**Microorganisms**

**Microorganism:** An organism which cannot be seen by naked eyes is called microorganism or microbe. We need a microscope to see a microbe.

**Types of Microorganisms**

1. **Bacteria:** Bacteria are microscopic organisms which have cell walls but do not have nucleus. Some bacteria are autotrophs but most are heterotrophs. Bacteria are found in different shapes; like rod-shaped, spiral, spherical and comma-shaped. Examples: Rhizobium, E. coli, Pseudomonas, Streptococcus, etc.
2. **Algae:** Algae are green plants which are simple in structure. A cell of algae contains cell wall and chloroplast. Algae are autotrophs. Some algae are microscopic. Examples: Chlamydomonas, Spirogyra, etc.
3. **Fungi:** Fungi have cell wall and nucleus in their cells but do not have chloroplast. Fungi are saprotrophs, i.e. they feed on dead remains of plants and animals. Almost all fungi are microscopic, except mushrooms. Examples: yeast, Rhizopus (bread mould), Aspergillus, Penicillium, etc.
4. **Protozoa:** Protozoa do not have cell wall and chloroplast but they do have nucleus. Amoeba and Plasmodium are examples of protozoa.

**Virus:** Viruses are also microscopic but they are not considered as living beings. They are considered as a borderline case between living and non-living. A virus behaves as non-living when it is outside a host cell, i.e. a virus does not carry on nutrition, respiration or reproduction when it is outside a host. But once it is inside a host, it behaves like a living being, i.e. it carries on nutrition, respiration and reproduction when it is inside a host. Examples: HIV, Tobacco Mosaic Virus (TMV), etc.

**Habitat of Microorganisms:** Microorganisms live almost everywhere on the earth. They are found on land, water and in air. They are even found inside and on our body. Some microbes are even found in extremely harsh conditions, e.g. in the crater of volcano and in sulphur springs.

### Friendly Microorganisms

* Lactobacillus is an example of bacteria. Lactobacillus facilitates conversion of milk into curd.
* Yeast causes fermentation of many food items. The process by which sugar solution changes into alcohol due to anaerobic respiration by microbes is called fermentation.
* When yeast is added to batter of cake, idli or pakora, there is production of carbon dioxide due to respiration by yeast. Carbon dioxide gas creates bubbles in dough or batter which makes fluffy cakes, breads, idli and dosa.
* Fermentation also helps in production of alcohol from fruit juice, sugar cane juice or from cereals. This process is utilized to make wine, beer and other alcohol products.

#### Antibiotic

**Antibiotic:** A substance which kills or stops the growth of bacteria is called antibiotic.

Alexander Fleming discovered the antibiotic Penicillin in 1929. During one of his experiments; Alexander Fleming observed that bacteria did not grow on culture where a fungus (Penicillum notatum) was present. Thus, penicillin was prepared from a fungus Penicillium. Penicillin made it possible to treat many difficult diseases. Most of the modern antibiotics are derivatives of penicillin, e.g. amoxicillin, cefotaxime, cefoperazone, cefuroxime, ceftazidime, etc. Some other examples of antibiotics are; tetracycline, norfloxacin, ciprofloxacin, doxycycline, etc.

### Vaccine

Our body has the ability to fight diseases. The defence-mechanism of our body produces antibodies to fight a disease-causing microbe which may enter our body. While doing so, our body remembers to fight any future onslaught of that microbe. This concept was utilized to make vaccines against various diseases.

A vaccine made by a weak or killed strain of a disease-causing microbe. When a vaccine is inoculated in the body, the body prepares antibodies against it. Thus, the body learns and remembers how to fight with that microbe in future. Thus, vaccination helps in preventing against a particular disease.

Edward Jenner discovered small pox vaccine in 1798. He observed that people who were rearing cows did not suffer from small pox. That observation led to the discovery of small pox vaccine.

Vaccines are now available for many diseases; like small pox, tuberculosis, polio, tetanus, diphtheria, whooping cough, hepatitis, etc.

### Pulse Polio:

**Polio:** Polio is a viral disease which damages the nerves in spine. This results in weak muscles and paralysis; especially in legs. Polio is also called infantile paralysis. Polio vaccine can prevent this disease.

Pulse Polio is a large scale programme to eradicate polio from India. This programme is being run by the United Nations; in coordination with the Government of India. All children under five years of age are given polio drops; under this programme. Pulse Polio has been highly successful against eradication of polio.

**Increasing Soil Fertility:** Blue-green algae fix atmospheric nitrogen in soil. Rhizobium bacteria live in root nodules of leguminous plants. These bacteria also help in nitrogen fixation in soil. Thus, these microbes help in improving soil fertility.

**Cleaning the Environment:** Many microbes feed on dead remains of plants and animals. Thus, these microbes play the role of decomposers. Thus, microbes help in clearing organic waste from our surroundings. Dead cattle, waste from meat and fish shop, waste from vegetable market, etc. are decomposed because of microbes.

