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OUR FOOD: WHERE DOES IT COMES FROM 1

CONTENTS

- *Food Varieties*
- *Why do we need food*
- *Sources of food*
  - *Plant Parts & Animal Products as food.*
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Food is essential for all the living organisms. Plants prepare their own food and store in their special organs as fruits, tubers, seeds etc. Animals and human beings depend on this stored food of plant. Bigger animals depend on smaller animals for their food. Human beings also depend on animals for their food

INTRODUCTION

You must have noticed that the day you miss your breakfast or lunch, you feel tired and exhausted. It shows that you lack energy to remain active. All living beings need energy to remain alive and active. You get energy from the food you eat.

Definition of Food : Any edible substance, which one eats and which provides material or materials useful for the body of a living being, can be termed as food.

Why food is essential for us ?

1. Food provides us energy.
2. It helps us grow.
3. Food helps us overcome wear and tear.
4. Food protects against diseases.

VARIETY OF FOOD

Food	:	All living things need energy to do work and for growth and repair. They get this energy from the food. Our body uses this energy for doing work.
Food Variety	:	We eat different varieties of food like rice, bread, vegetables, eggs, butter, sweets, cheese, etc.
Ingredients of Food	:	Materials needed to prepare any food item are called ingredients. Two or more than two ingredients are needed to prepare a dish.
Example	:	To prepare boiled rice, rice and water are used, so rice and water are the ingredients for boiled rice. Vegetables, salt, water and spices are used in cooking vegetable curry, so vegetables, salt, water and spices are ingredients of vegetable curry.

Example 1: Why are spices used in our food?

Solution : Spices makes our food tasty.

Example 2: How Kheer is prepared ?

Solution : Kheer is prepared by using milk, rice and sugar.

LIVING THINGS NEED FOOD AND ENERGY

All organisms need food to remain alive grow and get energy for carrying out various life activities. A cow eats grass. Humans eat cooked food.

You have seen the animals and plants also need food and energy. Plant take energy from the sun and make their food using water and carbondioxide. The process of preparing food by green plants is called **photosynthesis.**

Only green plants can make their food from carbon dioxide and water using solar energy are called **autotrophs.** The green plants provide food and energy to all animals on earth. Animals and nongreen

plants do not have a pigment. So they cannot make their own food. They eat plants or other animals to gain energy. They are called **heterotrophs.**

Source of Human Food

Plants as a source of food : Plants are a major source of our food.

Cereals : Wheat, rice, maize, jowar and bajra are called cereals. It is rich in carbohydrates.

Pulses : Pulses are seeds which are rich in proteins. Bengal gram (chana), green gram (among), black gram (urad), lentil (masur), pigeon pea (arhar), beans, kidney beans (rajmah), chick peas (kabuli chana) and soyabean are some examples of commonly used pulses.

Sprouts : To make food more nutritious, some whole grains like green gram or Bengal gram can be made to sprout.

Sprouts are germinating seeds which are rich in proteins and vitamin B-complex.

Vegetables : Different parts of herbaceous plants which are eaten either raw or after cooking are called vegetables. They are a rich source of minerals and vitamins and form the food roughage. Vegetables may be derived from root, stem, leaf, flower or fruit.

Fruits

Many flowers change into fruits. Some fruits are eaten raw and fresh. Apple, peach, pear, mango, banana, chickoo, guava, grapes, orange, papaya, watermelon, litchi, etc. are fruits. The fruits are rich in sugar, vitamins and minerals.

Dry fruits: Some fruits like groundnut, walnut, coconut, cashewnut and almonds are dried and stored to be eaten afterwards. They are rich in oil and vitamins. Raisins are dry grapes and are rich in sugar.

Sugar

Beet root and sugarcane stem have sugar stored in them. The white granules of table sugar and brown jaggery are- obtained from sugarcane juice.

Oils

Seeds of mustard, groundnut, soyabean, til, sunflower, etc. are used for extracting oils.

We also get oil from coconut fruit. Oils are energy-giving foods and are used for cooking food.

Spices

Spices add taste and aroma to our food. Some common spices used in India are cardamom (elaichi), clove (laung), pepper (kali mirch), turmeric (haldi), cinnamon (dal chini), coriander (dhania), ajwain, jeera, chillies, ginger and hing. Spices may be dry seeds, fruits or bark of plants.

Tea and coffee

Tea and coffee are stimulants because they contain a substance called **caffeine.** Tea is obtained by drying tea leaves. Coffee and cocoa powder are prepared from dry seeds of coffee and cocoa plants respectively.

SOMETHING MORE

* We become addicted to tea or coffee because of caffeine. Remember, excessive intake of tea or *coffee* is harmful to our health.
* Some plants have two or more edible parts. For example, mustard leaves are used as green vegetable and mustard seeds give us oil.
* While cutting an onion, substances called sulphides present in it, irritate the eyes and make us cry.

Animal products as a source of food

Animal products, such as meat, egg, fish, milk, cheese, butter, curd, honey etc. are eaten as food. These foods are rich in proteins.

Meat

We get meat from goat, sheep, poultry like chicken, hen, duck, turkey and geese. Fishes, prawns and crabs are a good source of proteins and iodine.

Eggs

Hen eggs are used as food all over the world. They are also used in preparing cakes and pastries. Eggs are a rich source of proteins and vitamins. They can be eaten as boiled, fried, poached or omelette. In addition to chicken eggs, the eggs of ducks and geese are also eaten.

Milk and milk products

We get milk from cows, buffaloes, goats and sheep. Mainly cows and buffaloes are reared for milk. The milk provides protein, fat, vitamins and calcium. It is used for making cottage paneer, cheese, butter, ghee, curd, khoya and sweets.

Honey

Honey is produced by honeybees from the nectar collected from flowers. Honey contains sugar, minerals and enzymes. It has antibacterial action. It is easy to digest and is used to make several ayurvedic medicines. Honey is considered as a better substitute of sugar. Rearing bees for obtaining honey is called **apiculture.**

Example 1: What do you mean by herbivores?
Solution : Animals that eat only plants are known as herbivores.
Example 2: What is poultry? Give Examples.
Solution : Rearing of animals which provide meat and egg are called poultry.
Ex :- Hen poultry, Duck poultry, etc.

OUR FOOD HABITS

All of us normally take three meals a day **-breakfast, lunch and dinner.** We have the different items for all the three meals daily. For a different week the people have different meal plans.

Now you can easily conclude that

- Different people have different choices of food.
- People belonging to different states eat different kinds of food.
- There is a variety in the food eaten even by the people of the same state.
- We all eat different kinds of foods.

a) **Vegetarians:** These are the individuals who depend on plants and plant products for their food. Vegetarian diet comprises only pulses, grains, cereals, fruits, vegetables.

b) **Non-vegetarians:** These are the individuals who depend on animals and animal products for their food. Non-vegetarian diet comprises eggs, meat, fish, poultry etc.

Food and feeding habits

We know that different animals eat different foods. Depending upon the food they eat, animals are classified as herbivores, carnivores and omnivores.

Herbivores : (herba – grass + vorous – eater)

Animals that eat plants or plant parts are called herbivores.

Herbivores have some special or modified body parts to get or eat their food.

* Squirrels, rabbits and rats have sharp front teeth to gnaw (bite) nuts and seeds.
* Humming birds have modified beaks suitable to suck nectar from flowers.
* Horses and cows have broad and blunt teeth to grind the food (grass, black gram, etc.) before it is swallowed.
* Elephants have long trunks to lift their food and put it into their mouth.

Carnivores

Carnivore (carnis – flesh + vorous – eater) means meat - eater. So, animals that eat flesh of other animals are called carnivores or carnivorous animals. Lion, tiger, leopard, frog, lizard, owl, vulture, snake, etc. are carnivores.

Omnivores

Omnivores (omni – all things + vorous – eater) means all things – eater.

Animals that eat plants as well as other animals are called omnivores. We, the human beings, are also omnivores. We eat both plants as well as the flesh of other animals. The people who:

* do not eat meat and eggs are called vegetarians.
* eat plants as well as meat and eggs are called nonvegetarians.

The few animals eat the animals that are already dead and rotten are called **scavengers.**

Some micro-organism are feed on dead plants and animals are called **decomposers**.

Example : Fungi and bacteria.

KEY POINTS

- **Autotrophs :** *Green* plants are called autotrophs as they make their own food by the process *of* photosynthesis.
- **Heterotrophs :** Nongreen plants and all animals are heterotrophs. For them, the main source of food is either plants or animals or both.
- **Herbivores** : Animals which eat plants or plant parts are called herbivores.
- **Carnivores** : Animals which eat other animals are called carnivores.
- **Omnivores** : Animals which eat both plants and animals are called omnivores.
- **Sources of food** : Our food comes from plants as well as from animals.
- **Apiculture** : The practice of bee-keeping is called apiculture.
- **Balanced Diet** : Diet is the food we generally eat. A balanced diet contains all the nutrients required by the body in the right proportion.
- **Nutrients** : Our body needs five groups of nutrients—carbohydrates, fats, proteins, vitamins and minerals.
- **Groups of nutrients** : Carbohydrates and fats are called energy-giving food. Proteins are tissue-building food, and vitamins and minerals are protective food.
- **Carbohydrates** : Sugars and starch are carbohydrates. They contain carbon, oxygen and hydrogen. Starch contains more energy than do sugars. Excess carbohydrates are stored as fat. Accumulation of fat can cause obesity.
- **Fats** : Fats contain carbon, hydrogen and oxygen. They produce- more energy than carbohydrates do but are more difficult to digest. They act as an energy bank, protect the body from cold and cushion internal organs.
- **Proteins** : Proteins contain nitrogen, carbon, hydrogen and oxygen. They are needed to build and repair tissues. Hair, skin, nails, and muscles are made up of proteins.
- **Vitamins and Minerals** : Vitamins and minerals are needed for the proper growth and functioning of the body. Some deficiency diseases due to the lack of vitamins and minerals in the body are as follows.

Vitamin A—night blindness
Vitamin B_1—beriberi
Vitamin B_6—pellagra
Vitamin B_{12}—anaemia
Vitamin D—rickets
Vitamin C—scurvy
Iodine—goitre
Calcium—weak bones and iron
Phosphorus—weak bones and teeth

FACT FILE

1. There is a a food substitute intended to supply all daily nutritional needs, known as "Soylent"
2. Coconut water can be used (in emergencies) as a substitute for blood plasma.
3. Almost **HALF** of the world's food is thrown away every year.
4. CARROTS were originally PURPLE
5. Honey is the only food that will never rot, it can last 3000 years.
6. Cheese is the most stolen food in the world.
7. An average person in the U.S. eats 35 tons of food in a lifetime.
8. There is no single food that provides all the nutrients that humans need, except for breast milk.
9. Eating fast food regularly has the same impact on the liver as hepatitis.
10. Even thinking about a favourite food triggered release of dopamine, a feel-good hormone also produced during sex and drug use.
11. Octopuses are eaten alive in Korea.
12. India has the world's lowest meat consumption per person.
13. Almost 70 percent of the red meat eaten globally is goat meat.
14. During the average meal, you eat over 90,000 miles of DNA.

DIAGRAM BASED QUESTIONS

1. Identify the food items and Illustrate its uses and importance about them.



Ans. **Clove (Laung)** It is used as a cooking ingredient mainly for seasoning or preparing masalas.Clove oil is beneficial for coping with tooth ache and sore gums. It is also beneficial remedy for chest pains, fever, digestive problems, cough and cold.

Coriander (Dhaniya) Coriander leaves as well as coriander seeds are used in cooking.

It also has some medicinal uses. It can be used externally on aching joints and rheumatism.

It is also good for coping with soar throat, allergies, digestion problems, hay fever etc.

Cumin (Zeera) It is used for cooking and it also possesses medicinal properties.

It is a good source or iron and keeps immune system healthy. Water boiled with cumin seeds is good for coping with dysentery.

Curry leaves(Curry Patta) It is used as a main ingredient for seasoning in some countries. It has many medicinal uses.These leaves are beneficial for reducing blood sugar. Each part of the plant provides some benefit or the other. The dried leaves are extensively used in herbal medicines.

2. Identify the picture and write its importance.

Ans Turnips

Turnips are very low calorie root vegetables; carry just 28 calories per 100 g. They are very good source of anti-oxidants, minerals, vitamins and dietary fiber. Fresh roots indeed one of the those vegetables that are rich in vitamin C.

