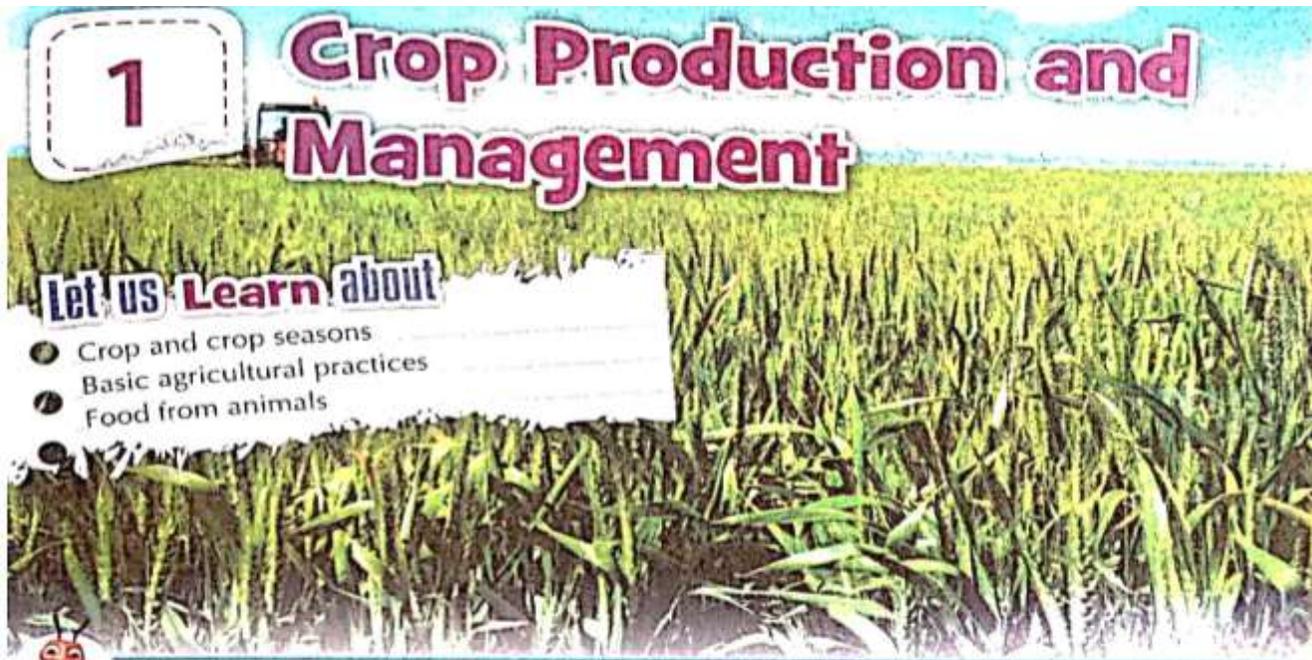




ACADEMIC WORLD SCHOOL™
BEMETARA

Summer Assignment III 2020- 21
Class –VIII
Subject - Science



Previous Connect

Farmers grow crops in field. They grow different crops in different seasons and soils. They irrigate the fields, add fertilizers and manures to ensure good produce.

All living things require food to stay alive. You have already learnt that plants and animals are the two main sources of food. Animals are **domesticated** and raised to obtain food from them. Different types of plants give us different types of food. To fulfil our needs, each of these plants is grown on a large scale. The cultivation of plants in farms is called **farming**. The branch of science that deals with growing plants and raising livestock for human use is called **agriculture**. Agriculture is the largest occupation in our country.

CROP AND CROP SEASONS

The same kind of plants grown and cultivated at one place on a large scale are called **crop**. The product which is obtained from a crop is called **produce**. Crops can be classified either on the basis of the products obtained or on the basis of the season in which they grow.

FACT FILE

India is the world's second biggest producer and consumer of grain after China.



Crop

Various crops and their produce

Crops	Crop plants	Products they provide
Cereal or Grain crops	Rice, Wheat, Barley, Maize, Oats	Carbohydrates
Pulses or Legume crops	Peas, Beans, Gram, Soya bean, Lentil	Proteins
Fibre crops	Cotton, Hemp, Jute	Fibres for cloth
Oilseed crops	Mustard, Sunflower, Groundnut, Coconut	Oils
Tuber crops	Potato, Tapioca	Starch
Sugar crops	Beetroot, Sugar cane	Carbohydrates in the form of sugar
Root crops	Carrot, Sweet potato	Starch, Vitamins
Beverage crops	Tea, Coffee	Beverages

FACT FILE

The Green Revolution contributed to increase food production. The White Revolution led to the availability of good quality milk.



Rabi crop



Kharif crop

Classification of crops on the basis of the seasons in which they grow

In India, there are two main crop seasons –

Rabi crops: The crops which are sown in the month of October/November and harvested in March/April are called **rabi crops**. These crops are also called **winter crops**. Wheat, mustard, barley, gram, pea are some of the examples of rabi crops. These crops do not depend on monsoon rains because the water requirement of these crops is less.

Kharif crops: The crops which are sown in June/July and harvested in September/October are called **kharif crops**. These crops are also called **summer crops**. Rice (paddy), maize, pulses, cotton, groundnuts are some examples of kharif crops. These crops require plenty of water and largely depend on monsoon rains.



Time to Answer

Fill in the blanks.

- _____ crops depend on monsoon rains for growth.
- _____ is the largest occupation in our country.
- Rice and wheat are examples of _____.
- Mustard is a source of _____.
- Beetroot is a source of _____.

BASIC AGRICULTURAL PRACTICES

The various activities that a farmer performs to produce a good crop are called **agricultural practices**.

Sowing of seeds

The process of putting seeds in the soil is called **sowing**. To get a good crop yield, it is important to select good quality seeds (which are disease-resistant and free of infection) and sow them properly.

Selection of good quality seeds can be done by soaking seeds in water. Soaking of seeds in water before sowing also helps in softening the hard outer coating of seeds and, thus, helps in early **germination** of seeds.



Activity 1



Healthy seeds settle down

To separate healthy seeds from unhealthy ones

Take a glass bowl and fill it upto three-fourth with water. Put a handful of gram seeds in it. Leave it undisturbed for about one hour. You will observe that some seeds float on water as they are hollow and light. These are unhealthy seeds. The seeds which settle down at the bottom are healthy and are good for sowing.

A farmer should keep following things in mind while sowing the seeds:

- Seeds should be sown in the proper season and in moist soil.
- Seeds should be sown at the correct depth (which varies from crop to crop). The depth of seeds matters the most. If seeds are sown too deep in the soil, then their roots will not be able to respire while those sown close to the surface may be eaten by birds and insects.
- Seeds should be sown at proper spacing to prevent overcrowding of plants. This also allows each plant to get enough water, nutrients and sunlight.

Methods of sowing

Seeds can be sown in two ways.

