

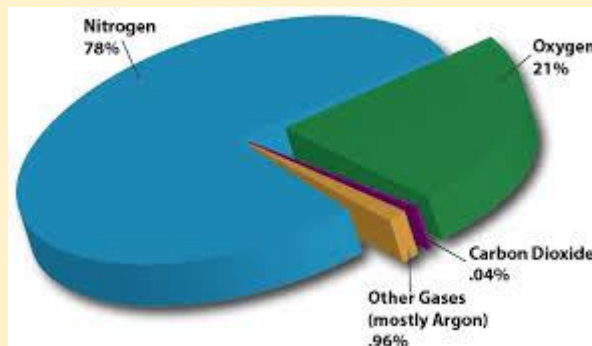
Chapter-14 : Natural resources

Resources on the earth : The natural resources of the earth are air, water, soil, minerals and living organisms.



- The outer crust of the earth is the lithosphere. The water on the earth is the hydrosphere. The layer of the air around the earth is the atmosphere. Living organisms are found where the atmosphere, hydrosphere and lithosphere interact and is the biosphere.

Air (Atmosphere) : Air is a mixture of gases like nitrogen, oxygen, carbon dioxide, water vapour and other gases.



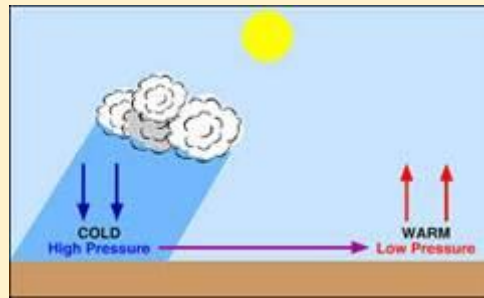
- During respiration living organisms use oxygen to break down glucose and get energy for their activities. This results in the release of carbon dioxide. Burning of fuels also use oxygen and release carbon dioxide.
- During photosynthesis green plants convert carbon dioxide into glucose in the presence of sunlight. This results in the release of oxygen.
- These processes help to maintain the oxygen - carbon dioxide balance in nature.

The role of atmosphere in climate control : The atmosphere covers the earth like a blanket. Air is a bad conductor of heat. It prevents sudden increase in temperature during the day and also slows down the escape of heat during the

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night. So, the atmosphere keeps the average temperature of the earth fairly steady during the day and throughout the year.



The movement of air (Winds) : When air gets heated, it rises up and produces low pressure and cool air moves in to take its place. The movement of air causes winds.



- During the day, the land gets heated faster than the sea. So, the hot air above the land rises up and cool air from the sea moves towards the land. During the night, sea cools down slowly than the land. So, the hot air above the sea rises up and cool air from the land moves towards the sea.

Rain : When water bodies are heated during the day, a large amount of water evaporates and rises up. Some water vapour also gets into the atmosphere due to biological activities like transpiration. As the water vapour rises, it cools and condenses to form tiny droplets of water. This appears as clouds. When the tiny droplets of water join together to form bigger drops of water, they fall down as rain, snow or hail.



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Air pollution : The increase in the content of harmful substances in the air is called air pollution.



- Fossil fuels like coal and petroleum contain small amounts of nitrogen and sulphur. When these fuels are burnt, it releases oxides of sulphur and nitrogen. These oxides dissolve in rain and causes acid rain.
- Burning of fossil fuels also release unburnt carbon particles which reduces visibility. During cold weather along with condensed water it forms smog.
- Regular breathing air containing these harmful substances causes allergies, cancer, heart diseases etc.

Water (A wonder liquid) : A very large area of the earth's surface is covered with water. Water is also found inside the earth, in the atmosphere as water vapour. The water in seas and oceans is saline. Fresh water is found in rivers, lakes, ponds and as ice and snow at the poles and mountains in cold regions.



- Water is needed by living organisms because all life processes and cellular activities need water. So, all organisms need water to survive.
- The amount of water and other factors like temperature and nature of soil decides the diversity of species and the number of individuals of each species in an area.