NCERT QUESTIONS AND ANSWERS

1. Do you find that all living beings need the same kind of food?

Ans. No, the food requirements of all living organisms are different. Depending on the food requirements, living organisms are grouped into three categories:

- Herbivores: Animals which eat only plants and plant products are called herbivores. For example: Cow, elephant, rabbit, horse, etc.
- Carnivores: Animals which eat other animals are called carnivores. For example: Lion, tiger, lizard, etc.
- Omnivores: These animals eat both plants and animals. For example: Dog, cat, crow, etc.

2. Name five plants and their parts that we eat.

Ans. Plants - edible parts
Carrot - root
Potato - stem
Carrot - root
Apple - fruit
Cabbage - leaf

3. Match the items given in Column A with that in Column B

Column A	Column B
Milk, curd, panner ghee	eat other animals
Spinach, cauliflower, carrot	eat plant and plants products
Lions and tigers	are vegetables
Herbivores	are all animal products

Ans.

Column A	Column B
Milk, curd, panner ghee	are all animal products
Spinach, cauliflower, carrot	are vegetables
Lions and tigers	eat plant and plants products
Herbivores	eat other animals

4. Do you find that all living beings need the same kind of food?

Ans. No, the food requirements of all living organisms are different. Depending on the food requirements, living organisms are grouped into three categories:

- Herbivores: Animals which eat only plants and plant products are called herbivores. For example: Cow, elephant, rabbit, horse, etc.
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6. Match the items given in Column A with that in Column B

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Herbivores	are all animal products

Ans.

Column A	Column B
Milk, curd, panner ghee	are all animal products
Spinach, cauliflower, carrot	are vegetables
Lions and tigers	eat plant and plants products
Herbivores	eat other animals

7. Fill up the blanks with the words given:
Herbivore, plant, milk, sugarcane, carnivore
(a) Tiger is a _____ because it eats only meat.

Ans. Carnivore
(b) Deer eats only plant products and so, is called _____.

Ans. Herbivore
(c) Parrot eats only _____ products.

Ans. Plant
(d) The _____that we drink, which comes from cows, buffaloes and goats is an animal product.

Ans. Milk
(e) We get sugar from _____ .

Ans. Sugarcane

8. Fill up the blanks with the words given:
Herbivore, plant, milk, sugarcane, carnivore
(a) Tiger is a _____ because it eats only meat.

Ans. Carnivore
(b) Deer eats only plant products and so, is called _____.

Ans. Herbivore
(c) Parrot eats only _____ products.

Ans. plant
(d) The _____that we drink, which comes from cows, buffaloes and goats is an animal product.

Ans. milk
(e) We get sugar from _____ .

Ans. sugarcane

PRACTICE QUESTIONS

Very Short Answer Type Question

1. Give one word for the following :
   (i) *Animals which eat other animals.*
   (ii) *Organisms which can manufacture their own food.*
   (iii) *Animals which eat plants and plant products only.*
2. What are the different food products obtained from animals?
3. Name the animals which provide us milk, egg, meat, honey and fats.
4. From the following plants, find out the edible parts :
   Brinjal, sugarcane, banana, wheat, mustard and carrot.
5. From which plants we obtained grains, pulses, oils and fruits ? Name two each plants.
6. Name the plants from which we obtained vegetables ?
7. From where do we obtain chapati ?
8. How is ghee prepared from cow milk ?

Short Answer Type Question

9. Name six plant products which are useful to man.
10. Name some animal products which are useful to man.
11. Name the different food groups.
12. Name three sources each of carbohydrates, fats and proteins.
13. What are the essential nutrients of our body ?

Medium Answer Type Question

14. Which are protective foods ?
15. Why is Indian diet considered as a balanced diet ?
16. Name the nutrient in the milk which
    (a) helps in growth & repair of body.
    (b) helps in making bones & teeth strong.
    (c) provides energy to the body.

Long Answer Type Question

17. What is the importance of food ?
18. In what ways we can help for providing food to many people ?
19. Answer the following questions :
    (a) *In a day's meal, note down the different types of food that we should eat, so that, we have a complete diet. Explain it.*
    (b) *Do you feel that food is essential in the time of sleeping ?*
    (c) *Do you feel that all living beings need the same kind of food ?*

MULTIPLE CHOICE QUESTIONS

ASSIGNMENT - 1

1. Given below are names of some animals

   (i) Goat (ii) Human beings (iii) Cockroach (iv) Eagle

   Which of the above animals form a pair of omnivores?

   (A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (ii) and (iv)

2. Honeybee makes honey from

   (A) pollen (B) petals (C) nectar (D) bud

3. Below are names of some animals

   (i) Cow (ii) Sheep (iii) Horse (iv) Ox

   Which of the above are sources of milk for human beings?

   (A) (i) and (iii) (B) (i) and (ii) (C) (ii) and (iii) (D) (iii) and (iv)

4. Given below is a list of edible plants

   (i) Banana (ii) Pumpkin (iii) Lady's finger (iv) Brinjal

   Which pair of plants have two or more edible parts?

   (A) (i)and (ii) (B) (ii) and (iii) (C) (in) and (iv) (D) (i)and(iv)

5. The part of a banana plant not used as food is

   (A) flower (B) fruit (C) stem (D) root

6. Read each set of terms and identify the odd set

   (A) Cow, milk, butter (B) Hen, meat, egg

   (C) Goat, milk, meat (D) Plant, vegetable, butter milK

7. Glucose and fructose are

   (A) starches (B) fats (C) sugars (D) none of these

8. Starch is a kind of

   (A) carbohydrate (B) fat (C) protein (D) vitamin

9. Vitamins and minerals are

   (A) tissue-building nutrients (B) energy-rich nutrients

   (C) protective nutrients (D) none of these

10. Which part of the plant is cabbage?

    (A) Root (B) Fruit (C) Leaves (D) Flower

ASSIGNMENT -2

1. Herbivores eat only
   (A) Animals (B) Plants
   (C) Both plants and animals (D) Dead bodies of animals
2. Eagle is
   (A) Carnivore (B) Omnivore (C) Herbivore (D) Scavenger
3. Which of the following is a Carnivore?
   (A) Horse (B) Goat (C) Lion (D) Deer.
4. The plant part eaten in case of radish is
   (A) Stem (B) Root (C) Flower (D) Seed
5. Bees store in their beehive
   (A) Honey (B) Eggs (C) Curd (D) All these
6. Sources of food is from
   (A) Both plants and animals (B) Animals only
   (C) Plants only (D) Sprouts
7. For which of the following purpose do organism required food?
   (A) To provide energy for various activities of the body.
   (B) For reproduction, growth and development.
   (C) To protect from diseases
   (D) All of them.
8. Which of the following statement is not true?
   (A) There is a lot of variety in the food we eat.
   (B) We eat different food items at different times of the day.
   (C) People from different states of India eat the same kind of food.
   (D) A food item is prepared using two or more materials.
9. The ingredients present in cooked dal (pulse) are
   (A) Rice, urad dal, salt and water
   (B) Dal (any) water, salt, oil and spices.
   (C) Milk, rice and sugar
   (D) Atta and water.
10. Kheer is prepared by using
    (A) Vegetable, salt, oil, spices and water
    (B) Atta (flour) and water
    (C) Milk, rice and sugar
    (D) Rice and water.

ASSIGNMENT - 3

1. This food is obtained from animals.
   (A) Sugar (B) Honey (C) Jaggery (D) Jam
2. Which of the following is not made using both plant and animal sources of food?
   (A) Hamburger (B) Cake (C) *Kheer* (D) *Rott*
3. Which of the following is a balanced diet?
   (A) *Roti,* rice, pulses, yoghurt (B) Rice, pulses, vegetables, roti
   (C) Rice, pulses, fruit, *kheer* (D) *Roti,* pulses, vegetables, yoghurt, fruit
4. Which of these are rich in energy?
   (A) Cereals (B) Iodine (C) Salt (D) Sugar
5. Which of these are caused by a deficiency of minerals only?
   (A) Anaemia (B) Rickets (C) Beriberi (D) Goitre
6. Which of the following are good for the eyes?
   (A) Carrots (B) Sun light (C) Citrus fruit (D) Wheat
7. Which of the following are needed for strong teeth?
   (A) Calcium (B) Nitrogen (C) Iodine (D) Iron
8. Night blindness is caused due to lack of
   (A) Vitamin A (B) Vitamin B (C) Vitaminc C (D) Vitaminc D
9. A goat is a
   (A) Herbivore (B) Carnivore (C) Omnivore (D) Scavenger.
10. Lions and Tigers eat
    (A) Only plants or plant products. (B) Other animals.
    (C) Both plants and animals. (D) Dead animals.

MISCELLANEOUS QUESTIONS

Filling the blanks

1. Food ingredients in case of cooked rice are____and____
2. In case of kheer, the food ingredients are____and____
3. Idli contains____ingredients (Mention the no. of ingredients).
4. Crow is an example of____as it eats plants and animals.
5. Deer is an example of____as it eats only plants.
6. The edible plant part in spinach is the ____.
7. A carnivore is an animal which eats____
8. Carrots and radish are foods obtained from____of plants.
9. Honey is prepared by the bees from the____.
10. Egg and meat are provided by____ animals
11. Sugar is obtained from the stem of____.
12. Materials which are used to prepare food items are called____.
13. The ingredients used to prepare chapatti are____and____.
14. ____eat only plants or plant products.
15. ____and ____ eat other animals.
16. Animals that eat dead bodies of animals are called as ____.
17. A crow is an example of____animal.
18. Organisms that prepare their own food are called____.
19. ____ is the example of a stem which is edible
20. ____ and ____are examples of spices.
21. ____ is an example of an edible flower.
22. Animals which provide meat and egg are called____.
23. Germinated seeds are called____.

State whether the following statements are true (t) or false (f)

24. Number of food ingredients in a chapati / roti is two ( )
25. Cockroaches are omnivores . ( )
26. Animals that eat plants are herbivores. ( )
27. An elephant is a carnivore. ( )
28. A potato is the underground root. ( )
29. Curd is an animal product . ( )

30. Honey is produced by honeybees. ( )
31. We need food to protect our body from diseases and keep it healthy ( )
32. Food eaten at breakfast, lunch and dinner is the same. ( )
33. Fruits like banana and apple consist of two or more material. ( )
34. Chapati is prepared using flour (atta) and water. ( )
35. Scavengers help to keep the environment clean. ( )
36. A crow is a carnivore. ( )
37. Human beings are omnivores. ( )
38. The edible part in ginger is the root ( )
39. The edible part in corn is the seed. ( )
40. The edible part in cauliflower is the fruit. ( )
41. Milk is obtained from cow, buffalo and goat. ( )

Match the following

42.

Column A		Column B	
i)	Honey	1)	Herbivore
ii)	Egg	2)	Milk Product
iii)	Human being	3)	Sweet liquid
iv)	Cow	4)	Omnivore
v)	Paneer	5)	Hen
vi)	Cabbage	6)	Edible part — seed
vii)	Wheat	7)	Edible part —leaf.

43.

Column A		Column B	
i)	Boiled Rice	1)	Tiger
ii)	Herbivore	2)	Eats both plants and animals
iii)	Sugar	3)	Scavenger
iv)	Kheer	4)	Rice grains and water
v)	Meat	5)	Cow, buffalo and goat
vi)	Carnivore	6)	Eats only plants
vii)	Wheat	7)	Sheep, goat, chicken, fish
viii)	Omnivore	8)	Milk, rice, sugar
ix)	Milk	9)	Edible part is seed
x)	Vulture	10)	Sugarcane.