- Manual method or broadcasting:** This method involves scattering of seeds by hand. Seeds like maize, bajra are sown by this method. Seeds sown by this method are distributed unevenly in the field, leading to wastage and reduced crop yield.
- Mechanical method:** In this method, seeds are sown using a **seed drill**. The drill makes furrows in the soil and the seeds fall into the furrows at proper depths and proper distances. Sowing seeds by seed drill is faster and saves labour.



Manual method of sowing seeds



Seed drill

The basic agricultural practices are listed below:

- Preparation of soil
- Sowing of seeds
- Manuring
- Irrigation
- Protection of crops
- Harvesting
- Storage

Preparation of soil

The first step for growing a crop is to prepare the soil. The preparation of soil involves **ploughing** and **levelling**. The soil needs to be loosened so that the roots can penetrate deep into the soil and can breathe easily. The process of loosening and turning the soil is called **ploughing**, or **tilling**. **Plough**, **hoe** and **cultivator**, driven by tractors, are used for ploughing. Its advantages are:

- It helps to bring the nutrient-rich soil from the lower layers to the top, making it available to plants.
- It also helps to retain moisture for a longer period.

After ploughing the soil, some big pieces of soil, called **crumbs**, remain in the soil which may cause difficulty in sowing seeds. To break the big pieces of soil, **levelling** of soil is required. It is done with the help of a wooden or iron plank.

Agricultural implements

Farmers need some special tools to grow a good crop. The tools used by farmers during farming are called **agricultural implements**. Some of the implements used in ploughing are as follows:

Plough– It is made of wood and iron. The strong triangular iron strip is called **ploughshare** and the long wooden part of the plough is called **ploughshaft**. In earlier times, ploughs were driven by animals like bulls and horses, but nowadays ploughing is done by cultivators driven by tractors.

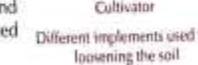
Hoe– A hoe consists of a long rod of wood or iron, with a broad, strong iron plate attached to one end. The bent plate acts like a blade and is useful for loosening the soil and removing weeds.

Cultivator–A cultivator is a type of farm implement used for secondary tillage. Its teeth (also called **shanks**) pierce the soil as they are dragged through it. Cultivators are driven with the help of tractors. They stir and **pulverise** the soil, either before planting or after the crop has started growing.

tillage: the process of preparing land for growing crops
pulverise: to crush soil lumps into fine powder



Farmer ploughing the field



Different implements used for loosening the soil

Crop transplantation

In some crops, like rice (paddy), and vegetables, like chillies and tomatoes, the seeds are sown in a small area called **nursery**. When they germinate into small seedlings, these are transferred to the main field. This is called **crop transplantation**.

Advantages of crop transplantation

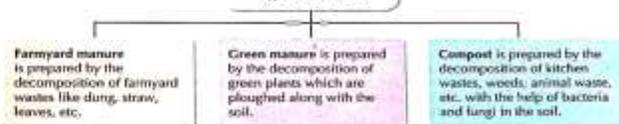
- It helps farmers to select only healthy seedlings.
- It is easy to keep proper spacing between the plants.
- Crop yield increases as unhealthy plants are sorted out.

Manuring

When crops are grown continuously in the same field, the soil becomes deficient in some nutrients. This reduces the crop yield. This problem can be overcome by adding manures and fertilisers in the soil. The process of adding manure to the soil is called **manuring**.

- Manure** is an organic substance obtained from the decomposition of plant and animal wastes. Manures are added to the soil before or after the seeds are sown. It is rich in **humus**. It improves soil texture, increases its water holding capacity, makes it porous and increases the soil-friendly microbes in it. Manure is mainly of three types as shown in the flow chart below:

Types of Manure



- Fertiliser** is a chemical compound that is manufactured in factories. It provides specific nutrients like phosphorus, potassium, etc. to crops. For example, **urea** supplies nitrogen, **CAN** (calcium ammonium nitrate) supplies calcium and nitrogen, **diammonium phosphate** supplies nitrogen and phosphorus. They are easy to use, transport and can be easily stored. They are also easily soluble in water and hence easily absorbed by plants and utilised immediately.



Transplantation

Differences between manure and fertilizer

Manure	Fertiliser
<ul style="list-style-type: none"> Manure is a natural substance. It is not nutrient-specific and is required in large quantities. It is rich in humus. It is not readily soluble in water and is slowly absorbed by plants. 	<ul style="list-style-type: none"> Fertiliser is a chemical substance. It is nutrient-specific and required in very small quantities. It does not provide any humus to the soil. It is soluble in water and readily absorbed by plants.

Activity 2

To grow seedlings with manure and fertilizer

Take three equal-sized vessels. Fill the first vessel with soil upto half mark and add a little amount of manure in it. (You can use any type of manure). Mark it as 'A'. Now, take the second vessel and again fill it with soil upto half mark and add a little amount of urea in it. Similarly, fill it. You can also use any other fertilizer. Mark it as 'B'. Now plant a seedling in the third vessel only with soil and mark it as 'C'. Now plant a seedling in each of them. Keep them at a safe place where sunlight is available in plenty. Water them regularly and observe them for 10-15 days. Note down the height of each plant after 15 days and fill in the table given below.



Height of plant in vessel A =	_____ cm
Height of plant in vessel B =	_____ cm
Height of plant in vessel C =	_____ cm

Despite the advantages, fertilisers also have some disadvantages. They reduce soil fertility if used regularly. They also cause water and soil pollution.

As an alternative to fertilisers, nutrients in the soil can be replenished naturally by practising various methods as:

- Field fallow**— Leaving the land free for one or more seasons to regain nutrients.
- Crop rotation**— It is the practice of growing a series of different types of crops in the same area in sequential seasons. This practice is generally used for the replenishment of nitrogen by growing a leguminous crop, that adds nitrogen and organic matter to the soil in sequence with cereals and other crops.
- Mixed cropping**— Sometimes two or more crops are grown together in the same field. This method is called **multiple or mixed cropping**. The crops to be grown together are chosen in such a way that the waste materials from one crop help in the growth of the other.



Drip system

sandy soil and uneven land where sufficient water is not available at every part of the field.

- Drip system**— This involves providing water drop by drop near the roots of the plants. This system helps plants to get regular water supply and involves no wastage of water.

Advantages of irrigation

- Irrigation helps seeds to germinate.
- It is also essential for absorption of nutrients by plants from the soil and for the elongation of roots.
- Water also protects crops from frost and dry hot air currents.

Disadvantages of excessive irrigation

It is important to provide plants with right amount of water at the right time. Excessive water can cause the following problems:

- Waterlogging** occurs in the soil that inhibits germination of seeds.
- Roots do not hold the crop upright.
- Plants which cannot resist strong winds fall down.

Crop protection

For protection of crops, farmers use several methods, some of which are as follows:

Scarecrows

These are the images of human forms placed in fields that can keep birds away from a field.

