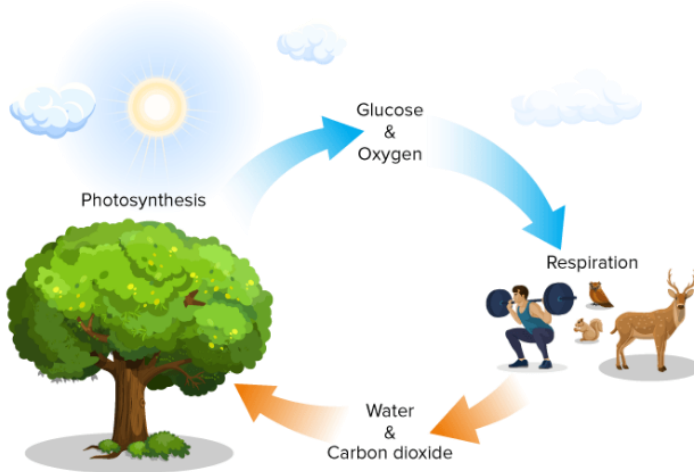


## Ecology

Ecology is the study of relationships between living organisms and their environment.



### Short Question

Define Ecology.

What is ecosystem?

Differentiate between biotic and abiotic components.

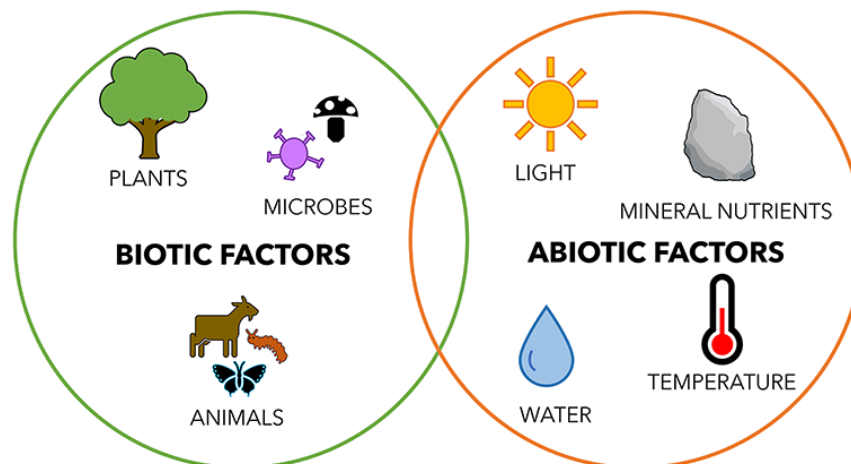
### Ecosystem:

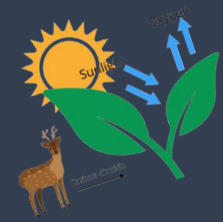
An ecosystem is a system of interaction and interdependence between biotic (living) and abiotic (non-living) components of the environment.

**Biotic components:** The living things of the environment are called biotic components.

**Abiotic components:** The non-living things of the environment are called abiotic components.

### Examples:





**Q. How carbon and oxygen cycles are helpful for the environment?**

**Carbon and Oxygen cycles:**

The carbon and oxygen cycles describe the continuous exchange and transformation of carbon dioxide and oxygen between living organisms, the atmosphere, and the Earth's surface. They bring balance and symmetry to life by ensuring a continuous exchange of gases critical for all living organisms.

**Related SLO**

**Students' Learning Outcomes**

Relate how oxygen and carbon cycles are complementary processes that bring balance and symmetry to life on Earth.

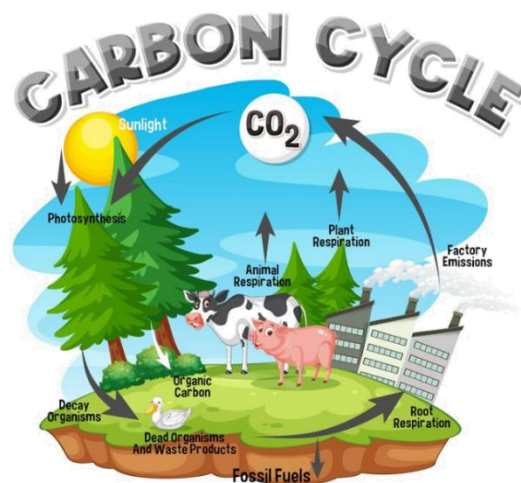
**Carbon Cycle:**

- Carbon is the foundation of all life on Earth.
- It is found in our atmosphere in the form of carbon dioxide.
- Plants prepare their food through photosynthesis, converting carbon dioxide and water into glucose and oxygen.
- During the decomposition and combustion of biomass (matter of dead bodies), the carbon in biomass is released into the atmosphere as carbon dioxide, and oxygen gas present in the atmosphere is used.

**Short Question**

How do plants prepare their food in the carbon cycle?

What happens with oxygen and carbon during decomposition and combustion of biomass?