**Microorganisms**

**Harmful Microorganisms**

**Communicable Disease:** A disease which can spread from one person to another is called communicable disease.

**Infectious Disease:** A disease which is caused by an attack from microbes is called infectious disease.

**Pathogen:** A microbe which causes disease is called a pathogen. Some examples of pathogens are as follows:

|  |  |  |
| --- | --- | --- |
| **Pathogen** | **Disease** | **Mode of Transmission** |
| Plasmodium | Malaria | Spreads through bite of female Anopheles mosquito. |
| Dengue virus | Dengue | Spreads through bite of Aedes mosquito. |
| Common cold virus | Common cold | Through air; when someone coughs or sneezes. |
| Many bacteria | Cholera, diarrhoea | Through contaminated food and water. |
| Hepatitis B virus | Hepatitis B | Through exchange body fluids. |
| HIV | AIDS | Through exchange of body fluids. |
| Bacillus anthracis | Anthrax (in animals) | Through contact. |

#### How to prevent Malaria and Dengue:

* Malaria and dengue spread through mosquitoes. So, breeding of mosquito should be prevented.
* Don’t allow water to stagnate in surroundings because mosquitoes lay eggs in stagnant water.
* Frequently clean the water in cooler.
* Keep the overhead tank covered.
* Keep the drains properly covered.
* Fill any ditch with sand or soil.
* Use mosquito repellant creams and mosquito nets to prevent mosquito bite.

|  |  |  |
| --- | --- | --- |
| **Diseases caused by microbes in plants** | | |
| **Microbes** | **Disease** | **Mode of transmission** |
| Bacteria | Citrus canker | Air |
| Fungi | Rust of wheat | Air, seeds |
| Virus | Yellow vein mosaic of Okra | Insects |

**Food Poisoning:** Some bacteria produce a toxic substance in food. Consuming a food item with toxic substance can result in food poisoning. Food poisoning is a serious case and needs immediate hospitalization. Lack of timely care in case of food poisoning may prove fatal.

## Food Preservation

Techniques to prolong the shelf life of a food are called food preservation. We know that microbes proliferate very fast in presence of food, moisture, oxygen and ambient temperature. All the methods of food preservation are aimed at ruling out the food, moisture, oxygen and ambient temperature for microbes so that they won’t proliferate. Some common methods of food preservation are as follows:

**Sun Drying:** This is a traditional method of food preservation. Sun-drying helps in removing moisture from food. Grains are dried in sun before being stored. Many vegetables are also sun-dried so that they can be used in off season.

**Chemical Method:** Some chemicals prevent the growth of microorganisms in food. These chemicals are used in pickles and jams to preserve them. Salt, acids and oil are also used as food preservatives. Examples: sodium benzoate and sodium metabisulphate.

**Preservation by common salt:** When a food item is kept in plenty of salt, water from food comes out because of osmosis. It results in dehydration of the food item. Absence of moisture helps to prevent the growth of microbes. Fish, meat and pickles are preserved by adding salt.

**Preservation by Sugar:** Sugar preserves food by reducing moisture in food. Jam, jelly and squash are preserved by adding sugar.

**Preservation by Oil and Vinegar:** The layer of oil on top of food prevents oxygen from entering the food. Some microbes do not survive in absence of oxygen. Some microbes cannot survive in acidic environment and thus vinegar is an effective food preservative.

**Heat and Cold Treatment:** Most of the organisms can survive within a particular range of temperature. When the temperature becomes too low or too high, organisms cannot survive. Heating a food item or freezing a food items thus helps in preservation. In most of the households, milk is boiled twice or thrice in a day to prolong its shelf life. Milk is pasteurized before being packed. Pasteurization involves heating the milk to 70°C for about 15 to 30 minutes and is then quickly cooling down the milk. Pasteurization helps in killing the microbes which may be present in milk.Most of the organisms can survive within a particular range of temperature. When the temperature becomes too low or too high, organisms cannot survive. Heating a food item or freezing a food items thus helps in preservation. In most of the households, milk is boiled twice or thrice in a day to prolong its shelf life. Milk is pasteurized before being packed. Pasteurization involves heating the milk to 70°C for about 15 to 30 minutes and is then quickly cooling down the milk. Pasteurization helps in killing the microbes which may be present in milk.

**Storage and Packing:** Some food items are stored in air-tight packets so that oxygen is not available for proliferation of microbes. Some food items are packed in cans; along with some preservatives. Oily food; such as potato chips; is packed in air-tight packets which are filled with nitrogen gas. Nitrogen gas prevents the oily food from becoming rancid.

**Nitrogen Fixation**

You may have read that 78% of atmosphere is composed of nitrogen. But green plants cannot utilize gaseous nitrogen. Gaseous nitrogen needs to be converted into compounds of nitrogen so that plants can utilize nitrogen. The process of converting nitrogen into compounds which can be taken up by green plants is called nitrogen fixation. Following are the main steps of nitrogen fixation:

* Blue green algae and some bacteria (like Rhizobium) convert gaseous nitrogen into compounds of nitrogen. Such nitrogenous compounds get deposited in soil.
* During lighting, some of the nitrogen in atmosphere gets converted into compounds of nitrogen. Such nitrogenous compounds reach the soil along with rainwater.
* Green plants absorb nitrogenous compounds from soil. Plants make protein and various other important molecules from nitrogen. Nitrogen reaches the body of other organisms through food chain.
* A major portion of nitrogen from animals and plants is removed during excretion. Remaining portion of nitrogen is sent back to the environment when dead animals and plants get decomposed.