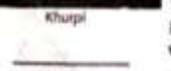
Use of pesticides

After replenishing the soil with adequate nutrients, it is important to protect the crop from damage by pests (insects and rodents), microbes and fungus. For this purpose, chemical substances known as **pesticides** are used. Pesticides are poisonous in nature; they kill the pests but do not harm the plants. Pesticides include **insecticides** (kill insects), **fungicides** (destroy fungi) and **rodenticides** (kill rats and mice). Some commonly used pesticides are DDT, BHC, malathion, gamaxene, heptachlor, methyl parathion, etc.

Weeding

Some unwanted plants grow along with crop plants and compete with the crops for water, minerals and sunlight. These plants are called **weeds**. *Amaranthus (chaula)* and wild oat (*Javri*) are some examples of weeds.

They need to be removed at regular intervals otherwise crop yield is badly affected. The process of removing weeds from a field is called **weeding**. It can be done by the following methods:



Khurpi

waterlogging: filled or soaked with water

Time to Answer

Fill in the blanks.

- Seed drill is a device used for sowing _____.
- The preparation of soil involves ploughing and _____.
- _____ is rich in humus while fertilisers are not.
- To get a good crop yield, it is important to select _____ of good quality.
- _____ manure consists of green plants which are ploughed along with the soil.
- Broadcasting is the method of scattering seeds by _____.

Irrigation

The process of watering crops in the field at different intervals is called **irrigation**. In India, farmers cannot depend on rain for irrigation because it may not rain when the crops require water. To get a good produce, crops need to be irrigated properly. The time and frequency of irrigation differs from crop to crop and soil to soil. The various sources of irrigation are wells, ponds, tube wells, lakes, rivers, canals and dams.

Methods of irrigation

Traditional methods: Irrigation can be done by **traditional methods** like *dhekli*, *rahat*, moat and chain pump. In these methods, water available in wells and canals is distributed in the fields by using cattle or human labour. These methods are cheaper as they do not require the use of electricity but are less efficient.



Moat

Chain pump

Dhekli

Rahat

Traditional methods of irrigation

Modern methods: These methods of irrigation are more efficient than the traditional methods. In these methods, water is equally distributed to all parts of the field. These methods are generally aimed at conserving water. **Some of the most commonly used modern methods of irrigation are as follows:**

- Sprinkler system**— This is one of the most commonly used methods of irrigation. It involves installing vertical pipes at equal distances with rotating nozzles on the top. The pipes are connected to the main pipeline, that supplies water under pressure to be spread on the crop through the rotating nozzles. This method is recommended for



Sprinkler system

- Mechanical method:** In this method, weeds are removed by hand or by using implements like a *khurpi* or a **harrow**.
- Chemical method:** These methods involve removal of weeds by using chemicals called **weedicides**. 2,4-D and MCPA are examples of **weedicides**.
- Biological method:** In this method, natural enemies of weeds like insects are released in the field which feed on weeds and destroy them. For example, cochineal insect is used to eliminate prickly pear.

Harvesting

When a crop is fully grown, the next stage is to cut it down from the fields. The process of cutting and gathering of crops is called **harvesting**. It can be done manually with a sickle or by machine called harvester. The harvested grain is then stored. In case of cereal crops, harvesting is followed by **threshing**.

Threshing

The process of separating grain seeds from the **chaff** in the harvested crop is called **threshing**. It can be done manually or by a machine called **thresher**. A machine called 'combine' is used for both harvesting and threshing.

Winnowing

Farmers that have small land holdings separate grain from chaff by dropping the harvested crop on the ground from a height by the use of blowing wind. This is called **winnowing**. The chaff which is lighter is blown away upto some distance whereas the heavier grains fall directly to the ground below.

Storage

The harvested food grain needs to be stored very carefully to protect it from insects, pests, rodents and fungal diseases. As moisture promotes the growth of bacteria and fungi, so the grain is dried in the sun and then stored in gunny bags and silos.

Types of Storage

There are two types of storage – dry storage and cold storage.

Dry storage is a method used for storing non **perishable** food materials like food grains. On **small scale** or at **domestic level**, grain is stored in jute bags or metallic bins. On **large scale** or at **commercial level**, grain is stored in gunny bags, silos or granaries.

Cold storage is a method used for storage of perishable food materials. Since these food materials have a very short shelf life, they are stored at low temperature. Vegetables and fruits are stored by this method.

chaff: the seed coverings and other debris
perishable: likely to spoil or decay quickly



Harrow



Manual threshing (beating)



Mechanical threshing



Combine



Winnowing

FACT FILE

Some stocks of grains must be maintained to compensate for the shortage due to failure of monsoon in a particular year. This is known as a **buffer stock**.



- Honeybees are reared for honey. The rearing of honeybees on a large scale is called **apiculture**.
- The breeding, hatching and rearing of fish under controlled conditions on a large scale is called **pisciculture**.

Time to Answer

Answer the following.

- Define irrigation.
- What is winnowing?
- What is weeding?
- What type of food is stored in cold storage?
- Name any two pesticides.

Activity 3

Make a list of food items obtained from different animals and complete the table given below:

Food item	Animal from which it is obtained



FOOD FROM ANIMALS

Animals are also an important source of food. For example,

- Cows, buffaloes give us **milk**.
- Ducks and hens are a source of **eggs**.
- Honeybees give us **honey**.
- Fish, goat, hen are sources of **meat**.

Food obtained from animals is also important for health. Milk, egg and fish are rich sources of proteins. Meat is rich in fats and proteins. Cod liver oil, which is obtained from fish, is rich in vitamin D.

Time to Answer

Write True or False for the following statements.

- Pisciculture is the rearing of honeybees. _____
- Cod liver oil is rich in Vitamin-D. _____
- Ducks and cows give us milk. _____
- Goat and hen are sources of meat. _____

Animal husbandry

The domestication of animals on a large scale is called **animal husbandry**.

- All domestic and useful animals constitute **livestock**. Livestock are domesticated animals raised in an agricultural setting to produce commodities such as food, fibre and labour. Livestock are generally raised for profit.
- The practice of raising birds like chicken, ducks and fowls is called **poultry farming**.

Key Terms

Agriculture: the science or practice of farming and rearing of animals

Crop: one kind of plants grown on a large piece of land

Agricultural practices: the various activities that a farmer performs to produce a good crop

Exercise:

FIND THE ANSWERS OF EVERY QUESTION GIVEN BELOW FROM THE TEXT ABOVE:-

Q1. Give answer in one word:

- Name any one method of weeding.
- What is the process of putting seeds in soil called?
- Name any one winter crop.
- Which machine is used for the separation of grain from stalks and husks?
- What is rearing of animals on a large scale called?
- What is the process of watering crops is called?
- Name the implement used to sow seed.
- What is the science or practice of farming and rearing of animals called?
- Name the implement used for ploughing.
- Name the natural substance used to replenish nutrients in the soil.

Q2. Answer the following question in short (20-30 words):

- a. Write the three disadvantages of excessive irrigation.
- b. What is fertiliser? Name any two .
- c. What is threshing?
- d. Define crop transplantation.
- e. What are the disadvantages of traditional methods of irrigation?
- f. Describe three methods of weeding.
- g. Define the term “Rabi crop”.
- h. What is livestock? Explain with examples.
- i. Why should weeds be removed from a field?
- j. What is harvesting?