**Oxygen Cycle:**

- The oxygen cycle maintains the level of oxygen in the atmosphere.
- During photosynthesis, plants release oxygen gas into the atmosphere.
- All animals and plants respire to obtain energy. During respiration, they take in oxygen from the atmosphere.
- During the decomposition and combustion of biomass, the oxygen gas present in the atmosphere is used.



**Short Questions**

2. Differentiate between carbon and oxygen cycle. (Exercise based)

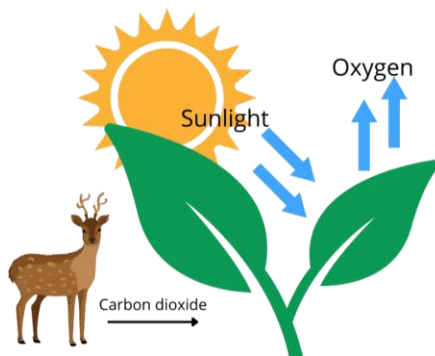
**Ans: Oxygen Cycle:** In oxygen cycle oxygen is used by animals to release CO<sub>2</sub>.

**Carbon Cycle:** In carbon Cycle carbon dioxide is absorbed by plants and oxygen is released.

3. How carbon dioxide is released to the atmosphere in oxygen cycle?

**Role of Living Things in Cycling Oxygen and Carbon:**

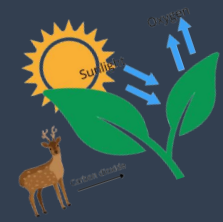
Living organisms play a crucial role in cycling oxygen and carbon through ecosystems.



**Related SLO**

**Students' Learning Outcomes**

Describe the role of living things in cycling oxygen and carbon through an ecosystem citing the processes of respiration and photosynthesis and combustion.

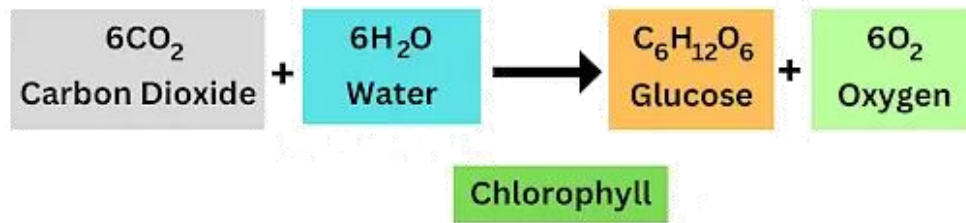


**Photosynthesis:**

Photosynthesis is the process through which plants, algae, and some bacteria make their own food using sunlight, carbon dioxide, and water to produce glucose and oxygen. This process releases oxygen into the atmosphere, which is essential for the survival of most living organisms.

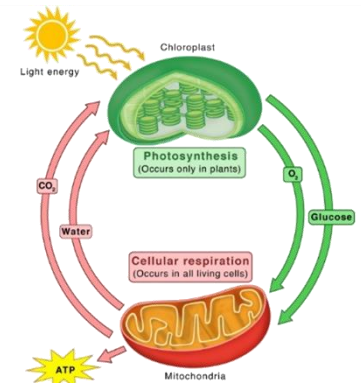
**Short Questions**

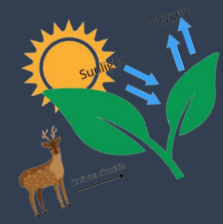
**3. How do plants prepare their food?**



**Respiration:**

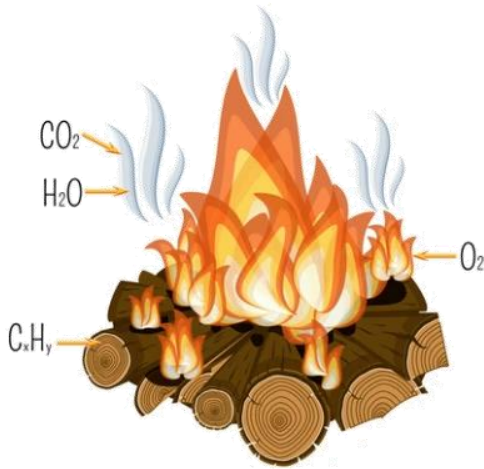
Respiration is the energy-releasing process in which both plants and animals use oxygen to break down glucose and other organic molecules to release energy. This process produces carbon dioxide as a byproduct, which is then released back into the atmosphere.





### Combustion:

Combustion is a burning process that occurs in the presence of oxygen. When organic matter such as wood or fossil fuels are burned, combustion releases carbon dioxide into the atmosphere. This carbon dioxide can be reabsorbed by plants during photosynthesis, completing the cycle.



### Short Questions

4. What happens with the carbon during the combustion of organic matter?

### Brain Teaser

**What are fossils and fossil fuels how are they important?**

**Fossils:** are the ancient remains of plants and animals that were present a long time ago.

**Fossil fuels:** Fossil fuels are energy sources like coal, oil, and natural gas formed from the ancient remains of plants and animals. The burning of fossil fuel releases poisonous substances.