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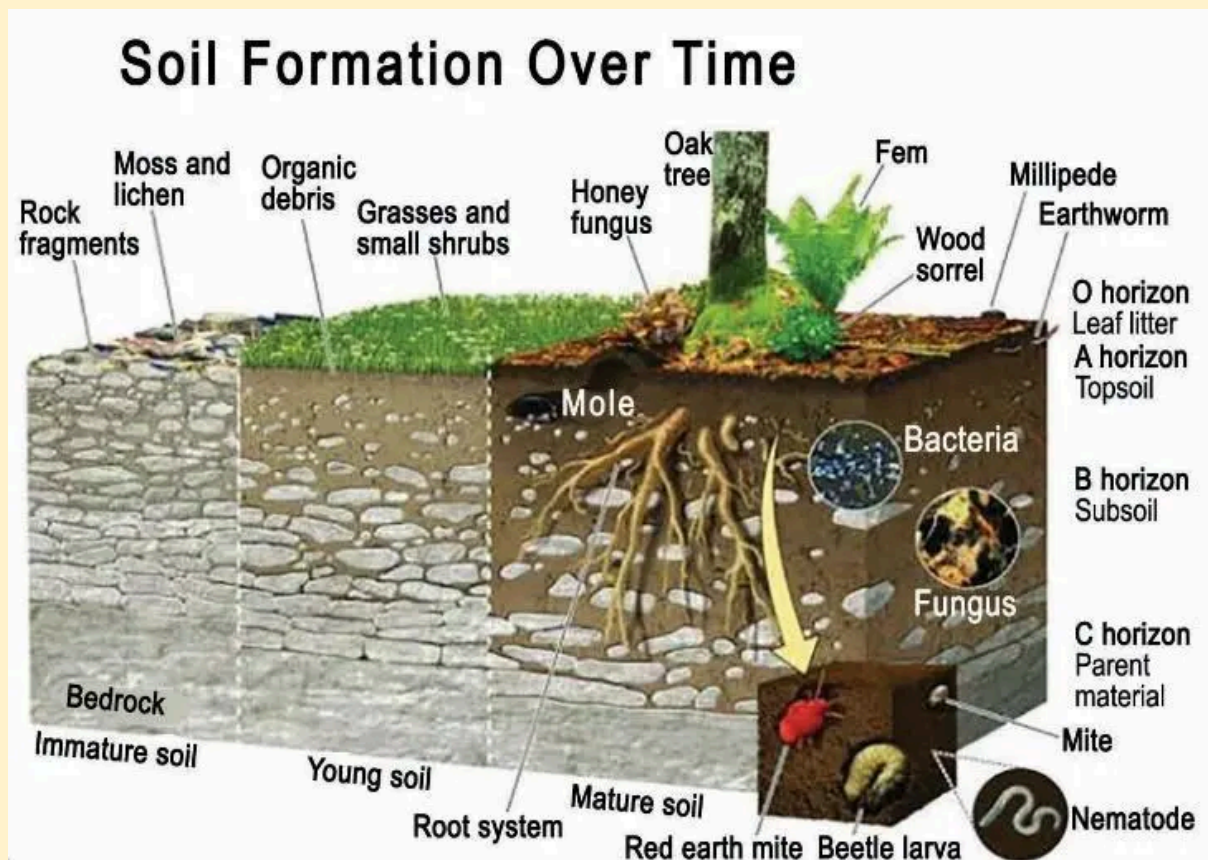
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Water pollution : The increase in the content of harmful substances in water is called water pollution.



- Water pollution is caused by addition of harmful substances like fertilizers and pesticides from farms; sewage from towns, cities and factories; harmful chemicals from factories; disease causing micro-organisms changes in the amount of oxygen dissolved in water or changes in the temperature of water.

Formation of soil : Soil is formed by the breaking down of rocks on the surface of the earth by physical, chemical and biological processes.



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- The sun heats the rocks during the day and the rocks expand and at night the rocks cool and contracts. This causes the rocks to crack and break into smaller pieces.
- Water enters the cracks in the rocks and when water freezes, it expands and causes the cracks in the rocks to widen and break into smaller pieces. The flowing water carries the rock pieces. These pieces rub against each other and become smaller and smaller particles.
- A strong wind also breaks rocks into smaller particles and carries it from one place to the other.
- The roots of large trees grow into the cracks in rocks and break it into smaller pieces. Lichens which grow on rocks produce some substance which cause the rock surface to powder and become soil.

Composition of soil : Soil is a mixture of rock particles, decayed organisms i.e. humus, living organisms, minerals, air and water. The amount of minerals, humus, air and water are the factors which decide the biodiversity in that area.

Soil pollution : The addition of harmful substances which affects the fertility of the soil and kills the diversity of organisms living in it is called soil pollution.

- Soil pollution is caused by the excessive use of fertilizers and pesticides. It kills the organisms like earthworms and bacteria which makes the soil rich in humus. The removal of useful components and addition of other harmful substances reduces the fertility of soil and causes soil pollution.