Q3. Answer the following question in long (40-50 words).

- a. State the difference between manure and fertilizer.
- b. What is animal husbandry? How is it useful?
- c. What is the proper way of sowing seeds? Explain.
- d. Explain any two modern methods of irrigation.
- e. State the difference between Kharif and Rabi crops.

Q4. Think and answer the following questions.

- a. Rice cannot be grown in winters. Is it true? If so, why?
- b. Why is it necessary to water crops frequently in summers?

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2

Microorganisms

Let us Learn about

- Types of microorganisms
- Useful microorganisms
- Harmful microorganisms
- Food preservation
- Nitrogen cycle



Previous Connect

Microorganisms are found everywhere – on land, in water, air, food, our body, etc. Some microorganisms are useful to us while some are harmful. You have learnt that a bacterium called *Rhizobium* fixes atmospheric nitrogen and provides it to plants. On the other hand, some microorganisms cause diseases in humans.

Our world is full of different types of living organisms. There are some organisms that are too small to be seen by naked eyes. These tiny living things that can only be seen under a microscope are called **microorganisms** or simply **microbes**. They are found everywhere and can even survive in extreme conditions of ice-cold climates to hot springs. They can survive in almost all-types of environment.

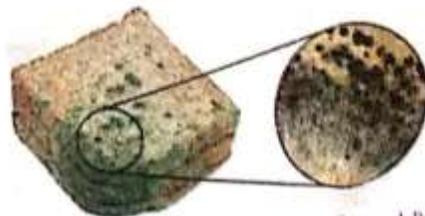
The science which deals with the study of microorganisms is called **microbiology**. Some microorganisms are useful to us while some others cause diseases. Disease-causing microorganisms are called **pathogens**.



Activity I

To show the presence of microorganisms in air

Take a slice of bread and moisten it. Place it in a warm place for two days. You will observe greyish patches on the bread. With the help of a needle, take a little of this greyish patch and spread it on a glass slide in a drop of water. Observe it under the microscope. You will see structures as shown here.



Fungi on rotten bread (Bread mould)





Activity 2

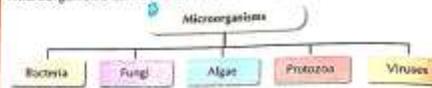
To show the presence of microorganisms in water
Collect some pond water and put a drop of it on a glass slide. Observe the slide under the microscope. You will see microorganisms.

FACT FILE

Thiomargarita namibiensis is the largest bacterium ever discovered. It was found in the ocean sediments of the continental shelf of Namibia. It is large enough to be seen with the naked eye.

TYPES OF MICROORGANISMS

Microorganisms can be classified into five groups:

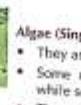


Bacteria (Singular – Bacterium):

- They are the simplest microorganisms and are unicellular (single-celled).
- They are found in different shapes, like rod-shaped (*Bacillus*), spherical (Coccus), spiral-shaped (*Spirillum*) and comma-shaped (*Vibrio*).
- Almost all bacteria are invisible to the naked eye. Under optimal conditions, bacteria can grow rapidly.



Different shapes of bacteria

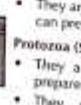


Algae (Singular – Alga)

- They are simple, plant-like organisms.
- Some of them are unicellular like *Chlamydomonas* while some others are multicellular like *Spirogyra*.
- They are found in water. They possess chlorophyll and can prepare their own food.

Protozoa (Singular – Protozoan)

- They are unicellular microorganisms which cannot prepare their own food.
- They are heterotrophs. For example: *Amoeba*, *Paramecium*, *Plasmodium*, *Trypanosoma*.



Protozoa

Fungi (Singular – Fungus)

- They are plant like organisms which are mostly saprophytes while some are parasites.
- They may be unicellular (yeast) or multicellular (mushroom).



Yeast

Fungi

Mushroom

Viruses (Singular – Virus)

- They are the smallest microorganisms that can only be seen under an electron microscope.
- They are made up of genetic material surrounded by a protein coat. They can only multiply inside a living host cell.
- Outside the host cell, a virus does not show any characteristic of a living thing.
- Viruses are said to be neither living nor non-living organisms. Bacteriophage, influenza virus are some examples of viruses.



Influenza virus



Bacteriophage

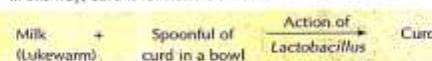
Viruses

USEFUL MICROORGANISMS

Some microorganisms are useful to us in several ways as discussed below:

In preparation of food items

- A bacterium called *Lactobacillus* is useful in making curd from milk. Milk contains lactose (milk sugar), curd contains the bacterium *Lactobacillus* that helps to convert lactose in the milk to lactic acid. In this way, curd is formed from milk.



Lactobacillus bacteria help in making curd

- Cheese and paneer are made by using *Lactobacillus* or *Streptococcus*.
- Yeast, a fungus, is used to make bread, cakes, idlis, etc. To make bread, yeast is added to a mixture of flour, sugar and warm water and is kneaded to make a soft dough. The dough is left undisturbed for 2–3 hours and then the dough rises due to the release of carbon dioxide by the respiration of yeast cells.



Yeast makes the bread fluffy

Commercial uses of microorganisms

Microorganisms are also used in the large-scale production of some substances. Some of the commercial uses of different microorganisms are as follows:

- Yeast is used in the commercial production of wine and beer. Yeast is grown on natural sugars present in grains of barley, wheat, rice, crushed fruit juices, etc. They convert sugar into alcohol.

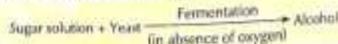
The process of breaking down of sugar into an acid or alcohol by the action of microbes is called **fermentation**.



Activity 3

To make alcohol by the fermentation of sugar

Take a beaker and fill 200 ml of water in it. Now add two tablespoon of sugar in it. Stir it well. Then add half a spoon of yeast in it and cover it with a watch glass. Keep it for four to five hours in a warm place. Then smell it. You will find that it smells like alcohol.



- Some bacteria help in the ripening of tea leaves which gives tea its characteristic flavour.
- Yeast is an important source of vitamin B-complex.
- The fermentation property of some fungi is used for manufacturing citric acid, oxalic acid, etc.

Some other uses of microorganisms

In increasing the fertility of soil

Rhizobium bacteria are present in the root nodules of leguminous plants like pea and bean. These bacteria are able to fix atmospheric nitrogen and convert it into suitable forms like nitrates. Some bacteria and blue-green algae living in the soil can also fix atmospheric nitrogen into nitrates. These microbes are commonly called **biological nitrogen fixers**. Soil fertility increases with nitrogen fixation.



Activity 4

To study the roots of leguminous plants

Gently pull out a gram or bean plant from the soil. Observe its root nodules. You will find bulb-like structures on its roots as shown in the figure.