COMPETITIVE CORNER

1 Which of the following is an omnivore?

(A) Human being (B) Crow (C) Cockroach (D) All

2 Scavengers eat

(A) Only plants or plant products (B) Others animals

(C) Dead animals (D) Both plants and animals

3 Eggs are obtained from

(A) Hen (B) Duck (C) Honeybees (D) Both a and b

4 Green plants are called producers because

(A) They are green in color (B) They can prepare their own food

(C) They provide food to animals (D) They do not eat the plants

5 The edible part of a mango is

(A) Fruit (B) Stem (C) Leaf (D) Root

6 The edible part of potato and onion are

(A) Fruit (B) Stem (C) Leaf (D) Root

7 The edible part in radish and carrot is

(A) Fruit (B) Stem (C) Root (D) Leaf

8 The edible part of cabbage is

(A) Fruit (B) Stem (C) Root (D) Leaf

9 Poultry products are rich in

(A) Carbohydrates (B) Fats (C) Proteins (D) Vitamins

10. It is not a source of milk.

(A) Cow (B) Hen (C) Goat (D) Buffalo

ANSWER KEY

Multiple Choice Questions

Assignment -1

1. (B)	2. (C)	3. (B)	4. (A)	5. (D)	6. (D)
7. (C)	8. (A)	9. (C)	10. (C)		

Assignment -2

1. (B)	2. (D)	3. (C)	4. (B)	5. (A)	6. (A)
7. (D)	8. (C)	9. (B)	10. (C)		

Assignment - 3

1. (B)	2. (D)	3. (D)	4. (A)	5. (A)	6. (A)
7. (A)	8. (A)	9. (A)	10.(B)		

Miscellaneous Questions

Fill in the blancks

1. rice , water	2. Milk, rice, sugar	3. 4	4. Omnivores	5. herbivores
6. leaf	7. other animals	8. root	9. nectar	10.poultry
11. sugarcane	12. ingredients	13.atta, water	14. herbivores	15.carnivores, omnivores
16. scavengers	17. omnivore	18. producers	19. potato/sugarcane	
20. chillies, turmeric		21. cauliflower/ rose/spathe	22.poultry	23.sprouts

True and false

l. True	2.True	3. True	4. False	5. False	6. True
7.True	8. True	9. False	l0. False	11. True	12. True
13. False	14.True	15.False	16.True	17. False	18.True

Match the following

1. i) - 3; ii)-5; iii)-4; iv)-1; v)-2; vi)-7; vii)-6

2. i) - 4; ii)-6; iii)-10; iv)8; v)7; vi)1; vii)9; viii)2; ix) 5; x)3

Competitive Corner

1. (D)	2. (C)	3. (D)	4. (B)	5. (A)	6. (B)
7. (C)	8. (D)	9. (C)	10.(B)		

HINTS AND SOLUTIONS

PRACTICE QUESTIONS

1. (i) Carnivorous (ii) Autotrophs (iii) Herbivorous.
2. Different food products obtained from animals are milk, egg, honey eat butter, honey, ghee, etc.
3. We get milk from cow, buffalo, goat and sheep. Eggs are provided to us from hens. Honey is obtained from honey bees. Meat provided to us from cock, hen, deer, rabbit and buffalo etc. They also provide us fats such as pigs.
4.

S. *No.*	*Name of the plants*	*Edible parts*
1.	Brinjal	Fruits
2,	Sugarcane	Stem
3.	Banana	Fruits
4.	Wheat (Grains)	Seeds
5.	Mustard	Stem, leaves and seeds.
6.	Carrot	Root

5. (i) Grains: We obtain from rice, wheat and maize, etc.
   (ii) Pulses : We get from urad, moong, masoor and gram. etc.
   (iii) Oils : Oil yielding plants are mustard, sunflower etc.
   (iv) Fruits : Mango, orange, lichi and guava etc.
6. We obtain vegetables from carrot, radish, cauliflower, brinjal, cabbage and mustard plants. We obtained vegetables from their roots, stems, leaves and fruits.
7. We obtain chapatis from wheat flour. It is prepared by flour mills by grinding wheat grains. Wheat grains are provided by fanners.
8. Cow milk is heated and curd is mixed in it. It is then centrifuged to obtain cream. Cream is converted to butter and after heating and filtering we obtain ghee.

SHORT ANSWER TYPE QUESTION

9. The products of plants which are useful to man are food such as grains, pulses, oils, fruits and vegetables. We also get different type of spices from plants. We get wood, wax, lakh, silk and fibres from plants. There are so many products which are useful to mankind.
10. We obtain many products from animals. We obtain milk, eggs and meat from different animals. Many animals provide skin and bones which we use in making shoes and fertilizers. Animal wastes are used as manures for improving soil fertility. They also provide us wool.
11. Different food groups are :
    (i) **Energy-providing food** : Carbohydrates and fats.
    (ii) **Body-building food :** Proteins.
    (iii) **Protective-food** : Fruit's, green vegetables and others.
12. Sources of:
    (i) **Carbohydrates:** Rice, wheat, sugar and jaggery etc.
    (ii) **Fats** : Butter, ghee, oils etc.
    (iii) **Proteins** : Eggs, milk, meat, pulses and soyabean etc.

13. The essential nutrients of our body are :
    (i) Carbohydrates, (ii) Proteins, (iii) fats, (iv) vitamins and
    (v) minerals.

MEDIUM ANSWER TYPE QUESTION

14. Those foods which are rich in minerals and vitamins such as green leafy vegetables and fruits. Mineral rich food are vegetables, meat, fish, egg, milk and pulses.
15. Indian diet is considered as a balanced diet because it contains all the nutrients which are necessary for our body. They are carbohydrates, fats, proteins, vitamins and minerals. They provide all nutrients to our body. Water and roughages are in right quantity in our diet.
16. (a) protein (b) calcium (c) milk sugar (lactose).

LONG ANSWER TYPE QUESTIONS

17. Food is needed by all living species for four main purposes :
    (i) An important function of food is to help a living organism to grow, if enough food is not given or it is not of the right kind, growth will not be sufficient or healthy.
    (ii) Second important function of food is to provide energy. We need energy for doing physical work. We use more energy when we run than when we walk and less energy when we sleep. Energy is given by hidden materials present in our food.
    (iii) Food is also needed by living beings for replacement and repairing their damaged body parts. We need food for the formation of new skin and tissues.
    (iv) Food gives us resistance against diseases and protects us from infections.
18. Our country people do not have enough food to eat. There are many reasons for it but main reason is poverty. So we can help in this regard by using following ways :
    1. We should grow more food.
    2. The food that we produce should not get spoilt or eaten away by animals.
    3. Each of us should be sure not to waste food.
    4. All of us should use easily and cheaply available food in the region.
19. (a) In a day's meal we should eat fruits, vegetables, chapati, rice, pulses, milk, oil/ghee and sugar in our daily diet. It will be a balanced diet. Carbohydrate, fats, proteins, vitamins and minerals, makes a balanced diet. Lack of any of the above foodstuffs, causes many diseases. For example lack of carbohydrate leads to lethargy and feeling of tiredness. Similarly, lack of fats causes rough skin, weak eyesight etc. Insufficient protein can slow down growth of children. Different type of food gives us carbohydrate, fats, proteins, vitamins and minerals, which are the essential component of a balance diet.
    (b) Yes, we feel that food is necessary when we are sleeping. During the time of sleeping, many physiological and metabolic processes are continued in our body. Our body needs energy for doing these processes and .we need food during sleeping for getting energy.
    (c) No, all living beings need different kinds of foods. Herbivorous, eats plants and plant products. Carnivorous eats other animals which eats plants and plant products and omnivorous eats both types of food—plants and animals. Different living beings need different amount or quantity of energy for doing their work. So they need different types of foods.

COMPONENTS OF FOOD 2

CONTENTS

- *Components of Food*
- *Nutrients or Foods on the basis of their role*
- *Balanced Diet*
- *Deficiency Diseases*
- *Minerals -Functions etc.,*

  Malnutritioin & Undernutrition
- *Key Points*
- *Fact File*

Food contains various components which provide us the essential nutrition. The basic components of food are called nutrients.

Carbohydrates, proteins, fats, vitamins and minerals are the nutrients which all of us need in our food.

Carbohydrate is energy giving food and is consumed in the largest amount.

Fat is also energy giving food but it is consumed in a small amount.

Protein is body building food and is required for growth and repair.

Vitamins help our body to fight diseases.

Minerals are required for various biological activities.

A diet which contains all the nutrients in right amount is called a balanced diet.

INTRODUCTION

Our food is a mixture of different types of substances that fulfil the needs of our body. The major nutrients in our food are **carbohydrates, fats, proteins, vitamins and minerals.**

Carbohydrates, fats and proteins make up the bulk of our food. Vitamins and minerals, though crucial for health, are needed in small quantities.

On the basis of functions nutrients are grouped into three categories:

(i) **Energy-giving foods:** These foods are rich in carbohydrates and fats. They provide energy to the body.

(ii) **Body-building foods:** These foods are rich in proteins. They help our body to grow.

(iii) **Protective foods:** These foods are rich in vitamins and minerals that protect our body against diseases and control our metabolism.

(iv) **Dietary fibres and water** are also important components of our food. Dietary fibres form the **roughage** part of our food. They help in the movement of bowel in the intestine.

Water helps our body to absorb nutrients from the food. It also helps in removing the wastes from the body.

Name of the Nutrient	Source	Function
Carbohydrates (energy giving food)	Rice, Potato, Wheat, sugar	Provide energy
Fats (energy giving food)	Butter, ghee, milk, cheese	Give more energy compared to carbohydrates
Vitamins and minerals (protective food)	Fruits and vegetables	Require for normal growth and development
Proteins (body building food)	Milk, eggs, meat, fish, soybean	Help in building and repair of body

CARBOHYDRATES

Carbohydrates are the main energy-giving food. They are formed in green plants during photosynthesis. They give us energy to do work and play.

Cereals and many other food items, such as apples, peas, beans, potatoes, vegetables and dry fruits are good sources of carbohydrates. Many processed foods, such as bread, pizza, burger, noodles, jams, jellies, etc. are rich in carbohydrates. We eat different foods because different foods have different nutrients. So to get all the nutrients, we must eat a variety of food every day.

Carbohydrates are of three types: **sugars, starch and cellulose.** Starch and sugars make the major part of our food.

(A) Sugars

Sugars are simple carbohydrates having sweet taste. These are soluble in water. Glucose, lactose, fructose and sucrose are examples of sugar. The main sources of sugar are:

* Fruits, which are sweet because they contain **glucose** or **fructose.**
* Honey also contains **sucrose and fructose.**
* **Lactose** is the sugar found in milk.
* Jaggery contains **sucrose.**

(B) Starch

Starch is a complex carbohydrate present in our food. A starch molecule is made up of a large number of glucose molecules joined together to form a long chain.

Starch is tasteless, odourless and like a white powder. It is insoluble in water. Major sources of starch are wheat, rice, maize and potatoes.

* Wheat flour is used to make bread, chapatis, pancakes, biscuits, cakes, etc.
* Rice is the world's third largest crop. It is also used in making idli and dosa.
* Corn or maize is used in making cornflakes and popcorn. Potatoes are rich in starch. They are used as staple vegetable.

Test to confirm the presence of carbohydrate (starch)

The following steps are performed to test the presence of starch in a food item.

- Take small quantity of the food item to be tested on a porcelain tile.
- Dilute it with two drops of water.
- Put 2-3 drops of iodine solution on it.
- Observe the colour of the food item.
- Change of colour in the food item into blue-black indicates the presence of starch in the food item.

(C) Cellulose

Cellulose is also a complex carbohydrates like starch. It is also tasteless and a white substance. It occurs in the cell wall of plant cells, wood, cotton and jute in the form fibres.

What happens to carbohydrates that we eat

Carbohydrates eaten either as sugar or starch are broken down to glucose in the alimentary canal. Glucose enters the blood which distributes it to every cell of our body.

The cells of our body use the glucose for instant energy. So, it is known as the source of instant energy in the body. Even temporary shortage of blood glucose can severely affect brain functioning.

Fats

- Fats are energy-giving food. They provide us with more energy when used up by the body.
- Fats are stored in our body for future use.
- Fats from animal sources include milk, butter, ghee, cheese and meat.
- Fats from plants are called as oils.

Test for Fats

The following steps are performed to test the presence of fat in a food item. Take a small quantity of the food item to be tested.

- Wrap the food item in a small piece of paper.
- Crush the food item wrapped in the paper.
- Straighten the paper.
- Dry the paper by keeping it in sunlight for a while.
- An oily patch on the paper indicates the presence of fat in the tested food item.

Proteins

Proteins are body-building nutrients. They are compounds of carbon, hydrogen, oxygen and nitrogen. Some proteins also contain sulphur, phosphorus or a metal.

A protein molecule is formed of a number of smaller molecules called **amino acids.** Twenty different kinds of amino acids join in a specific number and order to make a single protein molecule.

Proteins in our diet come from both plant and animal sources. Plants are able to produce all the amino acids they need. But our body is not able to produce 8 out of the 20 amino acids. These amino acids are called essential **amino acids.** They must be supplemented by food in our diet. Pulses, cereals, groundnuts, beans and dry fruits are the sources of plant proteins. Soyabean is the richest source of protein. Proteins form the main structures of our body like muscles, skin, hair and nails. They are needed for growth and repair of our body cells. They also help in making new cells and tissues.

Our blood contains a protein called **haemoglobin** which carries oxygen from lungs to the cells and carbon dioxide from the cells to the lungs. Oxygen is needed for the oxidation of food and release of energy. When our food does not have sufficient carbohydrates and fats, proteins are burnt in the body to give us energy.