Soil erosion : The carrying away of soil from one place to the other by flowing water and wind is called soil pollution. Large scale deforestation also causes soil erosion.

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- Soil erosion can be reduced or prevented by vegetative cover on the ground, afforestation, construction of bunds, terraces, dams etc.

Activity for effect of flowing water on top soil : Take two trays of the same size and fill them with soil. We plant mustard or green gram in one of the trays. Water both the trays for a few days till the first tray is covered by plant growth. Tilt the both trays at the same angle. Pour equal amount of water gently on both the trays. We see that more soil is carried out of the tray which did not have plant growth. This shows that vegetative cover reduces soil erosion.



Biogeochemical cycles : Biogeochemical cycles are the transfer of matter and energy between the biotic and abiotic components of the biosphere.

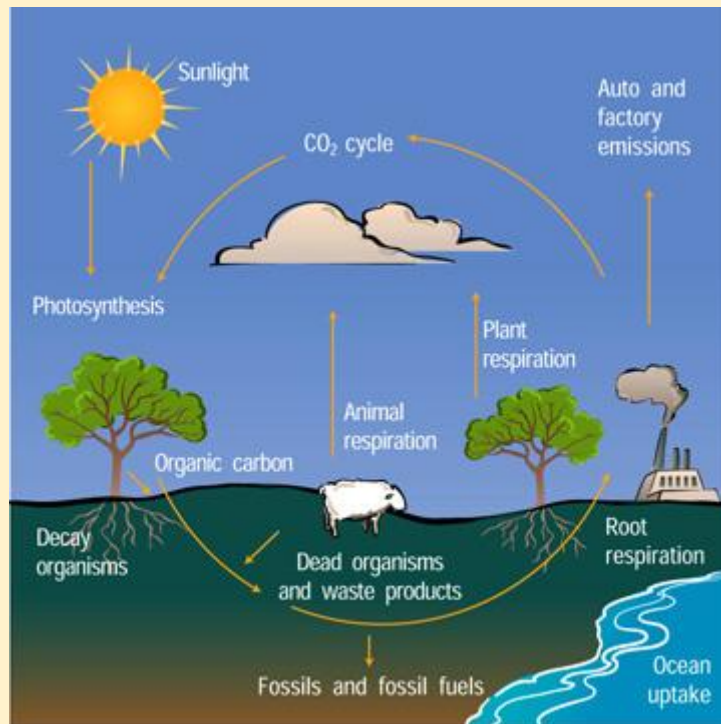
- The common biogeochemical cycles are Water cycle, Nitrogen cycle, Carbon cycle and Oxygen cycle.

Water cycle : When water bodies are heated during the day, a large amount of water evaporates and rises up. Some water vapour also gets into the atmosphere due to biological activities like transpiration and respiration. As the water vapour rises, it cools and condenses to form tiny droplets of water. This appears as clouds. When the tiny droplets of water join together to form bigger drops of water, they fall down as rain, snow or hail. Some of this water enters the