Rhizobium bacteria attached to roots

In cleaning the environment

Bacteria and fungi breakdown (decompose) dead and decaying plant and animal matter into simple inorganic substances. They are thus called **decomposers**. Inorganic compounds like phosphates, nitrates,

sulphates are mixed in the soil and are used by green plants during the process of photosynthesis. Hence, decomposers help to keep the environment clean by preventing the accumulation of remains and waste of dead organisms.

In sewage disposal

Microorganisms like bacteria decompose municipal sewage into useful substances. During the treatment of sewage, anaerobic bacteria produce methane gas, which is also called **biogas**.

In industries

- Bacteria are used in leather industry for tanning the skin of animals, making the leather soft and flexible.
- Bacteria are used in jute industry for separation of jute fibre from the stem by destroying the stem tissues. This is called **retting**.

In preparation of antibiotics

Antibiotics are medicines that kill or stop the growth of disease causing microorganisms. Microorganisms are used in the preparation of antibiotics. **Penicillin was the first antibiotic discovered by Alexander Fleming in 1928**. It was prepared from a fungus called *Penicillium notatum*. Sulfadiazine, streptomycin and tetracycline are some examples of antibiotics.

In preparation of vaccines

Vaccines are dead or weakened microorganisms that are introduced in the body. The weakened microorganisms do not harm the body. They induce the formation of antibodies that fight against diseases and develop immunity. This process is called **vaccination**.

The ability of a body to resist or fight a disease is known as **immunity**. Vaccines have been developed against cholera, smallpox, polio, typhoid, whooping cough, etc.

FACT FILE
Fungi like *Aspergillus nidulans* grow in the dark.

FACT FILE
The smallpox vaccine was the first successful vaccine to be developed. It was developed by Edward Jenner in 1796 who is often called 'the Father of Immunology'.



Time to Answer

- Answer the following.
- Which bacteria help in fixing atmospheric nitrogen?
 - Which microorganism converts milk into curd?
 - Which microorganism is used to make cakes and bread fluffy?
 - Which vitamin is yeast rich in?
 - What is the ability of the body to fight diseases called?

HARMFUL MICROORGANISMS

Some microorganisms are harmful for us. They can cause diseases and can also spoil our food, clothes, etc.

Disease causing microorganism in animals and plants

Microorganisms can cause diseases in both plants and animals. Some animal and plant diseases and their agents are listed in the table given below:

Animal diseases and causative agent

Disease	Causative agent
1. Foot-and-mouth disease in cattle	Virus
2. Anthrax disease in cattle	Bacterium
3. Sleeping sickness in cattle, pigs and horses	Protozoa

Plant diseases and causative agent

Disease	Causative agent
1. Potato blight	Virus
2. Tobacco mosaic	Virus
3. Rust of wheat	Fungi
4. Citrus canker	Bacterium
5. Yellow vein mosaic of okra	Virus



Rust of wheat



Potato blight

Disease-causing microorganisms in humans

Pathogens cause diseases in humans. These diseases are called **communicable diseases**, as they can spread from one person to another. Pathogens enter the human body through the air we breathe, food we eat, water we drink, through direct contact with a sick person or through carriers like insects.

Direct transmission

- **By direct contact:** Direct skin to skin, mucous to mucous, or mucous to skin contact may cause infection. Examples of diseases spread in this way are leprosy and eczema.
- **By droplet infection:** An infected person may release droplets of moisture carrying the disease-causing microorganism through coughing, sneezing, spitting. Examples of diseases spread in this way are tuberculosis and whooping cough.
- **By using an infected needle or syringe:** Infection can be transmitted through blood transfusion as in case of AIDS, or a bite as in case of a dog bite.

Indirect transmission

- Modes of indirect transmission are through infected food and water, through clothes, towels or personal belongings of a patient, or through dirty hands or unwashed fruits and vegetables.

Some microbial diseases

S.No.	Disease	Transmitted by	Symptoms	Preventive Measures
Bacterial diseases				
1.	Tuberculosis	Air	Low grade fever, breathlessness	BCG vaccination, general cleanliness
2.	Pneumonia	Air	High fever, inflammation of lungs	Antibiotics
3.	Cholera	Water/food	Vomiting, loose motions, dehydration	General hygiene, good sanitation, vaccination
4.	Typhoid	Water/food	Continuous fever due to infection in the intestine	Drinking boiled water, cooking food properly, maintaining good sanitation, vaccination
Viral diseases				
1.	Measles	Air/direct contact	Fever, rashes, running nose	Vaccination, keeping the patient in isolation
2.	Common cold	Air (sneezing) or coughing)	Running nose, watery eye	Keeping away from the person suffering from common cold
3.	Chicken pox	Air/direct contact	Rashes, fever, headache	Isolating the patient, vaccination
4.	Jaundice (Hepatitis B)	Water	Yellowing of eyes, hands and urine	Vaccination, drinking boiled water and clean food
5.	Polio	Air/water	Paralysis of leg muscles in children	Vaccination
Protozoan diseases				
1.	Malaria	Female Anopheles mosquito bite	High fever with chill	Avoiding water to collect in and around the house, spraying insecticides
2.	Amoebic dysentery	Food and water	Blood in the stool	Maintaining personal hygiene, drinking boiled water
Fungal diseases				
1.	Athlete's foot	Air	Fungal growth between the toes	Keep feet dry and clean
2.	Ringworm disease	Air	Circular rings on the skin	Medication



Stagnant water



Anopheles mosquito

Spread of diseases by insects

Insects like mosquitoes and houseflies are the carriers of microorganisms.

- **Mosquitoes** can act as a **vector** for many disease-causing viruses and parasites. For example, **Malaria** is spread by the female *Anopheles* mosquito. It is caused by the protozoan *Plasmodium*. When a female *Anopheles* mosquito sucks blood of an infected person, the *Plasmodium* is carried into its body. When this mosquito bites a healthy person, the protozoan enters his/her body causing malaria. Stagnant water is the breeding ground of mosquitoes. They lay their eggs in stagnant water such as cooler from which water has not been removed from many days. It is suggested to put kerosene or some insecticides in coolers to prevent the breeding of mosquitoes. Female *Aedes* mosquito is vector for dengue virus.
- **Houseflies** also carry harmful microbes from one place to another. When they sit on food items, microorganisms get stuck to food particles and enter our body when we eat such items. Your parents always advise you not to eat uncovered food items as they may contain microbes.



Time to Answer

Fill in the blanks.

- Chicken pox and measles are examples of _____ diseases.
- Malaria is caused by the bite of _____ mosquito.
- Athlete's foot is a _____ disease.
- Anthrax disease in cattle is caused by _____.
- Communicable diseases are caused in humans by _____.
- Rust of wheat is a plant disease caused by _____.
- Jaundice is a disease transmitted by _____.

FACT FILE

Common microbes which cause food poisoning are *Salmonella*, *Clostridium botulinum* and *Aspergillus*.