**Nitrogen Cycle:** The cycle of events by which nitrogen is channelized into the living world and back to atmosphere is called nitrogen cycle.

## NCERT Solution

##### Fill in the blanks:

1. Microorganisms can be seen with the help of a \_\_\_\_\_\_\_\_\_\_\_\_.
2. Blue green algae fix \_\_\_\_\_\_\_\_\_\_ directly from air to enhance fertility of soil.
3. Alcohol is produced with the help of \_\_\_\_\_\_\_\_\_\_.
4. Cholera is caused by \_\_\_\_\_\_\_\_\_\_.

**Answer:** (a) microscope, (b) nitrogen, (c) yeast, (d) bacteria

##### Tick the correct answer:

Question 1: Yeast is used in the production of

1. Sugar
2. Alcohol
3. Hydrochloric acid
4. Oxygen  
     
   **Answer:** (b) Alcohol

Question 2: The following is an antibiotic

1. Sodium bicarbonate
2. Streptomycin
3. Alcohol
4. Yeast  
     
   **Answer:** (b) Streptomycin

Question 3: Carrier of malaria-causing protozoan is

1. female Anopheles mosquito
2. cockroach
3. housefly
4. butterfly  
     
   **Answer:** (a) Female Anopheles mosquito

Question 4: The most common carrier of communicable diseases is

1. ant
2. housefly
3. dragonfly
4. spider  
     
   **Answer:** (b) Housefly

Question 5: The bread or idli dough rises because of

1. heat
2. grinding
3. growth of yeast cells
4. kneading  
     
   **Answer:** (c) Growth of yeast cells

Question 6: The process of conversion of sugar into alcohol is called

1. nitrogen fixation
2. moulding
3. fermentation
4. infection  
     
   **Answer:** (c) Fermentation

##### Match the organisms in Column I with their action in Column II.

|  |  |
| --- | --- |
| **Column I** | **Column II** |
| (a) Bacteria | (1) Fixing nitrogen |
| (b) Rhizobium | (2) Setting of curd |
| (c) Lactobacillus | (3) Baking of bread |
| (d) Yeast | (4) Causing malaria |
| (e) A protozoan | (5) Causing cholera |
| (f) A virus | (6) Causing AIDS |
| (g) Producing antibodies |  |

**Answer:** (a) → 5, (b) → 1, (c) → 2, (d) → 3, (e) → 4, (f) → 6

##### Answer these question:

Question 1: Can microorganisms be seen with the naked eye? If not, how can they be seen?

**Answer:** Such organisms can be seen through microscope.

Question 2: What are the major groups of microorganisms?

**Answer:** The major groups of microorganisms are: bacteria, algae, fungi and protozoa

Question 3: Name the microorganisms which can fix atmospheric nitrogen in the soil.

**Answer:** Rhizobium, Blue-green algae

Question 4: Write 10 lines on the usefulness of microorganisms in our lives.

**Answer:** Usefulness of microorganisms:

* Lactobacillus helps in making curd from milk.
* Yeast helps in rising of dough and batter while making various food items.
* Yeast helps in fermentation and thus in production of wine.
* Antibiotics are made from microbes.
* Microbes help in cleaning the environment by decomposing dead remains of plants and animals.
* Microbes help in nitrogen fixation in soil.
* Some microbes in our digestive system help in digestion of food.
* Weak strains of some microbes are utilized to make vaccine against diseases.
* Microbes help in making of compost.
* Lactobacillus (present in curd) is beneficial for our health.

Question 5: Write a short paragraph on the harms caused by microorganisms.

**Answer:** Many microorganisms are harmful for us. Some microbes enter our body and cause diseases. Some of the infectious diseases can be highly debilitating in nature. Some microbes infect cattle and poultry and thus cause heavy loss to us. Some microbes damage the crops. Microbes also spoil our food. For example; fruits, vegetables, meat, fish, milk, etc. can easily get spoiled due to microbes.

Question 6: What are antibiotics? What precautions must be taken while taking antibiotics?

**Answer:** A substance which kills or stops the growth of bacteria is called antibiotic. Following precautions need to be taken while taking antibiotics:

* Always follow a doctor’s prescription while taking an antibiotic.
* Never take an antibiotic without consulting a doctor.
* Always complete the prescribed dose of antibiotic. Don’t stop taking an antibiotic in between.
* Keep antibiotics away from children.
* Never use an antibiotic which is past its expiry date.

# Microorganisms

## Extra Questions

#### Multiple Choice Questions

Question 1: Which microbe is used for production of alcohol?