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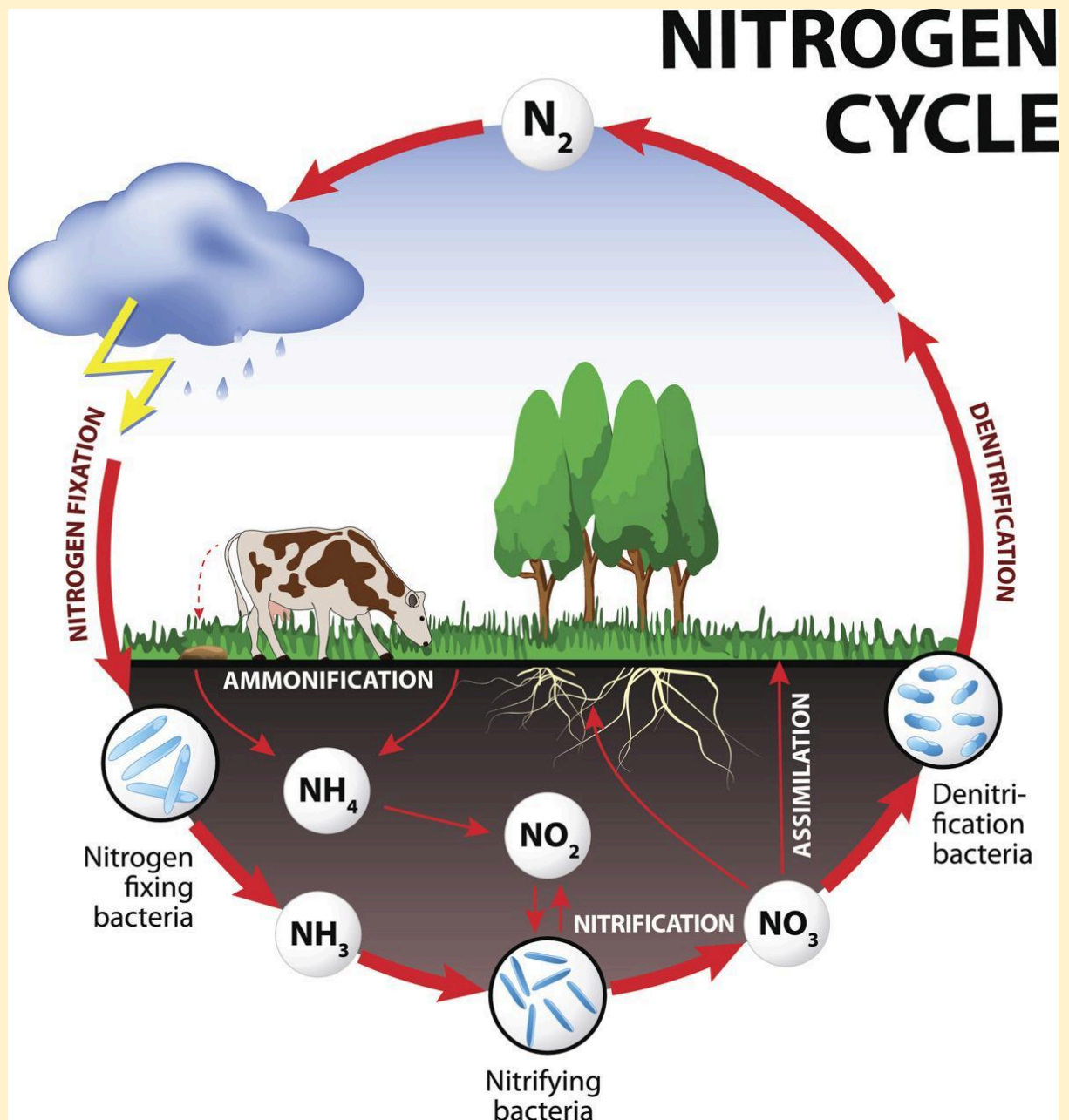
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ground and forms ground water. When water flows from the land to the seas it carries many nutrients and minerals which are used by marine organisms.



Nitrogen cycle : The nitrogen in the atmosphere is fixed into nitrogen compounds in the soil by nitrogen fixing bacteria in the root nodules of leguminous plants and also during lightning. These nitrogen compounds are taken by plants and used to make proteins. When animals eat plants they also get proteins. When plants and animals die, bacteria convert the proteins into nitrogen compounds like nitrites and nitrates. Other bacteria convert these nitrogen compounds back into nitrogen in the atmosphere.

- Nitrogen is an essential component of biological molecules like proteins, nucleic acids and some vitamins.