FOOD PRESERVATION

Food gets spoilt when it is attacked by microorganisms. Spoiled food gives off foul smell and tastes bad. Sometimes its colour may even change. Eating spoiled food can cause **food poisoning**. Food poisoning can cause vomiting, diarrhoea and abdominal pain.

Microorganisms require air, water and warmth for growth. Food can be prevented from getting spoilt by preventing the growth of microorganisms.

The process by which spoilage of food is prevented is called **food preservation**. Let us discuss some commonly used methods of food preservation.

Methods of food preservation

- **Drying (dehydration):** In this method, moisture content (water) of food is reduced by drying in the sun to prevent the growth of microorganisms. The process of removal of water is called **dehydration**. Vegetables like methi leaves, spices, cauliflower are dried in the sun. The dehydrated food is sealed in packets. Fish and meat are preserved by smoke and heat (smoking).
- **Freezing or Refrigeration:** Freezing stops the growth and multiplication of microorganisms and thus helps to preserve them. Meat, vegetables, fruits and milk are preserved in this way.



Preserved peas packet



Refrigerator

FACT FILE

Food additives are chemicals that are added in some foods during their manufacture. Preservatives are food - additives that keep food fresh, colouring makes the food look more attractive and flavouring helps to replenish the taste of the food which is lost when it is processed.

- **Pasteurisation:** This method is generally used to preserve milk. In this method, milk is heated to about 70°C for 15 to 30 seconds and then cooled quickly. This sudden change in temperature kills microorganisms and prevents their growth. Honey, beer, wine and juices are also preserved using this method. Pasteurised milk is stored in sterilized pouches or bottles.
- **Salting and adding sugars:** Salt and sugar are **natural preservatives**. The cells of microbes lose water on addition of salt and sugar, thereby inhibiting their growth. Pickles, meat and fish are preserved by salting. Jams, sauces and jellies are preserved by adding sugar.
- **By use of chemicals:** Chemicals like **citric acid**, **sodium benzoate** and **potassium metabisulphite** are used as preservatives to preserve jams, squashes and ketchups.
- **Canning:** In this method, foods are sealed in a can and heated to a high temperature (about 120°C) to kill microorganisms.



Preserved pickle and jam

FACT FILE

The method of pasteurisation was discovered by Louis Pasteur.

vector: an organism that transmits a disease from one living thing to another

The food is stored in airtight containers and cannot be spoiled by microorganisms. Canned food can be preserved for years.

- **By vacuum packing:** Snacks containing oil are marketed in sealed air tight packaging. The air is removed by evacuation and the packet is filled with nitrogen.

Advantages of food preservation

- It reduces the wastage of food by avoiding its spoilage.
- It helps to retain the nutritive value of food to a great extent.
- It ensures the food availability during off-season and at distant places.
- It increases the shelf life of perishable food items.

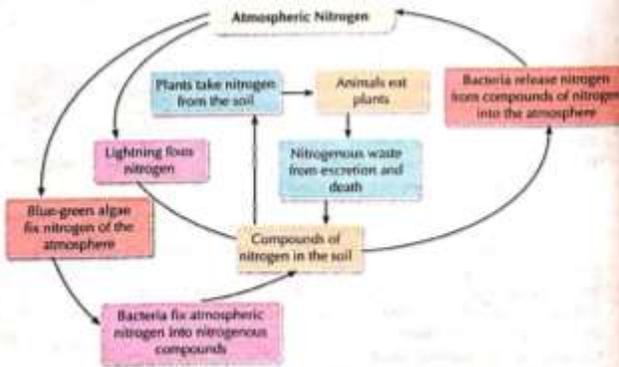
NITROGEN CYCLE

The cyclic process by which nitrogen is fixed, used by plants and animals and then returned to the atmosphere is called **nitrogen cycle**.

Important processes in the nitrogen cycle include nitrogen fixation, nitrogen assimilation, ammonification, nitrification and denitrification.

The atmosphere of earth contains approximately 78% nitrogen. However, this atmospheric nitrogen has limited availability for biological use, leading to a scarcity of usable nitrogen. This atmospheric nitrogen must be processed or fixed to be used by plants.

The conversion of atmospheric nitrogen into a form which is readily available to plants is called **nitrogen fixation**. It is an important step in the nitrogen cycle, for supply of this essential nutrient.



Fixation of nitrogen can be done in two ways.

• By symbiotic bacteria (Biological Nitrogen Fixation)

Leguminous plants like peas and beans have a bacterium called *Rhizobium* in their root nodules. The bacterium can take up atmospheric nitrogen and convert it into nitrates. Nitrates get mixed up with the soil after decay of plants.

• During lightning (Atmospheric Nitrogen Fixation)

When lightning occurs, the nitrogen and oxygen in the air react to form oxides of nitrogen.

These compounds fall down to the earth with rainwater as nitric acid.

The nitric acid reacts with soil alkalies such as limestone to form nitrates which are absorbed by the plants through their roots.

Plants take nitrogen from the soil in the form of nitrate salts or ammonium salts by absorption through their roots and use them to synthesise amino acids, proteins, nucleic acids and other nitrogen compounds. This is called **nitrate assimilation**.

Humans and animals utilise plant proteins and synthesise animal proteins. When plants and animals die, the proteins present in them are converted back to ammonium compounds by bacteria and fungi. The waste expelled by animals is also a nitrogenous organic compound, called urea, which is also converted into ammonia by the action of fungi. This process of conversion of organic nitrogenous compounds into ammonia is called **ammonification**.

The process of converting ammonia into nitrates is called **nitrification**. The nitrates in the soil are again absorbed by the plants.

The conversion of nitrates (in the soil) to free molecular nitrogen is called **denitrification**. This is done by denitrifying bacteria such as *Pseudomonas* and *Clostridium* in anaerobic conditions. In this way, the percentage of nitrogen in the atmosphere remains constant.



Time to Answer

Write True or False.

- Microorganisms can grow in dry conditions.
- Eating spoiled food can cause food poisoning.
- Food preservation reduces wastage.
- Dehydration removes water from the food.
- Citric acid and sodium benzoate are preservatives.
- Nitrogen is fixed during lightning.

Exercise

FIND THE ANSWERS OF EVERY QUESTIONS GIVEN BELOW FROM THE TEXT ABOVE:-

Q1. Give answer in one word of the following:

- Name any one pathogen.
- Name the bacterium that is visible with our naked eyes.
- Is yeast multicellular or unicellular?
- Who discovered penicillin?
- Name the bacterium which causes food poisoning?
- Which bacteria cause cholera?
- Name the microorganism which exhibits symbiotic life.
- Malaria is caused by which type of microbe.
- Fungi reproduce by which process.
- Which microorganism causes common cold?

Q2. Answer the following question in short (20-30 words).

- a. Write some ways in which microorganisms are useful for us.
- b. What are antibiotics? Give two examples.
- c. What is vaccine? Give one example.
- d. Explain the role of microorganisms in cleaning the environment.
- e. What is pasteurisation?
- f. Write some ways in which microorganisms are harmful for us.
- g. Define the term "Immunity". Suggest some ways to increase immunity.
- h. Explain the role of microorganisms in sewage treatment.
- i. Define food preservation.
- j. What is food poisoning? Which type of diseases caused by food poisoning?