Proteins protect us from diseases by producing antibodies. But our body does not store proteins. Therefore, some proteins are essential in our daily intake of food. Also, if more proteins are eaten they are converted into fats.

The daily requirement of proteins for a healthy person is about 1 gram per kilogram of body weight. However, the protein requirement of a person depends on age, gender and health conditions. The growing children, pregnant women and mothers nourishing a child need more proteins. Patients recovering from a disease also require more proteins. Children getting less proteins in their diet grow underweight and skinny with little flesh on their bones.

Test to confirm the presence of protein

The following steps are performed to test the presence of protein in a food item.

- Take a small quantity of the food item to be tested.
- Grind the food item and powder it by mashing .
- Put the food item into a test tube.
- Add 10 drops of water into the same test tube.
- Add two drops of copper sulphate solution to the same test tube.
- Add 10 drops of caustic soda solution and shake the same test tube.
- Violet colour indicates the presence of proteins in the tested food item.

Vitamins

Vitamins are needed by our body in very small quantities. But they are essential for the growth and maintenance of our body. Vitamins do not provide energy to us. They just help the body in the proper utilisation of carbohydrates, fats and proteins. They play a vital role in many chemical reactions that take place in our body.

Our body needs vitamins A, B (B-complex), C, D, E and K. B-complex is a group of several vitamins named as B_1, B_2, B_6, B_9 and B_{12}.

Since, our body can make only two vitamins, vitamin D and K, other vitamins must be present in our food. There are two classes of vitamins.

The vitamins which are soluble in water are termed as **water-soluble vitamins** and the vitamins that are soluble in oil are called **fat-soluble vitamins.**

Water-soluble vitamins: These vitamins (vitamin B and (C) are absorbed in the blood stream and excess amount is thrown out of the body. As these vitamins are not stored in the body, they need to be regularly supplied through food.

Fat-soluble vitamins: Vitamin A, D, E and K are fat-soluble vitamins. These vitamins are stored in the fat of the body and are used only when the body used them.

Vitamins help in protecting our body against diseases. They also help to keep our eye, bones, teeth and gums healthy.

Our diet must contain fresh fruits and vegetables. Vegetables should not overcooked because vitamin C gets destroy by overheating.

Minerals

Minerals are inorganic salts that contain chemical elements. Our body needs minerals like calcium, iron, iodine, phosphorus, sodium, fluorine in small amounts. Each one is essential for proper growth of the body and to maintain good health.Calcium and phosphorous are essential for proper formation of bones. Calcium is also needed for clotting of blood in case of some injury.

* Iron is needed for the formation of haemoglobin (red pigment) in the blood.
* Sodium and potassium help to maintain water balance in the body. Sodium is also needed for the transmission of messages in the nervous system and for the contraction of muscles.
* Iodine is needed for the normal functioning of thyroid gland. Its deficiency causes goitre.

Dietary fibres

We get dietary fibres from vegetables, whole grains, pulses and fresh fruits. The dietary fibres are formed of cellulose. Since we cannot digest cellulose, the dietary fibres do not provide us any nutrients. They simply add bulk to our food and help to get rid of undigested food. Therefore, dietary fibres are said to form food **roughage.**

Roughage helps in the retention of water and easy digestion of food by adding bulk to the food. It helps in easy and regular movement of bowel and thus prevents constipation. It also reduces excess of acidity in the stomach. Our intestine uses fibres to form stool. Stool is the solid undigested waste that is passed out of the body. Fibres make the stool soft and easy to pass through anus. Lack of fibres in our diet causes the stool to become hard and difficult to pass out. This condition is known as **constipation.**

Water

Water is essential for life. About two-third of our body weight is water. It maintains our body temperature and is needed in their excretion of body wastes. It also acts as a medium for biochemical reactions in our body. It helps in the transportation of nutrients in our body.

Normally, we get most of the water required by our body from the liquids we drink, such as water, milk and tea.

All fruits and vegetables also contain large quantities of water. Grapes are very rich in water content. They contain more than 50 per cent of their weight as water. Watermelon is the richest in water content. Excessive water loss from the body causes dehydration. Due to dehydration, blood becomes thicker causing severe pain and cramps. We can make up the loss of water and minerals from the body by adding one teaspoonful of sugar and a pinch of salt to 200 mL of water and drinking this solution. This solution is called rehydration solution.

Example 1:

Why we do not eat excess fats?

Solution :

If we eat excess fats they store under skin and cause high blood pressure and overweight. So avoid eating excess foods.

Example 2:

Why patients and Sport man are given Glucose solution?

Solution :

Glucose gives our body energy instantly.

DIET

The food we take every day, like dal, chapati, rice, curd, vegetables, fruits and milk is called our diet. We need all the essential nutrients, water and dietary fibres to keep our body active and healthy.

Nutrients, Their Main Source and Their Percentage in Our Daily Diet

Nutrients	Main sources	Percentage
Carbohydrates	Cereals (wheat, rice, maize) sugar, potato	60%
Fats	Oil, butter, milk. cheese	15%
Proteins	Eggs, meat, fish, milk, *cheese* pulses, soyabean	25%
Vitamins	Fruits, vegetables	Small amount
Minerals	Milk, meat, fish, eggs, vegetables, fruits, pulses	Small amount

Balanced Diet

The diet which contains all the essential nutrients in right proportion is called a balanced **diet.** It varies from person to person depending upon the sex, age group and profession.

Recommended Daily Balanced Diet for A 12-Year Old Child

Food	Vegetarian	Nonvegetarian
Cereals (wheat + rice)	320 g	320 g
Fats and oil	35 g	35 g
Pulses	70 g	60 g
Green leafy vegetables	75 g	100 g
Other vegetables	75 g	75 g
Fruits	50 g	50 g
Sugar and jaggery	50 g	35 g
Milk	250 g	250 g
Meat, fish and egg	—	1 egg or 30 g meat

A balanced diet should provide us:

* The required energy.
* Materials to repair the damaged cells or tissues in our body.
* Materials for growth and reproduction.

Calorie

* 1 Calorie (C) is the amount of heat needed to raise the temperature of 1,000 gram of water by one degree centigrade.
* Both the energy content of food and the energy needs of the body are expressed in terms of calorie. The calorie value of food is measured as the amount of heat produced when a certain amount of food is burnt.

DEFICIENCY DISEASES

Disease is the abnormal condition which makes the body weak and a person cannot perform his normal work. Deficiency diseases are the diseases which occur mainly due to the deficiency of one or more nutrients in the diet over a long period of time.

Vitamins :

Vitamins	Functions	Deficiency Diseases	Symptoms	Sources
A	Keeps the eyes and skin healthy	Loss of Vision (night blindness)	• Loss of vision in the dark (night)	Carrol, tomato, green leafy vegetables (spinach), yellow fruits (mango), milk, butter and fish liver oil
B Complex B_1	Helps in energy release	Beri-beri	• Very little energy to work • Weak muscles	Cereals, peas, potatoes, yeast, meat and milk
B_{12}	Formation of red blood cells	Anaemia	• Blood is deficient in red blood cells, so skin looks pale • Lack of appetite	Meat, liver, yeast, fish and milk
C	Keeps teeth, gums and bones healthy	Scurvy	• Swelling and bleeding of gums • Swelling of joints	Citrus fruits (lemon, orange), tomato and sprouts
D	Formation of strong bones and teeth	Rickets	• Weak bones • Decaying teeth, bow legs and development of pigeon chest conditions	Sunlight, milk, fish and eggs
K	Helps in blood clotting	Clotting of blood is affected	• Bleeding from gums	Spinach , cabbage, eggs and liver

Minerals :

Minerals	Functions	Deficiency Diseases	Symptoms	Sources
Calcium	• Healthy bone and teeth formation • Helps in blood clotting	Bones and tooth decay (rickets in children)	• Brittle bones • Tooth decay • Excessive bleeding	Milk, cheese and green vegetables
Sodium and Potassium	• Helps in maintaining body's water balance	Body and muscle weakness and paralysis	• General weakness • Dehydration	Salt and most foods
Phosphorus	• Bone and teeth formation	Rickets in children	• Weakening of bones and teeth • Body weakness	Bread, cheese, potatoes, milk, eggs and meal
Iron	• Formation of red pigment of blood (haemoglobin)	Anaemia	• Pale body colour • Whitish nails • Body weakness	Cereals, pulses, green leafy vegetables, meat eggs and lever
Iodine	• Thyroid gland function	Goitre	• Enlargement of thyroid gland (in the neck) • Mental retardation in children	Sea food and iodised salf.
Fluorine	• Makes teeth stronger	Dental decay	• Increased tooth decay	Sea food and tea

Wheat rich in carbohydrates is poor in nutrients like proteins and fats. Too much intake of wheat products results in deficiency of proteins and fats, thereby reducing the growth. Lack of proteins also results in stunted growth. It can cause skin diseases, swelling of the face, discolouration of hair, and even causes diarrhoea.
So, a balanced diet is to be taken to avoid deficiency diseases.

UNDERNUTRITION AND MALNUTRITION

Undernutrition

When the body gets less than the required food, even if it is balanced, it becomes weak and sick. This unhealthy state of the body is called **undernutrition.** In this case, a person gets less nutrients than required.

Malnutrition

In malnutrition, there is a shortage of one or more nutrients. This is due to the intake of unbalanced diet.

PROTEIN ENERGY MALNUTRITION (PEM)

Deficiency of proteins in the diet results in the development of diseases related to PEM. Kwashiorkor and Marasmus are two types of diseases related with protein energy malnutrition.

Kwashiorkor is one type of disease related to protein energy malnutrition. It affects mainly children under five years of age who do not get protein in their regular diet.

Symptoms: Child exhibits stunted growth, anaemia, swollen legs, discolouration of hair etc.

Treatment: Children affected should be given milk, eggs and other protein rich food.

Marasmus is also a disease related to protein energy malnutrition. It affects mostly infants who feed on mother's milk who receive less proteins in their diet.

Symptoms: Lean muscles, weak bones, rough skin, weak legs, mental retardation etc.

Treatment: Protein rich diet should be consumed by mothers who feed their children with breast milk.

Example 3:
A child is having a swollen neck and is mentally disabled. What disease is he suffering from?
Solution :
The child is suffering from goiter.
Example 4:
Name the disease caused by lack of proteins and carbohydrates.
Solution :
Marasmus is the disease in which ribs became prominants and skin became dry and wrinkled

Obesity

Eating energy-rich food in much excess than needed by the body causes fat deposition in the body and leads to **obesity.** Obese persons are prone to heart diseases and high blood pressure. Obesity in children has become a common problem these days. This is due to excessive intake of junk food like pizzas, potatoes, noodles, ice-cream and soft

KEY POINTS

- *Glucose is* the **source of instant energy**

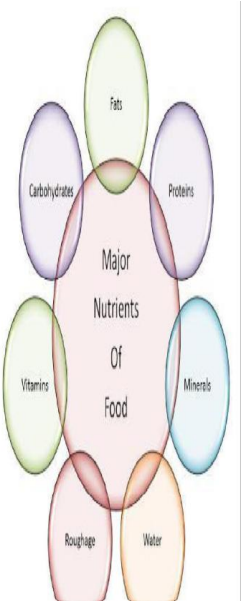
  Sugar and starch that we eat are change into glucose in our alimentary cannel. Slucose enters the blood and distributed to all the body cells. In the cells, it produces *energy.*
- *Liver* cells convert excess of glucose into **glycogen.** Glycogen is stored in the liver and in muscle cells and used when needed by the body.
- Table sugar is pure sucrose. It is prepared from the juice of sugarcane and sugarbeet. It does not contain any vitamins, minerals, fats or proteins.
- Excess intake of sugar and starchy food may lead to a disease called diabetes. This may cause kidney problem, heart disease and damage to eyes. People suffering from diabetes are advised not to eat sugar and starchy food like rice and potatoes.
- We need food for heat, energy, growth, repair of cells and good health.
- Major nutrients of food are carbohydrates, fats, proteins, vitamins and minerals.
- Food also contains dietary fibres and water.
- Carbohydrates are immediate source of energy, while fats are stored in the body to be used only when carbohydrates are in short supply.
- Proteins are needed for growth and repair.
- Vitamins and minerals are protective nutrients. They keep us fit and healthy and protect us from diseases.
- A balanced diet provides us all the nutrients in the right quantity as needed by our body.
- Dietary fibres form roughage in our body.
- Deficiency of one or more nutrients for a long period leads to deficiency diseases.
- Deficiency of proteins, carbohydrates and fats in the diet is called protein-energy malnutrition.
- Obesity is the excess eating of food rich in carbohydrates and fats.