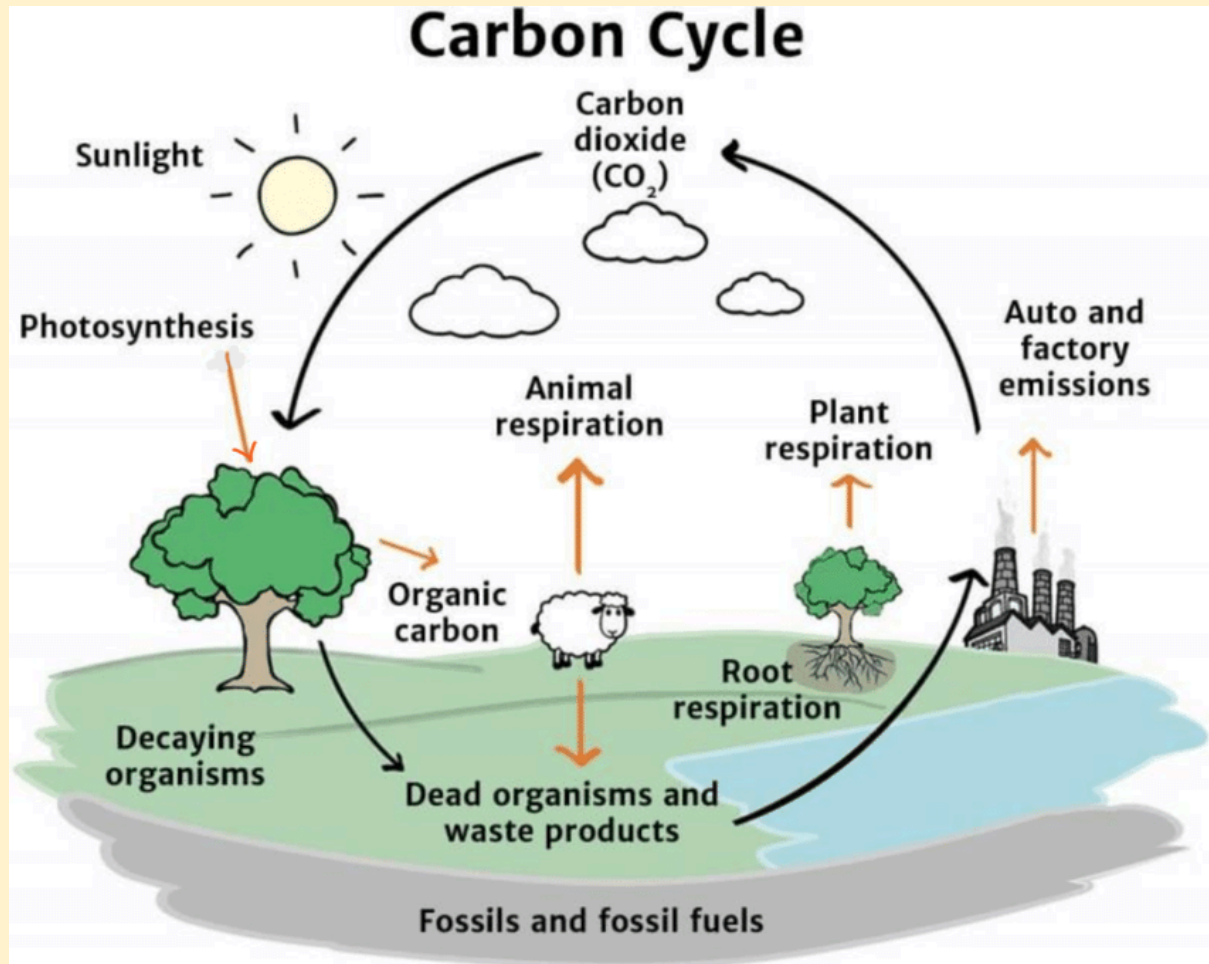
Carbon cycle : Carbon in the form of carbon dioxide is used by plants to prepare glucose by the process of photosynthesis. When animals eat plants then glucose enters the body of animals which is converted into other organic compounds and used in respiration process. During respiration, energy and carbon dioxide are produced. The carbon dioxide goes back into the atmosphere. Another process which adds carbon dioxide back into the atmosphere is the combustion of fuels like coal and petroleum. The organic