Q3. Answer the following question in long (40-50 words).

- a. Describe " Nitrogen cycle" with the help of diagram.
- b. What are the advantages of food preservation?
- c. Explain the different methods of food preservation with one example each.
- d. How do insects act as a carrier of diseases? Explain with examples.
- e. How is nitrogen fixed during lightning?

Q4. Think and answer the following questions.

- a. What will happen if children are not vaccinated during their early age?
- b. If we bury a dead body in ice, will it be obtained in the same condition after 10 years as it was buried?

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3

Synthetic Fibres and Plastics

Let us Learn about

- Synthetic fibres
- Plastics
- Plastics and the environment



Previous Connect

Fibres are used to make yarn. Yarn is used to make fabrics. Fibres can be natural or synthetic. Synthetic fibres are more reliable and have more tensile strength.

You have learnt that the clothes you wear are made up of fibres. Let's recall our knowledge about fibres. Fibres are broadly classified into two types – natural and synthetic fibres. The fibres obtained from plants and animals are called **natural fibres**. For example, silk and cotton. On the other hand, fibres that are manufactured in factories from chemical substances are called **synthetic fibres**. For example, nylon and rayon.



Activity I

To identify natural and synthetic fibres

In the table given below, make a list of eight articles made of fibres. Classify them as natural or synthetic fibres.

S.No.	Articles	Natural or Synthetic fibre
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Plastic materials display unique properties as compared to other materials and have contributed greatly to our everyday life. Plastics are used in housing, automobiles, aircraft, packaging, electronics, recreation items and medical implants.

Let's discuss some important properties of plastics.

- **Plastics are non-reactive:** Plastics do not react with water or other chemicals. Thus, they do not corrode. Due to this reason, plastics are used to store different kinds of materials. For example, many chemicals compounds like phenolphthalein, sodium hydroxide etc. are stored in plastic bottles. Pickles can also be stored in plastic jars.
- **Plastics are light and strong:** It is one of the most important properties of plastics due to which it can be used for various purposes. It is light in weight so it can be easily carried from one place to another. Objects made of plastic are strong, thus they do not break easily. Due to these properties, plastics are long-lasting.
- Plastics can be easily moulded into different shapes.
- Plastics are cheaper than the other materials used for the same purpose due to which it becomes the first choice of most of the people.
- **Plastics are bad conductors of heat:** Plastics allow very little or no heat to pass through them and hence are used to make handles of electric irons, heating pans, etc.
- **Plastics are poor conductors of electricity:** Plastics do not allow electric current to pass through them. It is for this reason that electric wires are covered with plastic.

as times as required. Polythene, polystyrene and PVC (polyvinyl chloride) are some examples of thermoplastics.

Some uses of thermoplastics are as follows:

- Polythene is used for making plastic bags, containers for storing water and oil, pipes for transporting water.
- Polyvinyl chloride (PVC) is used for making floor tiles, shoe soles, shoes, pipes, raincoats and bags.

Thermosetting plastics: The plastics which do not get deformed on heating even at high temperatures are called **thermosetting plastics**. These plastics harden on heating and hence, they cannot be reshaped repeatedly. Bakelite and melamine are the common examples of thermosetting plastics.

Some uses of thermosetting plastics are as follows :

- Teflon is used for making non-stick cookwares and as corrosion-proof coating in chemical industry.
- Bakelite is used to make electrical switches and plugs, for making tabletop laminates, combs, fountain pens, etc.
- Melamine is used for making unbreakable dinnerware and decorative objects.

Difference between thermoplastics and thermosetting plastics

Thermoplastics	Thermosetting plastics
1. They can be reshaped or remoulded as many times as possible.	1. They cannot be reshaped even on heating.
2. They become soft and get deformed on heating.	2. They do not melt or become soft on heating.
3. PVC and polythene are the examples of thermoplastics.	3. Melamine and Bakelite are the examples of thermosetting plastics.

PLASTICS AND THE ENVIRONMENT

Plastics are an **integral** part of our life but have several disadvantages. Plastics are **durable** and take a very long time to degrade. Let us discuss some of the disadvantages associated with plastics.

- Plastics are **non-biodegradable**, hence do not decay or rot by natural processes. Therefore, plastic waste causes soil pollution.

Integral: very important and necessary

durable: able to exist for a long time in a good condition

non-biodegradable: materials which do not get decomposed by natural processes



PVC Pipe

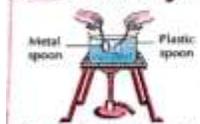


Electric plug made of Bakelite



Melamine cookery

Activity 4



Plastic is a bad conductor of heat

To show that plastics are bad conductors of heat

Take a beaker and boil water in it. Dip a part of a metal spoon and a plastic spoon in it for 10 minutes. Touch the ends of the spoons which are not in water. You will observe that the end of the metal spoon becomes hot but that of the plastic spoon does not become hot.

This proves that plastics are bad conductors of heat.

Types of Plastic

Plastics can be broadly classified into two types – thermoplastics and thermosetting plastics.

Thermoplastics: The plastics which get softened and deformed when heated are called **thermoplastics**. They can be remoulded as many

FACT FILE

Do not use ordinary plastic to heat food in a microwave as it gives out toxic substances. Use only microwave-friendly plastic.



Acrylic article

is also known as **acrilan**. Some well-known acrylic fibres are Orlon, Cashemilon and Acrilan. Some properties of acrylic are

- It is soft and light in weight.
- It is easy to wash and dries quickly.
- It does not shrink, stretch or wrinkle.
- It is resistant to chemicals and moths.

Acrylic is used to make socks, sweaters, shawls, etc. and also in making blankets and rugs.

Lycra

Lycra is a synthetic polymeric fibre also known as **spandex**. Some properties of Lycra include its softness and elasticity like a rubber. It has the ability to stretch and regain its original shape. Lycra is also used to make body-hugging clothes like undergarments and swimwear.

Activity 2

To test different types of fabrics by burning (To be demonstrated by the teacher)

Take different kinds of fabrics listed in the table below. Hold them one by one over a candle flame with the help of a forceps or tongs. Observe the flame carefully. They will show the following burning characteristics:

S.No.	Fibre	Burning Characteristics
1.	Cotton	Burns vigorously, no beads produced, smells like burning paper
2.	Wool and silk	Burns slowly, no beads formed, smells like burning hair
3.	Rayon	Burns readily, smells like burning paper
4.	Nylon	Burns slowly, forms beads, fabric shrinks on coming in contact with the flame
5.	Polyester	Burns slowly, forms beads
6.	Acrylic	Shrinks on coming in contact with the flame, forms a black bead

Advantages of Synthetic Fibres

Synthetic fibres have some advantages over natural fibres. They are as follows:

- They have a high tensile strength and can thus, withstand heavy load.
- They regain their original shape after stretching or compressing.
- Their production is independent of agricultural crops and animal farming.