FACT FILE

- Apples are more efficient than coffee at keeping people awake in the morning
- Eighteen ounces of an average Cola drink contain as much caffeine as a cup of coffee.
- According to a study done by the Palo Alto Medical Foundation, eating garlic while you have a sore throat will significantly shorten the duration of your sore throat. Further, it was found that eating garlic on a daily basis will significantly reduce your livelihood in eliminating cold.
- Honey generally has the effect of reducing pain on burns and open wounds because it prevents air from reaching the wounded area. Further, it has been shown to reduce scarring due to stimulating skin regrowth. Another great side-benefit to using honey to treat burns and cuts is that a bandage used after honey is fully applied to a wounded area won't stick to the wound when removed.
- It takes 12 bees their entire lives to produce one teaspoon of honey.
- Senate committee also claims that a diet composed of 10 percent protein, 10 percent fat, and 80 percent complex carbohydrates (plus exercise done in moderation) could save 98 percent of those who die of heart disease every year.
- Rennet, a common substance used to curdle milk and make cheese, is taken from the inner lining of the fourth stomach of a calf.
- Rice is the chief food for half the people of the world. There are 15,000 different kinds of Rice.
- Refined Sugar is the only food known that provides calories but no nutrition.
- Everyone knows about Vitamins A, B, C, D, and E. Few are aware that there are also Vitamin K (promotes proper liver function and vitality).

DIAGRAM BASED QUETIONS

1. Name the major nutrients in our food with help of diagram

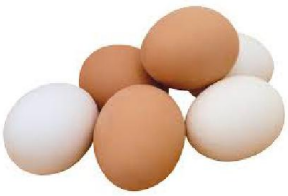


Ans: The major nutrients in our food are: Carbohydrates, proteins, fats, vitamins, and minerals.

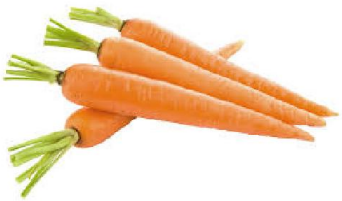
2. Name the components of food with the help of following diagram

(i)

(ii)



(iii)



(iv)

Ans. (i) Carbohydrate; (ii) Protein; (iii) Protein; (iv) Vitamins and minerals

NCERT QUESTIONS AND ANSWERS

1. Name the major nutrients in our food.

Ans. The major nutrients in our food are Carbohydrates, proteins, Fats, Vitamins and minerals.

2. Name the following:

(A) The nutrients which mainly give energy to our body.

Ans. (A) Carbohydrates and fats

(B) The nutrients that are needed for the growth and maintenance of our body.

Ans. (B) Proteins and minerals

(C) A vitamin required for maintaining good eyesight.

Ans. Vitamin A

(D) A mineral that is required for keeping our bones healthy.

Ans. Calcium

3. Name two foods each rich in:

(A) Fats

Ans. Mustard oil and Meat

(B) Starch

Ans. Rice and Mango

(C) Dietary fibre

Ans. Pulses and Potato

(D) Protein

Ans. Gram and Milk

4. Tick ☑ the following statements that are correct.

(A) By eating rice alone, we can fulfill the nutritional requirement in our body.

Ans. (×)

(B) Deficiency diseases can be prevented by eating a balanced diet.

Ans. (✓)

(C) Balanced diet for the body should contain a variety of food items.

Ans. (✓)

(D) Meat alone is sufficient to provide all nutrients to the body.

Ans. (×)

5. Fill in the blanks:

(A) _____ is caused by the deficiency of vitamin D.

Ans. Rickets

(B) Deficiency of _____ causes a disease known as beri-beri.

Ans. Vitamin B1

(C) Deficiency of vitamin C causes a disease known as _____.

Ans. Scurvy

(D) Night blindness is caused due to deficiency of _____ in our food.

Ans. Vitamin A

PRACTICE QUESTIONS

Very Short Answer Type Question

1. What is a balanced diet ?
2. Name the food needed :
   (A) To prevent scurvy, (B) To avoid constipation, (C) for growth.
3. Name the type of food which makes up a balanced diet.
4. What are protective foods? Give two examples.
5. Why does our body need nutritious food?
6. What is the role of carbohydrates and fats in our body?
7. Name the different components of food.
8. List the functions of food.
9. What are the causal factors for scurvy and rickets?

Short Answer Type Question

10. Explain the following with suitable examples :
    (i) Obesity (ii) Hypervitaminosis (iii) Anaemia.
11. What is the importance of carbohydrates in our body ?
12. What is meant by P.E.M. ? Name the disease caused by P.E.M.
13. What are the sources of cereals, proteins, vegetables and fats that you eat in your diet ?
14. Explain the importance of proteins in the human body.
15. How would you test the presence of the following in the given food?
    (A) Starch (B) Vitamin C.
16. How would you test the presence of proteins in the given food?
17. What are the main sources of the following :
    (A) Calcium, (B) Phosphorus, (C) Iron, (D) Sodium.
18. What are the sources and importance of the following vitamins in our diet ?
    (A) Vitamin 'A', (B) Vitamin B, (C) Vitamin C.

Medium Answer Type Question

19. What is the best diet for 12 years old child ?
20. Why should we take 5 or 6 glasses of water every day ?
21. Ram has fallen ill—he has lost weight. Please help him what should he eat?
22. What happens when we eat lots of fried food?
23. Why do we have to drink lots of water?
24. We have to eat lots of fibres in our food. Explain why?

Long Answer Type Question

25. What are vitamins? Why do we need vitamins ? Name few kinds of vitamins. What are their specific role in our body ?
26. Why do we need a balanced diet? Give examples to support to your answer.
27. What are the symptoms that appear if a person does not get enough protein in his diet? What can happen to children in case of deficiency of proteins ?
28. Give the functions, deficiency diseases, symptoms and sources of the following.
    (A) Calcium (B) Sodium and potassium (C) Phosphorus
    (D) Iron (E) Iodine (F) Fluorine.

MULTIPLE CHOICE QUESTIONS

Assignment-1

Choose the correct answer from the following:

1. Which mineral is necessary for the formation of haemoglobin ?
   (A) Potassium (B) Phosphorus (C) Calcium (D) Iron
2. Which is a water-soluble vitamin ?
   (A) Vitamin D (B) Vitamin C (C) Vitamin A (D) All of these
3. Which of the following is made up of aminoacids ?
   (A) Carbohydrates (B) Fats
   (C) Proteins (D) None of these
4. Which of these is the richest source of energy ?
   (A) Proteins (B) Fats
   (C) Vitamins and minerals (D) None of these
5. Carbohydrates are:
   (A) Body-building foods (B) Energy-giving foods
   (C) Needed for repair of tissues (D) Fibrous components of foods
6. Fats are:
   (A) Body-building foods (B) Inorganic compounds
   (C) Energy bank of the body (D) Needed for repair of tissues
7. Which of the following food items contain carbohydrates ?
   (A) Cabbage (B) Rice (C) Vitamins (D) Butter
8. Which of these are rich in energy ?
   (A) Cereals (B) Iodine (C) Salt (D) Water
9. The source of roughage in our food is:
   (A) Corncob (B) Dalia (C) Salad (D) All of these
10. Full form of P.E.M is
    (A) Protein egg malnutrition (B) Protein energy malnutrition
    (C) Pulses egg malnutrition (D) None of these

Assignment-2

1. This vitamin helps in maintaining healthy gums.
   (A) vitamin A (B) vitamin K
   (C) vitamin D (D) vitamin C
2. It is an important component of food but has no nutritive value.
   (A) vitamin C (B) calcium
   (C) water (D) fat
3. This mineral is required to prevent Goitre
   (A) Iodine (B) calcium
   (C) Phosphorus (D) sodium
4. Calcium and phosphorus are required for
   (A) healthy teeth and bones (B) long and black hair
   (C) forming haemoglobin (D) healthy nerves and muscles
5. This food item has more roughage.
   (A) sea food (B) milk
   (C) banana (D) cabbage
6. The food rich in fat
   (A) Butter (B) Ghee
   (C) Both (A) and (B) (D) Soyabean
7. The food rich in starch
   (A) Rice (cooked) (B) Banana
   (C) wheat (D) All of these
8. The food rich in protein
   (A) Whole grains (B) Pulses
   (C) Both (A) and (B) (D) Cabbage
9. Match the items of column 'A' with the items of column 'B'.

Column A	***Column B***
(k) Amla, tomato	(p) Protein
(l) Haemoglobin	(q) Iodine
(m) Goitre	(r) Iron
(n) Soyabean	(s) Vitamin C

   (A) (k)—(s), (l)—(r), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(r), (m)—(p), (n)—(q)
   (C) (k)—(r), (l)—(s), (m)—(q), (n)—(p) (D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)

10. Match the items of column 'A' with the items of column 'B'.

Column A	**Column B**
(k) Vitamins protect our body from	(p) carbohydrates
(l) Foods rich in vitamin 'A' are good for our	(q) disease
(m) Sugar, potato are rich in	(r) eyes
(n) Protein-energy malnutrition causes	(s) marasmus

   (A) (k)—(s), (l)—(r), (m)—(q), (n)—(p) (B) (k)—(q), (l)—(r), (m)—(p), (n)—(s)
   (C) (k)—(r), (l)—(s), (m)—(q), (n)—(p) (D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)

Assignment - 3

1. Which of the following is essential for body growth and formation of new cells ?
   (A) minerals (B) carbohydrate (C) proteins (D) vitamins
2. Beri-Beri is caused due to the deficiency of vitamin :
   (A) K (B) B (C) C (D) D
3. Night-blindness is caused due to the deficiency of vitamin :
   (A) B (B) D (C) C (D) A
4. The indigestible material in food is known as :
   (A) proteins (B) roughage (C) vitamins (D) fats
5. Sugar and starch are
   (A) proteins (B) fats
   (C) carbohydrates (D) vitamins
6. Dilute nitric acid is used to test presence of
   (A) sugar (B) starch
   (C) minerals (D) proteins
7. Which of the following food items has high protein content?
   (A) apple (B) orange
   (C) fish (D) onion
8. When iodine solution turns blue black, it shows the presence of
   (A) sugar (B) mineral
   (C) starch (D) vitamin
9. Nutrients whch protect our body from diseases :
   (A) carbohydrate (B) fats (C) minerals (D) proteins
10. Functional unit of protein is
    (A) fatty acid (B) glucose (C) amino acid (D) glycerol

MISCELLANEOUS QUESTIONS

Fill in the blanks

1. The two types of carbohydrates are ____ and ____ .
2. Fats produce ____ energy than Carbohydrates.
3. Food obtained from plants that are rich in fats are ____ .
4. Pulse, cheese and fish are rich sources of ____ .
5. Vitamin ____ make bones and teeth strong.
6. Vitamin ____ helps in clotting of blood.
7. Vitamin ____ is needed for healthy gums.
8. ____ is essential for the formation of haemoglobin.
9. Deficiency of ____ leads to Goitre.
10. ____ maintains a constant body temperature.
11. Deficiency of ____ leads to body weakness and loss of stamina.
12. Deficiency of Vitamin B leads to ____ .
13. Loss of vision or night blindness is caused due to the deficiency of ____ in our diet.
14. Processed foods are rich in ____ .
15. Sea food is rich source of ____ .
16. Pulses are good sources of ____ .
17. Protective foods include ____ & ____ .
18. Deficiency of Vitamin C causes a disease known as ____ .
19. Proper functioning of our digestive system is due to the presence of____ in our diet.
20. ____ is caused due to the deficiency of Vitamin. D.