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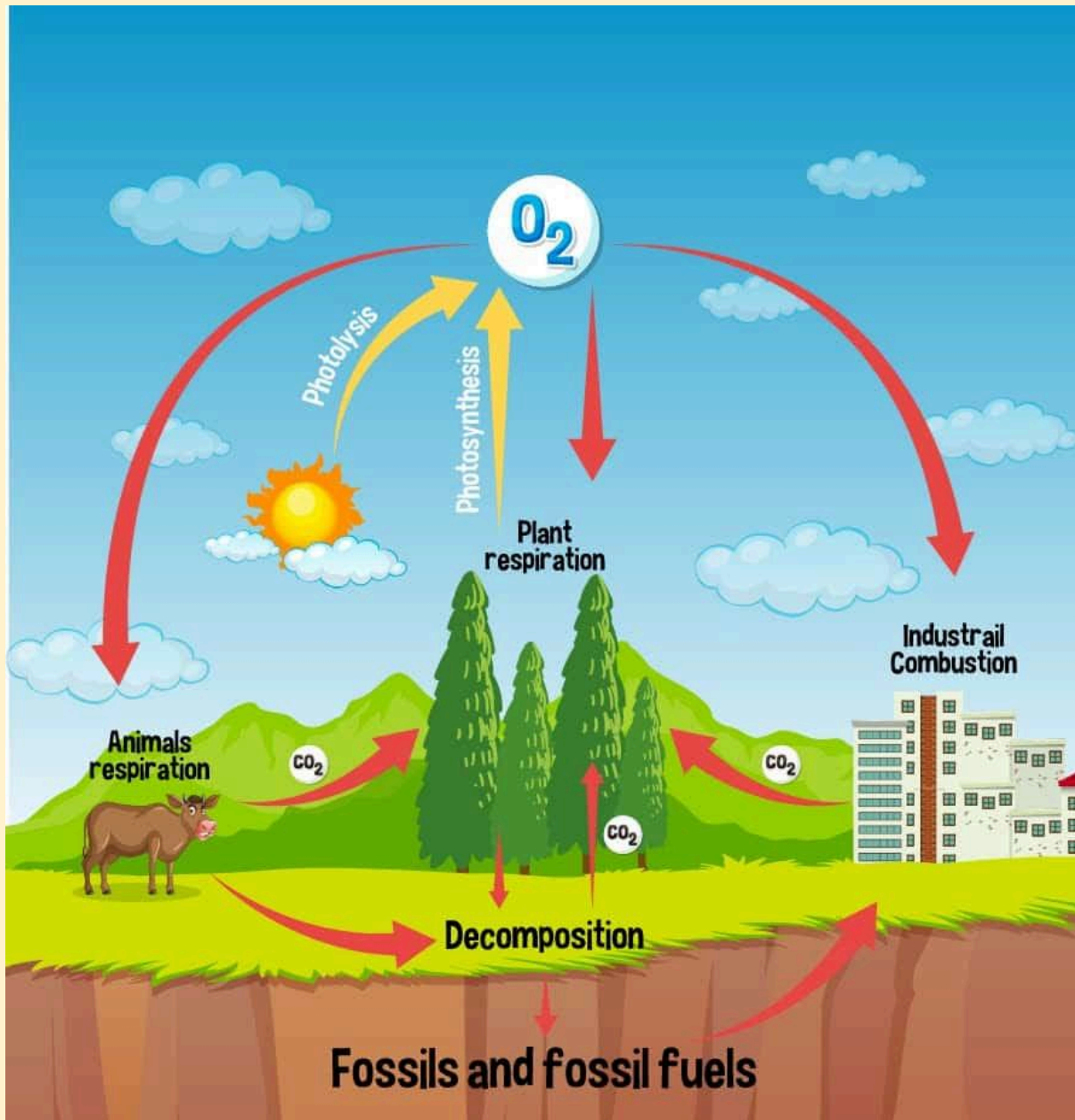
compound in plants and animals are also converted into carbonates, limestone, coal, petroleum, exoskeletons (shells) of some animals.

- Carbon is an essential component of biological molecules like carbohydrates, fats, proteins, vitamins, nucleic acids etc.



Oxygen cycle : Oxygen in the atmosphere is used for respiration, combustion and formation of oxide of elements. Oxygen is sent back into the atmosphere during photosynthesis.

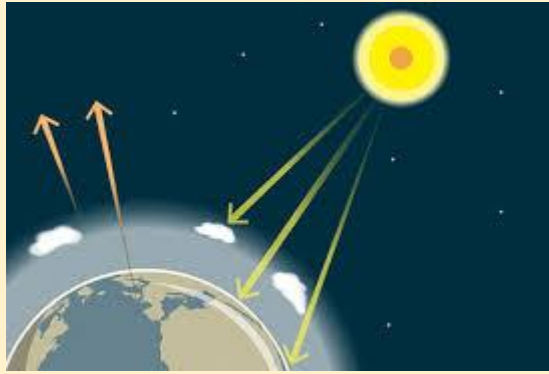
- Oxygen is an essential component of biological molecules like carbohydrates, fats and proteins.



The greenhouse effect : Gases like carbon dioxide, methane, chlorofluorocarbon (CFCs) traps the heat radiated by the earth and prevents the escape of heat from the earth. The increase in the presence of these gases in the atmosphere causes increase in the temperature of the atmosphere. This is called the greenhouse effect.

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- Greenhouse effect can cause melting of polar ice, increase in sea levels, flooding of coastal areas and submerging of islands.

Ozone layer : Ozone molecule contains three atoms of oxygen (O_3). It is present in the upper layers of the atmosphere. It is poisonous gas. It protects the earth from the harmful ultra-violet radiations from the sun which is harmful for living organisms.

- The ozone layer is being damaged by carbon compounds like chlorofluorocarbons (CFCs).
- To prevent the damage of the ozone layer, the use of CFCs is being reduced.