1. Yeast
2. Plasmodium
3. Lactobacillus
4. Rhizobium  
     
   **Answer:** (a) Yeast

Question 2: How much nitrogen is present in the atmosphere?

1. 78%
2. 88%
3. 68%
4. 58%  
     
   **Answer:** (a) 78%

Question 3: Malaria is caused by which type of microbe?

1. Bacteria
2. Fungi
3. Algae
4. Protozoa  
     
   **Answer:** (d) Protozoa

Question 4: Common cold is caused by which type of microbe?

1. Bacteria
2. Virus
3. Algae
4. Fungi  
     
   **Answer:** (b) Virus

Question 5: Which of the following diseases is caused by a fungus?

1. Cholera
2. Common cold
3. Ringworm
4. Dengue  
     
   **Answer:** (c) Ringworm

Question 6: Which of the following helps in making curd from milk?

1. Lactobacillus
2. Plasmodium
3. Yeast
4. Salmonella  
     
   **Answer:** (a) Lactobacillus

Question 7: Antibiotics are effective against which of the following?

1. Bacteria
2. Fungi
3. Virus
4. All of the above  
     
   **Answer:** (a) Bacteria

Question 8: Penicillin was discovered by which scientist?

1. Edward Jenner
2. Louis Pasteur
3. Alexander Fleming
4. Robert Koch  
     
   **Answer:** (c) Alexander Fleming

#### Very Short Answer Type Questions

1. What are microorganisms?  
     
   **Answer:** Organisms which cannot be seen by naked eyes are called microorganisms or microbes.
2. What is an antibiotic?  
     
   **Answer:** A substance which kills or stops the growth of bacteria is called antibiotic.
3. What is fermentation?  
     
   **Answer:** The process of conversion of sugar into alcohol by yeast through anaerobic respiration is called fermentation.
4. What is Polio?  
     
   **Answer:** Polio is a disease which affects nerves and results in paralysis; especially of legs.
5. What is communicable disease?  
     
   **Answer:** A disease which can spread from one person to another is called communicable disease.
6. What is a pathogen?  
     
   **Answer:** A microorganism which causes disease is called a pathogen.
7. What is food preservation?  
     
   **Answer:** Use of some techniques to prolong the shelf life of a food is called food preservation.
8. What is nitrogen fixation?  
     
   **Answer:** The process of changing atmospheric nitrogen into compounds of nitrogen so that plants can take up nitrogen is is called nitrogen fixation.
9. What is nitrogen cycle?  
     
   **Answer:** The sequence of events by which nitrogen is channelized to the living world and back to atmosphere is called nitrogen cycle.

# Microorganisms

## Extra Questions

##### Short Answer Type Questions

Question 1: Write a short note on bacteria.

**Answer:** Bacteria are microscopic organisms which have cell walls but do not have nucleus. Some bacteria are autotrophs but most are heterotrophs. Bacteria are found in different shapes; like rod-shaped, spiral, spherical and comma-shaped. Examples: Rhizobium, E. coli, Pseudomonas, Streptococcus, etc.

Question 2: What are viruses?

**Answer:** Viruses are also microscopic but they are not considered as living beings. They are considered as a borderline case between living and non-living. A virus behaves as non-living when it is outside a host cell, i.e. a virus does not carry on nutrition, respiration or reproduction when it is outside a host. But once it is inside a host, it behaves like a living being, i.e. it carries on nutrition, respiration and reproduction when it is inside a host. Examples: HIV, Tobacco Mosaic Virus (TMV), etc.

Question 3: 3What is a vaccine? How does it work?

**Answer:** A vaccine made by a weak or killed strain of a disease-causing microbe. When a vaccine is inoculated in the body, the body prepares antibodies against it. Thus, the body learns and remembers how to fight with that microbe in future. Thus, vaccination helps in preventing against a particular disease.

Question 4: How do the microbes help in cleaning the environment?

**Answer:** Many microbes feed on dead remains of plants and animals. Thus, these microbes play the role of decomposers. Thus, microbes help in clearing organic waste from our surroundings. Dead cattle, waste from meat and fish shop, waste from vegetable market, etc. are decomposed because of microbes.

Question 5: What do you understand by food poisoning?

**Answer:** Some bacteria produce a toxic substance in food. Consuming a food item with toxic substance can result in food poisoning. Food poisoning is a serious case and needs immediate hospitalization. Lack of timely care in case of food poisoning may prove fatal.

Question 6: How does salt help in food preservation?

**Answer:** When a food item is kept in plenty of salt, water from food comes out because of osmosis. It results in dehydration of the food item. Absence of moisture helps to prevent the growth of microbes. Fish, meat and pickles are preserved by adding salt.

Question 7: What do you understand by pasteurization?

**Answer:** Pasteurization is a method of food preservation. Milk is pasteurized before being packed. Pasteurization involves heating the milk to 70°C for about 15 to 30 minutes and is then quickly cooling down the milk. Pasteurization helps in killing the microbes which may be present in milk.

Question 8: Explain chemical method of food preservation.