True and False

21. Fat is a body building food. ( )
22. Iodine solution is used for testing the presence of proteins. ( )
23. Groundnut is a good source of starch. ( )
24. Beriberi is caused due to the deficiency of Vit C. ( )
25. Iron deficiency causes anaemia. ( )
26. Pulses are rich in proteins. ( )
27. Deficiency diseases can be prevented by eating balanced diet. ( )
28. Carbohydrates and fats are energy giving compounds. ( )
29. Fats produce less energy than carbohydrates. ( )
30. Minerals stored in the body keep it warm. ( )
31. Proteins are required for growth and maintenance of the body. ( )
32. Vit. A keeps our body and skin healthy. ( )
33. Vit. D makes our bones and teeth strong. ( )
34. Vitamins and minerals are called protective food. ( )
35. Deficiency of iodine leads to anaemia. ( )
36. Iodized salt, fish and seafood are the sources of iodine. ( )
37. A young child needs more carbohydrates and fats. ( )
38. Excessive intake of food leads to obesity. ( )
39. Vit. A keeps eyes and skin healthy. ( )
40. Deficiency of Vit. C leads to rickets. ( )

Match the following

41. Match the Column I to Column II

Column I	Column II
(a) Iodine deficiency	1) Scurvy
(b) Vit. D deficiency	2) Deficiency of protein & Carbohydrate.
(c) Kwashiorkor	3) Goitre.
(d) Obesity	4) Anaemia
(e) Calcium	5) Helps in clotting of blood.
(f) Vit. C deficiency	6) Night blindness.
(g) Marasmus	7) Essential for bones & teeth.
(h) Deficiency of haemoglobin	8) Deficiency of proteins.
(i) Vit. A deficiency	9) Rickets.
(j) Vit. K	10) Excessive intake of food.

42. Match the Column I to Column II

Column I	Column II
(a) Sea food	1) Potato
(b) Vit .D	2) Butter
(c) Protein	3) Anaemia
(d) Starch	4) Iodine
(e) Fat	5) Pulses
(f) Vit .B12	6) Rickets

COMPETITIVE CORNER

1. The component of food which is the major energy supplier is
   (A) Cellulose (B) Protein
   (C) Carbohydrate (D) Amino acid
2. Protein is made up of which molecule?
   (A) Lipid (B) Carbon and oxygen
   (C) Amino acid (D) Oxygen and hydrogen
3. Which of the following are the sources of fats?
   (A) Oil, Ghee, Butter
   (B) Eggs
   (C) Rice, wheat, potatoes (D) Iron and calcium
4. Which of the following is used to test starch ?
   (A) Iodine (B) Copper sulphate
   (C) caustic soda (D) water
5. Which of the statement is a true one ?
   i) oily patch on the paper shows the presence of carbohydrates
   ii) A violet colour indicates the presence of proteins in the food
   (A) (i) is correct (B) (ii) is correct
   (C) both (i) and (ii) is corect (D) none of these
6. Study the following and find the answer
   Assertion : Vitamin D helps our body to use calcium for bones and teeth
   Reason : Our body also prepares vitamin D in sunlight
   (A) Assertion is false, Reason is true
   (B) Assertion is true, Reason is false
   (C) Assertion and Reason are true and related
   (D) Assertion and Reason are true but no relation
7. Study the statements and find the correct one
   i) Statement 1 Roughage does not provide any nutrient to our body.
   ii) Statement 2 Roughage provides nutrients to our body.
   (A) (i) is correct (B) (ii) is correct
   (C) both (i) and (ii) is corect (D) none of these
8. Study the statements and find the correct one
   (A) water helps our body to absorb nutrients from food
   (B) many food materials them selves contain water.
   (C) The diet should contain a good amount of roughase and water
   (D) all the above

9. Choose the correct one :

Assertion : It can be very harmful to eat too much of fat rich foods.

Reason : We may suffer from a condition called obesity.

(A) Assertion is false, Reason is true.

(B) Assertion and Reason are false.

(C) Both are correct and Reason is related to the Assertion.

(D) Both are correct but Reason is not related to the above.

10. Choose the incorrect statement :

(A) The skins of many vegetables and fruits contain vitamins & minerals.

(B) cooking improves the taste of food and makes it easier to digest.

(C) cooking also results in the loss of certain nutrients.

(D) many useful proteins and minerals are gained by cooking with more water.

Answer key

Assignment -1

1. (D)	2. (B)	3. (C)	4. (B)	5. (B)	6. (C)
7. (B)	8. (A)	9. (D)	10. (B)		

Assignment -2

1. (D)	2. (C)	3. (A)	4. (A)	5. (D)	6. (C)
7. (D)	8. (C)	9. (A)	10. (B)		

Assingmnet -3

1. (C)	2. (B)	3. (D)	4. (B)	5. (C)	6. (D)
7. (C)	8. (C)	9. (C)	10. (C)		

Miscellaneous Questions

Fill in the blanks

l. Starch, Sugar		2. More	3. Ground nuts & nuts	4. Proteins
5. D	6. K	7. C	8. Iron	9. Iodine
10. Fats	11.Carbohydrates	12.Beriberi	13. Vitamin A	14.Minerals
15. Iodine	16. Protein	17. Vitamins, Minerals		
18. Scurvy	19. Fibres/Roughage		20.Rickets	

True and false

2l. False	22. False	23. False	24. False	25. True
26. True	27.True	28. True	29. False	30. False
31. True	32. True	33. True	34. True	35. False
36.True	37.False	38. True	39.True	40. False

Match the following

41. a) 3 b) 9 c) 8 d) 10 e) 7 f) 1 g) 2 h) 4 i) 6 j) 5

42. a) 4 b) 6 c) 5 d) 1 e) 2 f) 3

Competitive Corner

1. (C)	2. (C)	3. (A)	4. (A)	5. (B)	6. (D)
7. (A)	8. (D)	9. (C)	10.(D)		

HINTS AND SOLUTION

Practice Questions Corner

1. A diet containing all the essential requirements in right proportion, necessary for the growth and development of the body. These are carbohydrates, fats, proteins, vitamins and minerals. Sufficient amount of water and roughage should also be present.

2. (a) All citrus fruits, such as amla, orange, lemon etc.

(b) Water, juicy fruits and fresh vegetables.

(c) Milk and green leafy vegetables.

3. (i) Energy providing food, (ii) Growth promoting food, (iii) Protective food.

4. Those foods which help in the protection of body against diseases like vitamins and minerals.

5. We need nutritious food for the proper growth and healthy mind, for the body. So that we take nutritious food.

6. Carbohydrates and fats act as fuels in our body. On combustion, they provide energy. Energy is necessary for the physical and mental process to the body.

7. The main components of foods are : Carbohydrates, fats, proteins, vitamins and minerals. Roughage and water are also needed in proper quantity.

8. Functions of foods are : .

(i) To provide energy to do work.

(ii) To help in repairing of injured body part and growth.

(iii) To protect the body from infections and disease.

9. Scurvy is caused by the deficiency of vitamin'C'. In this disease, gums and nose start bleeding. The body bleeds inside. Rickets is caused by the deficiency of vitamin D. In this disease, bones become soft and bend.

10. (i) **Obesity** : It is caused by excess eating of fried foods. Fats and carbohydrates are stored in our body and cause obesity. In it too much fats are deposited in the body which is very harmful.

(ii) **Hypervitaminosis**: It is caused due to excess of vitamin 'D'. In hypervita-minosis the foot becomes like elephant and becomes very thick.

(iii) **Anaemia** : It is caused by the deficiency of iron. It is needed for the formation of red-blood cells in our blood. Therefore by the deficiency of iron our body becomes yellow. In this disease, there is a loss of appetite, nails becomes white, swelling appears on our hands and feet and other body parts.

11. Carbohydrates act as fuels in our body. It is the only nutrient which combusts frequently and produce energy. Our body use this energy in performing various body functions.

12. The elaborated form of P.E.M. is protein energy malnutrition. The diseases caused by P.E.M. are : *(i)* Kwashiorkar and (ii) Marasmus.

13. **Cereals** : We obtain these from chappatis of wheat, maize and millet. **Vegetables** are potato, tomato, cauliflower, onion, beans etc. **Proteins** are found in pulses, meat, eggs and milk. **Fats** sources are ghee, butter and groundnut oil.

14. Protein contains sufficient quantity of amino-acids to maintain a normal functioning of our body. It is required for growth and repairs in our body. It helps in building the new tissues. They also account for the tough fibrous nature of hair and nails. They are parts of our body and help in proper functioning of our body. It can also burn to provide energy in the time of emergency. /

15. (a) **Test for starch** : The material is dissolved in water. To this solution, add some drops of iodine solution. If it turns blue, it shows the presence of starch.

(b) **Test for vitamin C** : The material is dissolved in water and add some drops of iodine solution in it. Now with the help of a dropper put drpp by drop into the blue coloured iodine solution. If the blue colour disappears and brown colour appears, it shows the presence of vitamin C.

16. Take a small piece of white eggs and place it in a test tube. Add few drops of cone, nitric acid and heat it. The white colour becomes yellow. Decent it in a beaker and throw it into wash basin. Now add a few drops of NaOH on white part of egg. The colour turns violet. It shows the presence of protein in the given food.

17. **Sources of:**

(a) **Calcium** : Milk, butter milk, tapioca and green leafy vegetables.

(b) **Phosphorus** : Cereals, pulses (dal) and milk.

(c) **Iron** : Cereals, pulses, meat, green leafy vegetables, zeera, heeng.

(d) **Sodium:** Salt and most foods.

18.

	Sources	***Importance***
(a)	It is found in spinach, carrots, butter, sweet potatoes and mangoes.	Keeps the eyes, hair and skin healthy.
(b)	It is almost found in all fresh fruits specially lime, lemon, oranges, guava and goose berries.	Help resists infections, help keep teeth, gums and joints healthy.
(c)	It is found in green leafy vegetables, tomatoes and egg yolk.	It helps in the clotting of blood.

19. The best diet for 12 years old child is as follows : 25 g protein per kg of body weight, fats 30-35 g, minerals 10-20 mg, 1 mg vitamin A, 1 mg of vitamin B and 50 mg of vitamin C.

20. Water plays an important role in our body. It helps in digestion of food, excretion, maintaining body temperature and for all other metabolic processes. For all these activities, a man requires 5/6 glass of water every day.

21. Paheli Ram should eat such foods which are rich in carbohydrates and fats. He should eat chapatis, breads, peas, beans and fruits such as bananas and mango. Breads, burgers, sugar and pizza gives more carbohydrates. Dried fruits, jaggery and noodles are also rich source of carbohydrates.

22. Fried foods such as noodles, pizza, burgers, potato wafers, chocolate, candies, ice-creams and soft drinks all are harmful to us if we take these in excess and regularly. These fast foods lack in minerals and vitamins. They cause obesity. They increase body weight.

23. Water is required to perform several different functions. Our blood is mostly water. In dehydration, blood becomes thicker. Water helps in digestion. It dissolves waste products of the body and these could be removed through urine.

24. Fibrous material in our food comes from plants and their products, mainly from fruits and vegetables. It mainly contains indigestible plant carbohydrate called cellulose. It performs the following functions:

(i) It provides bulk in the food.

(ii) Roughage aids bowl movements and hence prevents constipation.

(iii) Corn-cob *(bhutta)* and half broken wheat *(Dalia)* also provide good roughage materials in addition to other nutrients.

(iv) Fibrous food is good for proper movement of food in alimentary canal.

Long Answer questions

25. Vitamins are important component which are essential for the functioning of our body. Vitamins protect our body from diseases and help in keeping our bones, teeth, gums and eyes healthy.

VITAMIN CHART

	Vitamin	Sources	Functions (essential for)	Deficiency diseases
1	Vitamin A	Oil, fish, liver egg, milk, butter and carrots	Eye and lungs	Night blindness
2	Vitamin D	Animal fat, milk ghee, butter	Bones and teeth formation	Rickets
3	Vitamin E	Vegetable, milk, egg yolk and vegetable oils	Sex glands	Hemolysis & sterility
4	Vitamin K	Liver, spinach cauliflower	Blood clotting	Haemorrhage

26. A balanced diet provides energy giving foods, body building foods and protective foods in proper quantities. So balanced diet provides the body with all the essential nutrients and the energy required by the body for its growth, development and maintenance. Eg: Milk products. It provides all the nutrients in adequate amounts.

27. If a person does not get enough proteins in the diet follow**ing symptoms** appear.

1. Stunted growth. 2.Swelling of face. 3.Diarrhoea

Discolouration of hair. 5.Skin problems. 6.Swollen abdomen.

In children deficiency of protein leads to severe malnutrition and diseases like kwashiorkor and marasmus.

28.