- They are not attacked by moths.
- They are resistant to bacterial attack and moisture.
- They dry quickly.
- Their cost is comparatively less than natural fibres.
- They are easy to wash and maintain.

Disadvantages of Synthetic Fibres

- They do not absorb moisture and sweat.
- They catch fire easily and melt before burning.
- They **cling** to the skin as they accumulate electric charge on them.

Activity 3

To compare the water holding capacity of synthetic and natural fibres

Take a synthetic fabric like nylon and a natural fabric like wool or cotton of the same size. Soak both the pieces in water for 10 minutes. Take them out of water and hang them on a clothes line. Place a mug below each piece of cloth. Note in which mug more water is collected. Leave the pieces to dry in the sun. Make a note, which one will dry faster.

Time to Answer

- Fill in the blanks.
- Synthetic fibres are made from smaller units called _____.
 - _____ combine to form long chains called polymers.
 - _____ is also called artificial silk.
 - Rayon is made from a naturally occurring polymer called _____.
 - Orlon and Cashemilon are _____ fibres.
 - Lycra is also known as _____.

PLASTICS

Plastics are one of the most commonly used materials nowadays. We use many things made of plastic in our daily life. For example: comb, bucket, chair, tiffin box, scale, bottle, etc. A plastic material is a synthetic or semi-synthetic organic solid that can be moulded. Plastics are typically organic compounds but they often contain other substances. They are most commonly derived from petrochemicals.



Objects made of plastic

cling to stick to something

Synthetic Fibres and Plastics

A comparison between the time taken by plastic and some other materials to decompose is shown in the table given below.

Biodegradable and non-biodegradable materials

S.No.	Material/waste	Nature of material	Approximate time it takes to decompose
1.	Paper	Biodegradable	10-30 days
2.	Cotton	Biodegradable	2-6 months
3.	Vegetables, fruits and other foodstuff	Biodegradable	10-20 days
4.	Wood	Biodegradable	10-20 years
5.	Wool	Biodegradable	10-20 months
6.	Metals such as tin and aluminium	Non-biodegradable	More than 100 years
7.	Plastics	Non-biodegradable	More than 100 years



A drain choked due to plastics



Pollution due to burning plastic materials



Blue bin Green bin

- Dumping plastics in waterbodies poses a threat to aquatic life.
- Burning plastics release toxic gases which cause air pollution. Thus, it may result in various health hazards.
- Plastic bags carelessly thrown on the roads find way into drains, which choke drains and sewage system. This results in the overflow of sewage water. The stagnant water becomes a breeding ground for mosquitoes that cause diseases like malaria.
- Plastic bags thrown in garbage, with food in them, are sometimes consumed by animals like cows. This may choke their respiratory system and lead to death of animals.
- If plastics remain in the soil for a long time, they block the seepage of rainwater through the soil, causing problems in recharging the groundwater.
- Use of recycled plastic bags to keep food items in them is also harmful for health.

Ways to reduce plastic pollution

- The best way to reduce pollution caused by plastics is to recycle them, although it is a very costly process.
- Use jute, cloth or paper bags instead of plastic bags when you go for shopping.
- Reuse plastic bags and containers for other purposes instead of throwing them.
- Try to buy products that have less plastic packaging.
- Dispose off plastic bags properly. The municipal corporation has made available green bins for collecting biodegradable wastes and blue bins for collecting non-biodegradable wastes like plastics.
- Remember the 4R formula (Reduce, Reuse, Recycle and Recover) and follow it to minimise the damage caused by the plastics to the environment.

Each one of us should take up the responsibility to keep public places clean and free from plastics.

FACT FILE
Scientists are trying to produce photodegradable plastics, which can be decomposed by sunlight.



Time to Answer

Write True or False.

- (a) Plastics are soluble in water. _____
- (b) Plastics are good conductors of heat and electricity. _____
- (c) Plastics do not release harmful gases on burning. _____
- (d) Thermosetting plastics get deformed on heating. _____
- (e) Plastics are biodegradable. _____
- (f) We should use jute bags instead of plastic bags to reduce pollution caused by plastics. _____



Key Terms

- Monomer:** a small unit which joins with other similar units to form a bigger unit
- Polymer:** a large unit made up of many small monomers
- Polymerisation:** the process of linking a large number of monomers to form a polymer
- Thermoplastics:** the plastics which can be remoulded repeatedly
- Thermosetting plastics:** the plastics which once set cannot be remoulded



Now I Know

- Synthetic fibres are polymers.
- Synthetic fibres are man-made fibres that are made by the chemical processing of petrochemicals.
- Rayon, nylon, polyester and acrylic are examples of synthetic fibres.
- Synthetic fibres are resistant to bacteria and moisture, have high tensile strength and are cheaper in cost than natural fibres. Synthetic fibres also have some disadvantages.
- Plastics are an integral part of our lives. Plastics are durable, non-reactive, inexpensive, strong, light in weight and poor conductors of heat and electricity.
- Plastics are of two types – thermoplastics and thermosetting plastics.
- Plastics are non-biodegradable and pollute the environment; hence we need to minimise their use and dispose them properly.

Exercise:

FIND THE ANSWERS OF EVERY QUESTIONS GIVEN BELOW FROM THE TEXT ABOVE:-

Q1. Give answer in one word of the following.

- a. Name the first fully synthetic fibre.
- b. Give one example of thermoplastic.
- c. Name the largest producer country of rayon in the world.
- d. Which synthetic fibre is also called artificial silk?
- e. Which artificial fibre is also called spandex?
- f. Which type of plastic cannot be remoulded ?
- g. Which synthetic fibre is also called acrilan?
- h. Which synthetic fibre has properties like wool?
- i. Name the basic component of animal fibre.
- j. Which synthetic fibre is made by using naturally occurring raw material?

Q2. Answer the following question in short (20-30 words).

- a. Write any three disadvantages of synthetic fibre.
- b. Why should plastic not be burnt?
- c. Why electric wires are covered with plastics?
- d. Describe polymerization.
- e. What is the full form of PVC? Mention its uses.
- f. Write two uses of thermosetting plastics.
- g. Write any three properties of rayon.
- h. Why are handles of heating pans made up of plastics?
- i. Why are plastics used to store different kinds of materials?
- j. Write any two uses of thermoplastics.

Q3. Answer the following question in long (40-50 words).

- a. State the difference between thermoplastics and thermosetting plastics.
- b. Suggest some ways to reduce the plastic pollution.
- c. Describe the important properties of plastic.
- d. Write six advantages of synthetic fibre.
- b) Write the properties of (i) Nylon (ii) Acrylic (iii) Polyester

Q4. Think and answer the following questions.

- a. Why does rayon smell like burning paper although it is a synthetic fibre.
- b. Suppose you have 100kg of unused plastic bags. How would you dispose them so that they do not cause any harm to the environment?

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