**Answer:** Some chemicals prevent the growth of microorganisms in food. These chemicals are used in pickles and jams to preserve them. Salt, acids and oil are also used as food preservatives. Examples: sodium benzoate and sodium metabisulphate.

# Conservation

#### Importance of Forest:

* Forest provides home to a large variety of animals.
* Trees take up carbon dioxide and release oxygen during photosynthesis. Thus, trees help in maintaining a balance between oxygen and carbon dioxide in the atmosphere.
* Forest is an important source of many raw materials for various purposes.
* Forest provides firewood, kendu leaves, lac, timber, etc.; especially to tribal people.
* Forest helps in precipitation.
* Forest helps in preventing soil erosion which may happen due to flood and wind.
* Forest helps in improving soil fertility.
* Forest helps in natural recharge of groundwater.

## Deforestation

**Deforestation:** Clearing of forest for making way for human activities is called deforestation.

#### Causes of Deforestation:

* Procuring land for cultivation
* Building houses and factories
* Making furniture and using wood for fuel
* Clearing land for making roads, railway lines, dams, etc.
* Grazing cattle

#### Effects of Deforestation

* Reduced forest cover increases the level of carbon dioxide in the atmosphere. This results in global warming.
* Reduces groundwater level.
* Reduces rainfall.
* Reduces soil fertility.
* Can result in droughts or in excess flood.
* May also lead to desertification.

**Desertification:** Conversion of fertile land into desert is called desertification. It happens in following steps:

* Pace of soil erosion increases when forest cover is reduced.
* Hard and rocky layer is exposed once topsoil is removed.
* Soil becomes deficient in humus and thus becomes infertile.
* The land turns into desert in due course of time.

### Conservation of Forest and Wildlife

**Biosphere:** The part of the earth where all living organisms are present is called biosphere. Biosphere is the narrow zone between hydrosphere, troposphere and atmosphere.

**Biodiversity:** Variety of organisms in a given area is called biodiversity in that area.

**Flora:** All the plant species in a given area are collectively called flora of that area.

**Fauna:** All the animals species in a given area are collectively called fauna of that area.

**Protected Areas:** Some areas have been demarcated to protect flora and fauna and their habitat. Such areas are called protected areas. Various rules, methods and policies to protect and conserve forests and wildlife are formulated by the government. There are of following types of protected areas:

1. **Sanctuary:** A sanctuary is an area where animals are protected from any disturbance to them or their habitat. In a wildlife sanctuary; poaching (killing) or capturing an animal is strictly prohibited.
2. **National Park:** A national park is an area which is reserved for wildlife, and where wildlife can freely use the habitat and natural resources. Satpura National Park is the first reserve forest of India.
3. **Biosphere Reserve:** A biosphere reserve is a large area of protected land for conservation of wildlife, plant and animal resources and traditional life of the tribals living in that area.

A biosphere reserve encompasses many other protected areas; like wildlife sanctuary and national park. For example; Pachmarhi Biosphere Reserve contains one national park and two wildlife sanctuaries. They are as follows:

* Satpura National Park
* Bori Wildlife Sanctuary
* Pachmarhi Wildlife Sanctuary
* **Endemic Species:** A species found exclusively in a particular area is called endemic species. Sal, wild mango, bison, Indian giant squirrel and flying squirrel are endemic to Pachmarhi Biosphere Reserve. Endemic species are at greater risk of extinction because they are not found anywhere else.
* **Species:** A group of population capable of interbreeding is called species. Capability of interbreeding is the most important criteria for species.
* **Project Tiger:** Project Tiger was launched in 1973 to protect and conserve tigers in India. This project is aimed at protecting the Bengal Tigers. Project Tiger has been successful in improving the population of tigers in India. As present, there are more than 2,000 tigers in India.
* **Endangered Species:** Species which are under threat of extinction are called endangered species. Examples: Elephants, lions, wild buffalo, etc.
* **Extinct Species:** Species which no longer exist on earth are called extinct species, e.g. dinosaurs, dodo, etc.
* **Ecosystem:** A system of interdependencies among all living beings and non-living things in a given area is called ecosystem.
* **Red Data Book:** The International Union for Conservation of Nature (IUCN) first came with the Red Data Book. It is a source book which keeps record of all the endangered plants and animals. Each country publishes its own version of Red Data Book from time to time.
* **Migration:** Long distance travel by animals to escape harsh conditions is called migration. Many birds and many other animals migrate long distances during unfavourable season. Human beings also migrate in search of livelihood. Siberian Crane migrates from Siberia to India during winters to escape harsh conditions in Siberia and to get comfortable conditions and food in India.
* **Recycling of Paper:** Paper can be recycled many times. As paper is made from wood pulp so recycling of paper helps in saving trees.
* **Reforestation:** Planting trees to recover forests is called reforestation. Reforestation can take place naturally as well as by human intervention.
* **Indian Forest (Conservation) Act:** The Indian Forest (Conservation) Act came into effect in 1927. This Act is aimed at preservation and conservation of natural forests, and at meeting the basic needs of the people who live in or near the forests.
* **Endemic Species:** A species found exclusively in a particular area is called endemic species. Sal, wild mango, bison, Indian giant squirrel and flying squirrel are endemic to Pachmarhi Biosphere Reserve. Endemic species are at greater risk of extinction because they are not found anywhere else.
* **Species:** A group of population capable of interbreeding is called species. Capability of interbreeding is the most important criteria for species.
* **Project Tiger:** Project Tiger was launched in 1973 to protect and conserve tigers in India. This project is aimed at protecting the Bengal Tigers. Project Tiger has been successful in improving the population of tigers in India. As present, there are more than 2,000 tigers in India.
* **Endangered Species:** Species which are under threat of extinction are called endangered species. Examples: Elephants, lions, wild buffalo, etc.
* **Extinct Species:** Species which no longer exist on earth are called extinct species, e.g. dinosaurs, dodo, etc.
* **Ecosystem:** A system of interdependencies among all living beings and non-living things in a given area is called ecosystem.
* **Red Data Book:** The International Union for Conservation of Nature (IUCN) first came with the Red Data Book. It is a source book which keeps record of all the endangered plants and animals. Each country publishes its own version of Red Data Book from time to time.
* **Migration:** Long distance travel by animals to escape harsh conditions is called migration. Many birds and many other animals migrate long distances during unfavourable season. Human beings also migrate in search of livelihood. Siberian Crane migrates from Siberia to India during winters to escape harsh conditions in Siberia and to get comfortable conditions and food in India.
* **Recycling of Paper:** Paper can be recycled many times. As paper is made from wood pulp so recycling of paper helps in saving trees.
* **Reforestation:** Planting trees to recover forests is called reforestation. Reforestation can take place naturally as well as by human intervention.
* **Indian Forest (Conservation) Act:** The Indian Forest (Conservation) Act came into effect in 1927. This Act is aimed at preservation and conservation of natural forests, and at meeting the basic needs of the people who live in or near the forests.
* **Endemic Species:** A species found exclusively in a particular area is called endemic species. Sal, wild mango, bison, Indian giant squirrel and flying squirrel are endemic to Pachmarhi Biosphere Reserve. Endemic species are at greater risk of extinction because they are not found anywhere else.
* **Species:** A group of population capable of interbreeding is called species. Capability of interbreeding is the most important criteria for species.
* **Project Tiger:** Project Tiger was launched in 1973 to protect and conserve tigers in India. This project is aimed at protecting the Bengal Tigers. Project Tiger has been successful in improving the population of tigers in India. As present, there are more than 2,000 tigers in India.
* **Endangered Species:** Species which are under threat of extinction are called endangered species. Examples: Elephants, lions, wild buffalo, etc.
* **Extinct Species:** Species which no longer exist on earth are called extinct species, e.g. dinosaurs, dodo, etc.
* **Ecosystem:** A system of interdependencies among all living beings and non-living things in a given area is called ecosystem.
* **Red Data Book:** The International Union for Conservation of Nature (IUCN) first came with the Red Data Book. It is a source book which keeps record of all the endangered plants and animals. Each country publishes its own version of Red Data Book from time to time.
* **Migration:** Long distance travel by animals to escape harsh conditions is called migration. Many birds and many other animals migrate long distances during unfavourable season. Human beings also migrate in search of livelihood. Siberian Crane migrates from Siberia to India during winters to escape harsh conditions in Siberia and to get comfortable conditions and food in India.
* **Recycling of Paper:** Paper can be recycled many times. As paper is made from wood pulp so recycling of paper helps in saving trees.
* **Reforestation:** Planting trees to recover forests is called reforestation. Reforestation can take place naturally as well as by human intervention.
* **Indian Forest (Conservation) Act:** The Indian Forest (Conservation) Act came into effect in 1927. This Act is aimed at preservation and conservation of natural forests, and at meeting the basic needs of the people who live in or near the forests.

##### What will happen if:

1. We go on cutting trees.  
     
   **Answer:** Mindless cutting of trees will result in deforestation. This will result in various kinds of damage to the environment. It will result in global warming, increased cases of floods and droughts. It will also result in many wild animals getting wiped off the earth.
2. The habitat of an animal is disturbed.  
     
   **Answer:** Wild animals will suffer from shortage of habitat and food. Many wild animals would enter human settlements in search of food. Instances of clash between humans and wild animals will be on rise.
3. The top layer of soil is exposed.  
     
   **Answer:** Soil will become deficient in humus and important nutrients. In the long run, the soil will become infertile. The whole area would become a desert in due course of time.

##### Differentiate between the following:

1. Wildlife sanctuary and biosphere reserve  
     
   **Answer:** A wildlife sanctuary is an area where wild animals are protected from human interference. A wildlife sanctuary is a part of a biosphere reserve. A biosphere reserve encompasses a larger area and is also aimed at facilitating smooth life for people living in or around that area.
2. Zoo and wildlife sanctuary  
     
   **Answer:** A zoo is an artificial enclosure where wild animals are kept, whereas a wildlife sanctuary is a natural area where wild animals are given protection.
3. Endangered and extinct species  
     
   **Answer:** Endangered species still exist on the earth but are at risk of getting extinct. Extinct species no longer exist on the earth.
4. Flora and fauna  
     
   **Answer:** Plants comprise the flora while animals comprise the fauna of a given area.

# Conservation

## NCERT Solution 2

##### Answer these questions:

Question 1: Why should we conserve biodiversity?