Minerals	Functions	Diseases	Symptoms	Sources
Calcium	i)Healthy bone and teeth formation. ii) Helps in blood clotting.	Bones and tooth decay (rickets in children)	i)Brittle bones ii)Tooth decay iii)Excessive bleeding.	Milk, cheese and green vegetables
Sodium and potassium	Helps in maintaining body's water balance	Body and muscle weakness and paralysis	i)General weakness ii)Dehydration	Salt and most cooked food
Phosphorus	Bone and teeth formation	Rickets in children	i)weakening of bone and teeth ii)Body weakness	Bread, cheese, potatoes, milk, eggs and meat
Iron	Formation of red pigment of blood	Anaemia	i)Pale body colour ii)whitish nails iii) Body weakness	Cereals, pulses, green leafy vegetables, meat, eggs and liver
Iodine	Thyroid gland function	Goitre	i)Enlargement of thyroid gland ii) mental retardation.	Seafood and iodised salt
Fluorine	Makes teeth stronger	Dental decay	i) Increased tooth decay	Seafood and tea

GETTING TO KNOW PLANTS 3

CONTENTS

- *Herbs, Shrubs & Trees*
- *Parts of Plant*
- *Structure and function of parts of Plants*
- *Parts of a Flower*
- *Key Points*
- *Fact File*

Plants are alive, just like people and animals.

How do we know this? Living things all do certain things:

They grow and die.

They need energy, nutrients, air, and water.

They produce young ones.

They are made up of cells.

They react to what's around them

INTRODUCTION

A plant has two main systems - the **root system** and the **shoot system.** The roots of a plant generally remain under the ground and the shoot of a plant remains above the ground. The shoot system consists of stem, leaves, flowers and fruits. Some plants like rose, mustard, mango and apple bear flowers and are called **flowering plants.** Plants like ferns and algae are called **non flowering** plants as they don't bear flowers.

Classification of flowering plants

Flowering plants may be classified on the following bases:

Structure and size: On this basis of sturcture and size plants are classified into **herbs, shrubs, trees, Climber** and **Creeper.**

Life span : On this basis of life span they are classified into **annual plants, biennial plants and perennial plants.**

Herbs, shrubs, trees, Creepers and Climbers

1. **Herbs** are small plants with soft and green stem and a life span of few months to one year.
   Examples: Mustard, wheat, paddy, maize, coriander, grass, tomato and seasonal flowering plants, like balsam, sweet pea, dahlia and pansy.
2. **Shrubs** are medium-sized woody plants. Their side branches start from just above the ground. They survive for several years. Examples: *Bougainvillea,* rose, lemon and henna.
3. **Trees** are tall and large plants with hard and woody stem. They have one main stem called **trunk.** The branches arise after reaching a certain height. Trees survive for more than ten years.
   Examples: Mango, coconut, banyan, peepal, jamun, neem and guava.

4. **Creepers** are the plants with weak stems and hence cannot stand straight. They grow on the ground.
   - Creepers as the name suggests creep horizontally on the ground.
   - Creepers are capable of growing new plants on their own.
   - Some creepers can also cause allergies or skin problems if touched.
   - Life time of creepers is very short.

5. **Climbers** are the plants that need support from other structures to grow and spread. Climbers can either grow horizontally or vertically unlike creepers that grow only in horizontal direction. Lifespan is very short in climbers.
   - The climbing plants use these tendrils to cling on to the support firmly.
   - A tendril can be a modified leaf or a shoot or petiole like structure which is used by climbers to wrap around a support.
   - Different types of tendrils are leaf tendril, stem tendril, leaflet tendril, leaf tip tendril etc.
   - Climbers attract insects and reptiles by their bright coloured flowers and fragrance.

Annual, biennial and perennial plants

- Annual plants survive only for one season. Herbs are annual plants. Examples: Mustard, wheat, gram, maize, paddy and seasonal flowering plants, like balsam, sweet pea and *Petunia.*
- Biennial plants complete their life cycle in two years. During the first year, they develop only vegetative parts. Flowers and fruits develop only in the second year. Examples: Radish, turnip and *Dahlia.*
- Shrubs and trees are perennial plants. They live for more than two years. Examples: Mango, guava, neem, peepal, babool.

Example 1:
What are herbs?
Solution :
Small plants with tender green stems are called herbs. Small plants with tender green stems are called herbs.
Example 2:
What are shrubs?
Solution :
Medium sized plants with hard stems are called shrubs.

STRUCTURE OF A PLANT

All the flowering plants have two main systems: root system and shoot system.

Root system

Root system is the underground nongreen part of a plant. It consists of primary root and its branches.

Characteristics of roots

Roots are nongreen underground part.

* They develop from the radicle of the seed.
* They grow towards soil and water.
* They grow away from sunlight.
* They do not have nodes and internodes.
* They have a number of lateral branches.

Functions of roots

* **Roots anchor the plant in soil:** Roots spread out in the soil and hold the plant firmly to the ground.

Parts of root system

Primary root: It is the main root. It develops from the radicle. It is thick and cylindrical, and grows deep into the soil.

Primary root is found in dicot plants only. In monocot plants, primary root disappears soon and new roots develop from the base of the stem.

Secondary roots: The side branches arising from the primary root are called secondary roots.

Tertiary roots: The branches of secondary roots are called tertiary roots.

Root cap: The tip of each branch of the root has a cap-like structure. It protects the dividing soft tissue when root branches push their way through the soil.

Root hair: Root and its branches are covered with fine root hair. They help in the absorption of water and minerals from the soil.

Types of root system

Root system is of following two types: **Taproot system and fibrous root system.**

Taproot system: In this system, the primary root is thick and long. It grows vertically downwards in the soil. It is also called true root. Taproot is found in dicot plants like gram, bean, pea, mango and carrot.

Fibrous root system: In this system, the primary root is short-lived. It is replaced by a cluster of fibre-like roots. All the branches arise from a common point at the base of the stem and spread out in the soil in different directions. These are also called **adventitious roots.**

Fibrous roots are found in monocot plants, like maize, wheat, rice, barley and grasses.

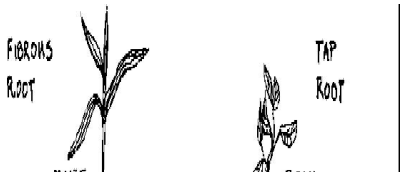


Fig. Types of Roots

* **Supporting roots:** The supporting roots a of two types: **Stilt roots and prop roots.**
* **Stilt roots:** In bamboo and sugarcane adventitious roots arise from the low nodes. These are called stilt roots. The grow downwards and provide additional support to the plant.
* **Prop roots:** In banyan and rubber tree additional roots arise from their horizontal: branches. These pillar-like roots are called prop roots. They grow downwards an penetrate into the soil. These roots act a pillars and support the tree branches.
* **Climbing roots:** The plants of betel, black pepper and money plant have climbing roots. The climbing roots arise from the nodes. They help the plant to stick and climb up the wall, rock or other trees.
* **Respiratory roots** are the roots modified for respiration. The plants in magroves have roots with special structures called as pnematophore to obtain more oxygen.
* **Parasitic roots** are the roots which arise from the stem and absorb nourishment from the host plant. e.g.*Cuscuta*.

Shoot system

Shoot system is the aerial part of a plant. It includes main stem, branches, leaves, buds, flowers, fruits and seeds. It develops from the **plumule of the seed.**

Stem

The stem is the main axis of the shoot system. It is green in herbaceous plants but woody and hard in shrubs and trees.

Characteristics of stem

* Stem grows towards light.
* It grows away from the soil and water.
* It has nodes and internodes.
* The point where a leaf or branch grows from the stem is called the node.
* The part of stem between two adjacent nodes is called **internode.**

  The angle between leaf-base and stem is called **leaf axil.**
* Stem bears leaves, branches, buds, flowers and fruits.
* Young stems are green but older woody stems are nongreen and hard.
* Stem connects the root system with rest of the plant parts.

Functions of stem

The main functions of stem are:

* **Support:** Stem supports branches, leaves, flowers and fruits. It keeps leaves spread out so that they can get enough sunlight.
* **Conduction of water and food:** Stem transports water and minerals absorbed by the roots to different parts of the plants. It also conducts food manufactured in leaves to other parts of the plant.

Modification of stem

In certain plants, stem is modified to carry out special functions other than support and conduction. These functions are discussed here.

Manufacture of food: The green stem of annual plants synthesizes food by photosynthesis. In cacti the stem becomes green and flattened, and makes food by photosynthesis.

SOMETHING MORE

* Cacti and succulents grow in deserts. They get very little water. To prevent loss of water, their leaves are modified into spines. Therefore, the stem becomes green and takes on the function of leaves.
* **Storage of food:** In potato, ginger, onion etc., the stem grows underground and stores food. The stored food is used during unfavourable season green aerial part does not survive. This type of stem remains underground and gives arial shoots in the next season. This is called **perennation.**

  In potatoes, modified stem is called tuber. It has a number of buds called eyes. Each bud can grow into an aerial shoot.

  In ginger, the underground stem stores food. It swells up in an irregular form and is called **rhizome.** It has nodes, internodes, buds and scaly leaves.

  In onion, garlic, lily, etc., the leaves store food and become fleshy. They overlap each other and are

attached to a disc. This disc is the reduced stem. Such modified stems are called **bulbs.**

In gladioli and zimikand, the stem is called corm. It is rounded and condensed into top-like structure covered with scaly leaves. It stores food.

* **Support and protection:** In some plants like grapevine and passion flower, the stem is weak and some branches are modified into thread-like structures. They are called **stem tendrils.** They arise from the axil of leaf and coil around the support.

  In rose, lemon and *Bougainvillea,* the stem is modified into **thorns.** They protect the plant from grazing animals.

Leaves - the factories of plants

The leaves are green and flattened structures. They arise from the nodes of stem and branches.

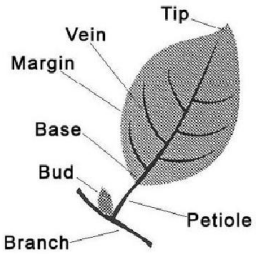
Structure of leaf

A typical leaf consists of the following parts:

* **Leaf base**: A leaf is attached to the stem with its leaf base.
* **Petiole:** It is the leaf stalk. It connects the leaf blade with the leaf base. Leaves with a petiole are called **stalked** while leaves without a petiole are called **sessile leaves.** Petiole is absent in monocot leaves.
* **Lamina or leaf blade:** This is the green, flat and expanded part of the leaf.
* **Midrib and veins:** It forms the middle axis of the leaf blade. It is formed by the extension of petiole. The lateral branches arising from the midrib are called **veins.** The veins branch into fine **veinlets.** The network formed by the veins and veinlets in the lamina is called **venation.** In dicot leaves, the venation is **reticulate.** In monocot leaves, the venation is **parallel** as all the veins run parallel to the midrib.

The functions of veins and veinlets are as follows:

* Veins and veinlets together support the lamina.
* They distribute water and minerals throughout the lamina.
* They transport food prepared by the cells of lamina through midrib, petiole and to various parts of the plant.



Functions of leaves

* **Photosynthesis:** The main function of leaves is photosynthesis, i.e., manufacture of food. All green leaves have **chlorophyll** which traps energy from sunlight and helps in the synthesis of glucose from carbon dioxide and water.
* **Transpiration:** It is the loss of water in the form of water vapour from the leaves of plants through their stomata. It cools the plant body during hot summer. Stomata are mainly present on the ventral

surface of the leaf.

* **Respiration:** At night when there is no photosynthesis, the leaves of plants breathe in oxygen and breathe out carbon dioxide. However, during the daytime, leaves use carbon dioxide from the air to perform photosynthesis and release oxygen into the atmosphere.

Types of leaves

The leaves may be **simple or compound.**

* **In simple leaf,** the lamina is undivided as in mango, peepal, china rose and mustard.
* **In a compound leaf,** the lamina of leaf is divided because the incisions of lamina reach upto the midrib. Thus, a compound leaf has a group **of leaflets.** Their number may be even or odd.

Modification of leaves

In some plants, the leaf or part of leaf is modified to perform some special functions. These functions are listed here.

* **Tendrils for support:** In creepers, the leaves or leaflets are modified into spring-like structures. These are called **leaf-tendrils.** They coil around some object and provide support to the weak stem to climb up, as in sweet pea.
* **Spines for protection:** In prickly poppy, leaf margins bear spines to protect the plant from grazing animals. In cacti, the leaves are modified into spines to avoid loss of water by transpiration.
* **In insect-eating (insectivorous) plants,** the leaves are modified into pitcher, bladder or flytrap for catching and digesting insects.

Note :

* Insectivorous plants grow in regions where soil is poor in nitrogen compounds.
* In pitcher plant, the lamina is modified into a pitcher and petiole into the leaf. The apex of the leaf forms lid of the pitcher.

Flower

Flower is the most attractive part of the flowering plants. It develops from the flowering bud and is modified to carry out sexual reproduction.

Structure of a flower

A typical flower has the following parts.

