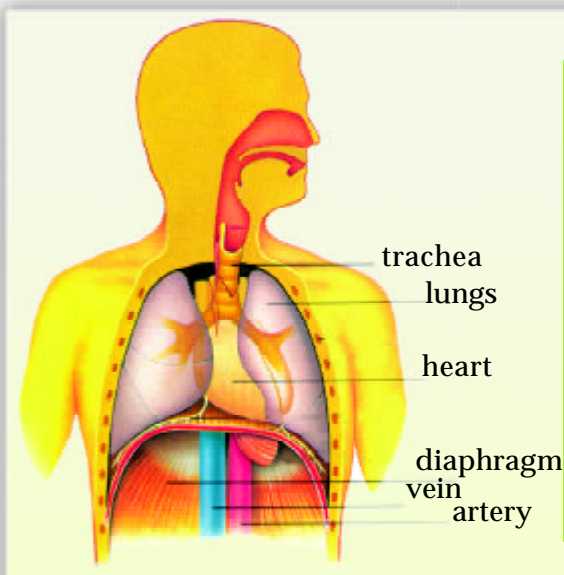
Find out similar instances when you feel difficulty in breathing.

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When you breathe polluted air, impurities will also get into the respiratory organs. This affects our respiratory organs adversely. What are the organs that take part in respiration?

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Respiratory System



Respiration

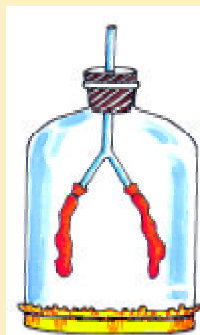
The air that gets into our nose passes through trachea and reaches the alveoli. The oxygen in the air mixes with blood vessels and carbon dioxide in the blood mixes with air. This air is exhaled by the lungs. Our body makes use of only a small amount of oxygen in the air we inhale.

Let's make a model of lungs

How do lungs contract and expand when we exhale and inhale air? Examine this by constructing a model of lungs.

What changes do you notice in the balloons tied to the hands of the Y-tube?

Method of construction



Cut a plastic bottle at its middle and make a hole on its lid and insert a Y-tube as shown in the picture. Tie two balloons on both the hands of the Y- tube. Cover the open end of the bottle air tight using a piece of balloon. Now gently pull the middle of the balloon downwards.

Describe how air gets in and out of the lungs by observing the figure of the respiratory system and by the experiments you have done.

If You Come Running...

Do the speed of respiration always the same?

Count how many times you breathe normally in a minute. Examine the rate of respiration after running in the ground for two or three minutes. Do you find any difference?

Rate of respiration (in a minute)

Before running	After running

Can you tell some other instances when you have to breathe at a faster rate?

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-
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Panting

Oxygen is essential for the production of energy for bodily activities. For more arduous work, more energy is needed. Then we breathe fast.

Inhalation and Exhalation

Components	inhaled air	exhaled air
Oxygen	21 %	18 %
Nitrogen	78 %	78 %
Carbon dioxide	0.04 %	3 %
Water content	less	more

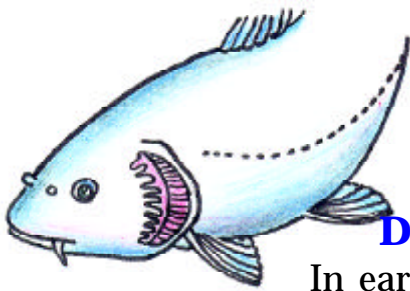
- Why is the amount of carbon dioxide more in exhaled air?
- Why is the amount of oxygen less in exhaled air?
- Which component remains the same in both the inhaled and exhaled air? Why?



Record your findings in your science diary after examining the table.



Do all living beings breathe in the same manner?



Different kinds of respiration

In earthworm gas exchange takes place through its skin. Fish breathe through gills. Frogs respire through skin when in water and they respire through lungs when on land. Book lungs are the respiratory organs of spiders.



When one smokes

Our lungs are very delicate. It is very essential to protect them. Our body has all the mechanisms to protect them. The hairs in the nasal tract filter the dust in the air we take in. Breathing dusty air and polluted air cause various health problems.

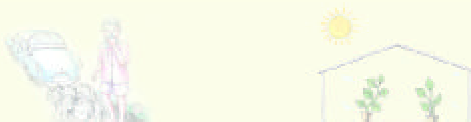


Smoking banned in public places

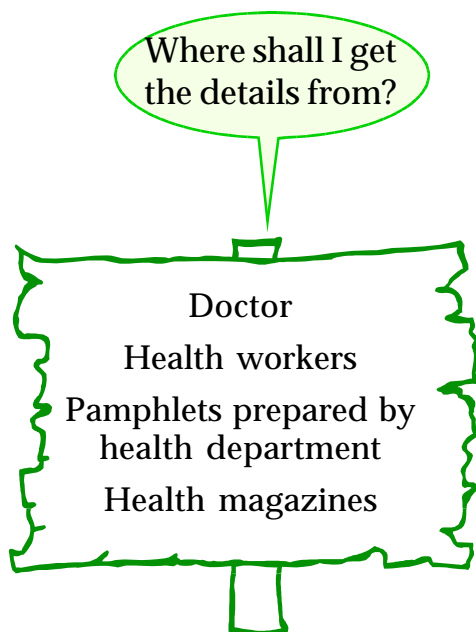
Tvpm: Government have issued orders banning smoking in public places like bus stand, hospitals, railway stations etc.

What is the need for banning smoking in public places?

What are the health problems caused by smoking?



Collect details regarding the ill-effects of smoking and breathing polluted air.



Nicotine

Tobacco contains a chemical substance called nicotine. It has an unpleasant smell. As nicotine stimulates the nervous system those who smoke get a temporary stimulation. But nicotine can harm the functioning of the lungs and the entire nervous system. Constant use of tobacco can cause cancer. Tobacco decoction has been used as a pesticide. Isn't this a clear evidence of the fact that tobacco contains poisonous substances?

Our air

Aren't we ourselves responsible for polluting the air? The increasing number of motor vehicles in our cities results in large scale pollution of air. Traffic officials use masks to avoid solid waste from the air they breathe. If we can't control air pollution there will be a situation when we may not have fresh air to breathe.

Are there instances of air pollution in your locality?

What can we do to check air pollution?

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Plan and execute activities to keep the air in the school and surroundings free from pollutants.