**Answer:** A healthy biodiversity is necessary to maintain a healthy ecosystem. This is important for our survival. Hence, we need to conserve biodiversity.

Question 2: Protected forests are also not completely safe for wild animals. Why?

**Answer:** In spite of various laws, it is difficult to completely stop the poaching of wild animals. Moreover, environmental damage in the surrounding areas can harm even the protected forests. Hence, it can be said that protected forests are also not completely safe for wild animals.

Question 3: Some tribals depend on the jungle. How?

**Answer:** Tribal people have been living in or around the jungle since ages. They take many forest produce for their day to day needs. For example; they use firewood as kitchen fuel, bamboo to make house and many useful items, medicinal plants to treat diseases, etc. They also take various items from forest to sell them into the market; in order to earn some money. Thus, tribals depend on the jungle in a significant way.

Question 4: What are the causes and consequences of deforestation?

**Answer:** Following are the causes of deforestation:

* Procuring land for cultivation
* Building houses and factories
* Making furniture and using wood for fuel
* Clearing land for making roads, railway lines, dams, etc.
* Grazing cattle

Effects of Deforestation

* Reduced forest cover increases the level of carbon dioxide in the atmosphere. This results in global warming.
* Reduces groundwater level.
* Reduces rainfall.
* Reduces soil fertility.
* Can result in droughts or in excess flood.
* May also lead to desertification.

Question 5: What is Red Data Book?

**Answer:** The International Union for Conservation of Nature (IUCN) first came with the Red Data Book. It is a source book which keeps record of all the endangered plants and animals. Each country publishes its own version of Red Data Book from time to time.

Question 6: What do you understand by the term migration?

**Answer:** Long distance travel by animals to escape harsh conditions is called migration. Many birds and many other animals migrate long distances during unfavourable season. Human beings also migrate in search of livelihood. Siberian Crane migrates from Siberia to India during winters to escape harsh conditions in Siberia and to get comfortable conditions and food in India.

Question 7: In order to meet the ever-increasing demand in factories and for shelter, trees are being continually cut. Is it justified to cut trees for such projects?

**Answer:** This is a difficult question to answer because this question is about the conflict between development and conservation. But when we keep in mind the need for sustainable development, it becomes necessary to strike a balance between development and conservation. If we keep on clearing forests in the name of economic development, a time will come when there will be no forest. That will be disastrous for the environment. All efforts should be done to prevent clearing of forests as much as possible. If clearing of trees is at all necessary then suitable measures should be taken for reforestation at alternate locations to compensate for the loss of trees.

##### Discuss and prepare a brief report

Question 1: How can you contribute to the maintenance of green wealth of your locality? Make a list of actions to be taken by you.

**Answer:** I will do following activities to maintain green wealth in my locality:

* I will plant one tree every year.
* I will motivate other people to do the same.
* I will prevent cutting of any tree in the name of building any new structure.

Question 2: Explain how deforestation leads to reduced rainfall.

**Answer:** Trees contribute in a major way to atmospheric moisture by way of transpiration. Thus, trees help in improving rainfall. After deforestation, no tree remains to carry out transpiration. Hence, deforestation leads to reduced rainfall.

Question 3: Find out the information about the national parks in your state. Identify and show their location on the outline map of India.

**Answer:** Dudhwa National Park (UP), Kanha National Park (Madhya Pradesh), Kaziranga National Park (Assam) are some examples.

Question 4: Why should paper be saved? Prepare a list of ways by which you can save paper.

**Answer:** Paper is made from wood pulp. This means that trees need to be cut to make paper. However, paper can be recycled many times. Recycling of paper helps in saving trees. This will save our environment. We can save paper in following ways:

* Use every page of notebook for writing and never leave a page blank.
* Use pencil to do mathematics exercises so that your writing can be erased to make the pages reusable.
* Do not waste paper by making paper planes.
* Use old envelopes and pamphlets for doing rough calculations during solving mathematics problems.
* Reuse old envelops and packets.

# Conservation

## Extra Questions

#### Multiple Choice Questions

Question 1: Which of the following animal is endemic to Pachmarhi Biosphere Reserve?

1. Flying squirrel
2. Bengal tiger
3. Elephant
4. Gharial  
     
   **Answer:** (a) flying squirrel

Question 2: Which of the following plants is endemic to Pachmarhi Biosphere Reserve?

1. Jackfruit
2. Wild Guava
3. Wild mango
4. Mahua  
     
   **Answer:** (c) Wild mango

Question 3: Kanha National Park is in which state?

1. Madhya Pradesh
2. Assam
3. West Bengal
4. Uttarakhand  
     
   **Answer:** (a) Madhya Pradesh

Question 4: Gir National Forest is in which state?