**Importance:** Fossils help us understand Earth's history, while fossil fuels provide essential energy for daily life and industrial activities.



**Choose the right option**

1. \_\_\_\_\_ are two elements that are essential to life.

- (A) Nitrogen and oxygen    (B) Carbon and oxygen    (C) Carbon and nitrogen    (D) Phosphorus and carbon

**Reason:** Carbon and oxygen are fundamental elements for life. Carbon is a key component of all organic molecules, and oxygen is crucial for respiration in most organisms.

2. During \_\_\_\_\_ animals take in oxygen from the atmosphere and release carbon dioxide in the atmosphere.

- (A) Decomposition    (B) Combustion    (C) Photosynthesis    (D) Respiration

**Reason:** Respiration is the process where animals and other organisms take in oxygen and release carbon dioxide as a byproduct of metabolizing food to produce energy.

3. Plants prepare their food during

- (A) Decomposition    (B) Combustion    (C) Photosynthesis    (D) Respiration

**Reason:** Photosynthesis is the process by which plants use sunlight, carbon dioxide, and water to produce glucose (food) and oxygen.

4. \_\_\_\_\_ constantly circulate between the environment

- (A) Carbon and oxygen    (B) Carbon and phosphorus    (C) Oxygen and Sulphur    (D) Sulphur and phosphorus

**Reason:** Carbon and oxygen are part of the carbon and oxygen cycles, which involve their continuous exchange between the atmosphere, living organisms, and other Earth systems.

5. Plants produce \_\_\_\_\_ during photosynthesis.

- (A) Coal    (B) Food    (C) Fossil fuel    (D) Energy

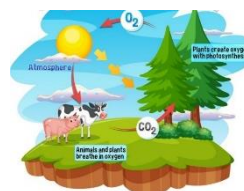
**Reason:** During photosynthesis, plants produce glucose (a form of food) as they convert solar energy into chemical energy.

6. The burning of fossil fuel releases \_\_\_\_\_ in the air.

- (A) Oil    (B) Carbon dioxide    (C) Oxygen    (D) Poisonous substances

**Reason:** Combustion of fossil fuels releases carbon dioxide, a greenhouse gas, contributing to global warming and air pollution.

7. The figure demonstrates which cycle?



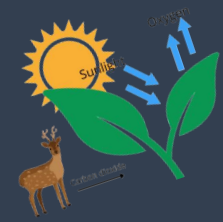
- (A) Oxygen cycle    (B) Carbon cycle    (C) Nitrogen cycle    (D) Water cycle

**Reason:** Oxygen cycle involves processes such as photosynthesis (where plants release oxygen), respiration (where organisms consume oxygen), and the formation and breakdown of minerals.

8. Decomposition and combustion of biomass produces:

- (A) Carbon dioxide    (B) Oxygen gas    (C) Oxides of nitrogen    (D) Oxides of Sulphur





**Reason:** Both decomposition and combustion of organic matter (biomass) release carbon dioxide into the atmosphere as a result of breaking down carbon-containing compounds.

**9. Biotic components of environment are:**

- Ⓐ Animals                      Ⓑ Air                      Ⓒ Water                      Ⓓ Temperature

**Reason:** Animals are living organisms, which makes them part of the biotic components of an environment. The other options—air, water, and temperature—are non-living (abiotic) factors.

**10. During photosynthesis plants take in carbon in the form of:**

- Ⓐ Carbon dioxide              Ⓑ Nitrogen              Ⓒ Oxygen              Ⓓ Hydrogen

**Reason:** Plants absorb carbon dioxide (CO<sub>2</sub>) from the air during photosynthesis. This carbon is used to produce glucose (food) and oxygen.

**11. Which gas is released by plants during photosynthesis?**

- Ⓐ Nitrogen                      Ⓑ Carbon monoxide              Ⓒ Oxygen                      Ⓓ Carbon dioxide

**Reason:** During photosynthesis, plants convert carbon dioxide and water into glucose and release oxygen (O<sub>2</sub>) as a byproduct.

**12. Which gas is used during combustion?**

- Ⓐ Helium                      Ⓑ Argon                      Ⓒ Oxygen                      Ⓓ Neon

**Reason:** Oxygen is essential for combustion, as it reacts with fuels to produce energy, heat, and light.

**13. Which one of the following is the abiotic component of an ecosystem?**

- Ⓐ Sun                      Ⓑ Plants                      Ⓒ Animals                      Ⓓ Humans

**Reason:** The sun is an abiotic (non-living) component of an ecosystem, providing energy necessary for processes like photosynthesis. Plants, animals, and humans are biotic (living) components.

**14. The study of relationship between biotic and abiotic components of environment is called:**

- Ⓐ Biology                      Ⓑ Ecology                      Ⓒ Cell biology                      Ⓓ Anatomy

**Reason:** Ecology is the branch of biology that specifically examines how organisms interact with each other and with their physical surroundings, including factors like climate, soil, and water.