1. Madhya Pradesh
2. Gujarat
3. Kerala
4. Rajasthan  
     
   **Answer:** (b) Gujarat

Question 5: Project Tiger was launched in which year?

1. 1963
2. 1973
3. 1983
4. 1993  
     
   **Answer:** (b) 1973

Question 6: Indian Forest (conservation) Act came into effect in which year?

1. 1947
2. 1937
3. 1927
4. 1917  
     
   **Answer:** (c) 1927

Question 7: What is the total number of national parks in Pachmarhi Biosphere Reserve?

1. One
2. Two
3. Three
4. Four  
     
   **Answer:** (a) One

Question 8: What is the total number of wildlife sanctuaries in Pachmarhi Biosphere Reserve?

1. One
2. Two
3. Three
4. Four  
     
   **Answer:** (b) Two

Question 9: The Red Data Book was originally prepared by which of the following?

1. IUCN
2. WWF
3. UNICEF
4. UNO  
     
   **Answer:** (a) IUCN

#### Very Short Answer Type Questions:

Question 1: What is deforestation?

**Answer:** Clearing of forest and using that land for other purposes is called deforestation.

Question 2: What is desertification?

**Answer:** Conversion of fertile land into desert is called desertification.

Question 3: What is biosphere?

**Answer:** The part of the earth where all living organisms are present is called biosphere. This is a nrrow zone between atmosphere, lithosphere and hydrosphere.

Question 4: What is biodiversity?

**Answer:** Variety of organisms existing on earth, their interrelationship and their relationship with the environment together comprise biodiversity.

Question 5: What are protected areas?

**Answer:** Areas which have been demarcated to protect our flora and fauna and their habitat are called protected areas.

Question 6: What do you understand by flora?

**Answer:** The plant species found in a particular area are collectively termed as flora.

Question 7: What do you understand by fauna?

**Answer:** The animal species found in a particular area are collectively termed as fauna.

Question 8: What is a species?

**Answer:** A group of population capable of interbreeding is called species.

Question 9: What is an extinct species?

**Answer:** Animals which no longer exist on earth are called extinct animals, e.g. dinosaurs, dodo, etc.

Question 10: What is ecosystem?

**Answer:** A system of interdependencies among all living beings and non-living things in an area is called ecosystem.

# Conservation

## Extra Questions

##### Short Answer Type Questions

Question 1: Write a brief note on protected areas?

**Answer:** Areas which have been demarcated to protect our flora and fauna and their habitat are called protected areas. The government lays down rules, methods and policies to protect and conserve forests and wildlife.

Question 2: What do you understand by endemic species? Give some examples of endemic species.

**Answer:** Species which is found exclusively in a particular area is called endemic species. Sal and wild mango are endemic flora to Pachmarhi Biosphere Reserve. Bison, Indian giant squirrel and flying squirrel are endemic to this region.

Question 3: State two reasons which can lead to extinction of an endemic species.

**Answer:** Following can lead to extinction of endemic species:

1. Destruction of natural habitat
2. Introduction of an exotic species
3. Increase in population

Question 4: What are the features members of a species?

**Answer:** Members of a species show following features:

1. They look similar
2. They can interbreed
3. They can produce fertile offspring among themselves only

Question 5: What are the two reasons for migration of animals?

**Answer:** Following are the reasons for migration of animals:

* Unfavourable climate
* Lack of food

Question 6: How does deforestation cause global warming?

**Answer:** We know that plants take up carbon dioxide and release oxygen during photosynthesis. This helps in maintaining the balance of carbon dioxide and oxygen in the atmosphere. Deforestation results in loss of green cover on the earth. Less number of plants means level of carbon dioxide increases in the atmosphere. Carbon dioxide traps solar energy and thus leads to overall increase in global temperature. Thus, deforestation causes global warming.

##### Long Answer Type Questions

Question 1: What are the consequences of deforestation?

**Answer:** Consequences of Deforestation

* Increases temperature and pollution level on earth. This happens because of increased level of carbon dioxide in the atmosphere.
* Reduces groundwater level.
* Reduces rainfall.
* Reduces soil fertility.
* Can result in droughts.
* Can also lead to desertification.

Question 2: Explain different types of protected areas.

**Answer:** Different types of protected areas are as follows:

1. **Sanctuary:** An area where animals are protected from any disturbance to them or their habitat is called a sanctuary. Poaching (killing) or capturing an animal is strictly prohibited in a wildlife sanctuary.
2. **National Park:** Areas reserved for wildlife where they can freely use the habitat and natural resources are called national parks. Satpura National Park is the first reserve forest of India.
3. **Biosphere Reserve:** Large areas of protected land for conservation of wildlife, plant and animal resources and traditional life of the tribals living in that area are called biosphere reserves. Some examples of threatened species which are protected in wildlife sanctuaries in India are; black buck, white eyed buck, elephant, golden cat, pink headed duck, gharial, marsh crocodile, python, rhinoceros, etc.