* **Pedicel:** The stalk of flower is called the **pedicel.** A flower is attached to the plant with its pedicel.
* **Thalamus:** It is the upper swollen end of the pedicel. All the floral parts are attached to the thalamus.
* **Sepals:** Sepals are green leaf-like structures. In a bud, they enclose and protect the inner parts of the flower. They are usually five in number. The whorl formed by sepals is called **calyx.** Calyx is the outermost whorl.
* **Petals:** Petals are brightly coloured and the most attractive part of a flower. They may be sweet scented. They form a whorl just inside the sepals. Because of bright colour and sweet fragrance, they attract insects for pollination. The whorl formed by petals is called **corolla.**
* **Stamens:** These are male reproductive organs of a flower. They form the third whorl. Stamens are collectively called the **androecium.**
* Each stamen has two parts: a long, narrow, **filament** and a bilobed sac-like **anther.** The filaments are attached to the thalamus and the anthers have **pollen grains.** Pollen grain contains male gametic

nucleus and pollinates the stigma of female reproductive part. The transfer of pollen grain from anther to stigma is called **pollination.**

* **Carpels or pistils:** Carpels form the fourth and the innermost whorl of the flower. It is also called **gynoecium.** This whorl is the female reproductive part. The number of carpels in different flowers varies, but each carpel has three parts:

- The swollen basal part of carpel is the **ovary.** It has ovules. After fertilisation, ovary grows into fruit and ovules form seeds.
- The long, thread-like middle part is **style.**
- The terminal expanded part of style is called **stigma.** It is sticky to trap the pollen grains during pollination.

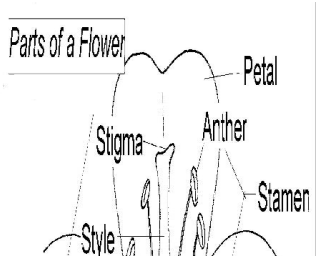


FIG. LABELLED DIAGRAM OF FLOWER

Essential and nonessential whorls

The calyx and corolla are called **accessory or nonessential** whorls because these are not associated directly with the reproduction.

Stamens and pistil form **essential whorls.** These are the male and female reproductive organs of the flower and are directly involved in reproduction.

* Flowers are reproductive organs of plant. The ovary of flower develops into fruit and its ovules form seeds. The seeds grow into new plants.
* Flowering plants are grown to beautify the surroundings.
* The nectar of flowers is collected by honey bees to prepare honey.
* Perfumes are prepared from flowers.
* **Cloves** are dried flower buds. These are used for flavouring food and as a medicine.

KEY POINTS

1. **Parts of Plant :** A flowering plant consists of root system and shoot system.
2. **Root system** : Develops from the radicle of seed and grows towards soil and away from sunlight.
3. **Dicot and Monocot Plants** : Have taproot, while monocot plants have fibrous roots.
4. **Adventitious roots** : Roots arising from any part of plant other than radicle are called adventitious roots.
5. **Shoot System** : Shoot system is the aerial part of plants. It consists of stem, branches, leaves, flowers and fruits. Stem develops from the plumule of the seed and grows towards light.
6. **Leaf** : Leaf is the photosynthetic part of plant. The arrangement of veins and veinlets in the leaf blade or lamina is called venation.
7. **Dicot Leaves** : In dicot leaves, venation is reticulate and in monocot leaves venation is parallel.
8. **Pollination** : Transfer of pollen grain from anthers to stigma is called pollination.
9. **Post fertisation changes** : After fertilisation, the ovules change into seeds and ovary matures into fruit.
10. **Function of leaf** : Leaves help in photosynthesis, respiration and transpiration.
11. **Reproductive part** : Flower is a shoot modified for reproduction.

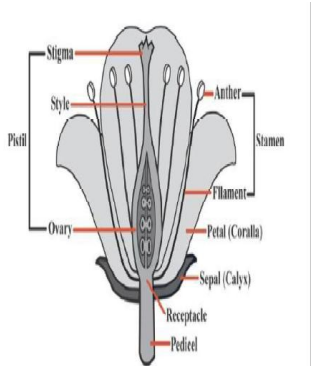
FACT FILE

1. The earth has more than 80,000 species of edible plants.
2. 90 percent of the foods humans eat come from just 30 plants.
3. Only one percent of rainforest plants have been studied for medicinal potential.
4. 80 percent of the Earth's original forests have been cleared or destroyed.
5. Just 10 percent of the world's plant-rich areas are protected.
6. More than half of plant species are native to just one country.
7. 68 percent of plants are in danger of going extinct.
8. Plant species are going extinct—about 5,000 times faster than they should.
9. Largest flower *Rafflesia* is an insectivorous plant.

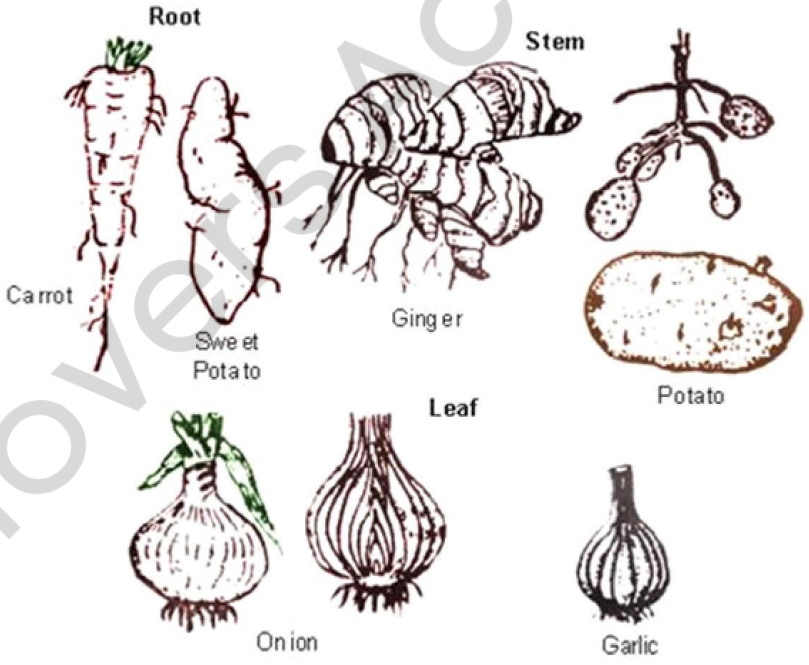
DIAGRAM BASED QUESTIONS

1. Draw a diagram of a flower showing its parts.

FLOWER DIAGRAM



2. Draw the diagram of modified root and stem for storage of food.



Modifications for food storage in plants

NCERT QUESTIONS AND ANSWERS

1. Correct the following statements and rewrite them in your notebook.
   (a) Stem absorbs water and minerals from the soil.
   (b) Leaves hold the plant upright.
   (c) Roots conduct water to the leaves.
   (d) The number of petals and sepals in a flower is always equal.
   (e) If the sepals of a flower are joined together, its petals are also joined together.
   (f) If the petals of a flower are joined together, then the pistil is joined to the petal.

Ans. (a) Root absorbs water and minerals from the soil.
(b) Stem holds the plants upright.
(c) Stem conducts water to the leaves.
(d) The number of petals and sepals in a flower may be equal or different.
(e) If the sepals of a flower are joined together, then its petals may or may not be joined together.
(f)If the petals of a flower are joined together, then the stamen may or may not be joined to the petal.

2. Draw (a) a leaf, (b) a taproot and (c) a flower

Ans.

(a) a leaf of rose plant

(b) Tap root of rose plant

(c) Flower of rose plant

3. Can you find a plant in your house or in your neighborhood, which has a long but a weak stem? Write its name. In which category would you classify it?

Ans. Its name is cucumber or money plant or pea. It comes under the category of climber plants.

4. What is the function of a stem in a plant?

Ans. Functions of stem in a plant:
(i) It provides supports to the branches of plant.
(ii) It bears buds, flowers, leaves and fruits
(iii) It carries water and minerals from roots to different parts of the plant.
(iv) It also carries prepared food from leaves to the different parts of the plants.

5. Which of the following leaves have reticulate venation?
Wheat, tulsi, maize, grass, coriander (dhania), China rose

Ans. The arrangements of veins in lamina of the leaf is called venation.
The leaves of Tulsi, Coriander and China rose have reticulate venation.

6. If a plant has fibrous root, what type of venation do its leaves likely to have?

Ans. The plants having fibrous root more likely to have parallel venation.

7. If a plant has leaves with reticulate venation, what kind of roots will it have?

Ans. Plants with reticulate venation will have tap root.

8. Is it possible for you to recognize the leaves without seeing them? How?

Ans. Yes, it is possible for to recognize the leaves without seeing them by smelling or touching them. Leaves of some plants have aroma which can be recognized by smelling.

9. Write the names of the parts of a flower.

Ans. The parts of a flower are sepals, petals, stamens and pistil.
(i) Sepal: It is the small leaf-like structures which is the most prominent part in a bud.
(ii) Petals: It is the prominent parts of the open flower which is of different colours.
(iii) Stamens: It is the male reproductive part of the flower.
(iv) Pistil: It is the female reproductive part of the flower.

10. Which of the following plants have you seen? of those that you have seen, which one have flowers? Grass, maize, wheat, chilli, tomato, tulsi, pipal, shisham, banyan, mango, jamun, guava, pomegranate, papaya, banana, lemon, sugarcane, potato, groundnut

Ans. The plants which have flowers are:
Grass, maize, wheat, chilli, tomato, tulsi, papal, shisham, banyan, mango, jamun, guava, pomegranate, papaya, banana, lemon, potato, groundnut.

11. Name the part of the plant which produces its food. Name this process.

Ans. Leaves produces the food of the plant. The process of making food in the presence of sunlight is called photosynthesis.

12. In which part of a flower, you are likely to find the ovary?

Ans. Ovary is present in the pistil of the flower.

13. Name two flowers, each with joined and separated sepals.

Ans. Two flowers with joined sepals: China rose and Cotton.
Two flowers with separated sepals: Rose and Jasmine.

PRACTICE QUESTIONS

Very Short Answer Type Question

1. What are herbs?
2. What are shrubs?
3. What are trees?
4. Define tap root.
5. Define fibrous roots.
6. Define stem.
7. Define leaf.
8. Define leaf blade.
9. Define petiole.
10. What is venation?

Short Answer Type Question

11. Define supporting roots with examples.
12. Mention some modified roots and stems which we eat.
13. What imparts green colour to a leaf ?
14. Write three modifications each of stems and leaves.
15. Which modified form of a leaf
    (i) Reduces loss of water ?
    (ii) Helps the plants in climbing against a support ?
16. What is a fruit? How does it differ from a seed?
17. What happens if a green plant does not get sunlight ?
18. If all plants on the earth had no stems, what will happen ? Discuss.
19. What is venation? What are the different types of venation? Explain each type of venation with examples?
20. Draw a labelled diagram to show different parts of pistil.
21. What happens when a pollen grain falls on a stigma?
22. What are the agents of pollination?
23 Differentiate between self pollination and cross pollination.

Medium Answer Type Question

24. Why are the green plants called autotrophs ?
25. Take a copper sulphate crystal and put it in a $CuSO_4$ solution. Observe the change. Does it grow ? How does it differ from growth in living organisms ?
26. List some common features of living and non-living things.
27. In what ways are livings things are different from non-living things ?
28. What do you understand by a life span of a living thing ?
29. All the living things respond to external stimuli. Explain.
30. Give two examples of egg-laying and young ones producing animals.

Long Answer Type Question

31. All living organisms need food. Why ?
32. You are given some boiled seeds. How will you show that they do not respire ?

ASSIGNMENT-1

1. The autotrophs are
   (A) All animals (B) All animals and plants
   (C) All green plants (D) Few animals
2. Small and non-woody plants are called
   (A) Trees these (B) Herbs
   (C) Shrubs D) Baby plant
3. Carrot, radish and turnip are
   (A) Modified stem (B) Modified root
   (C) Modified leaf (D) Modified fruit
4. Which of the following is odd one ?
   (A) Carrot (B) Radish
   (C) Turnip (D) Cactus
5. Which of the following is not a tree ?
   (A) Mango (B) Jamun
   (C) Tulsi (D) Neem
6. Which of the following is not a flower's part ?
   (A) Pistil (B) Sepals (C) Lamina (D) Petals.
7. Plants prepare their own food by the process of
   (A) Respiration (B) Transpiration (C) Photosynthesis (D) None of these
8. The innermost part of a flower is called :
   (A) Petals (B) Sepals (C) Petiole (D) Pistil
9. Plants having leaves with reticulate venation have
   (A) Fibrous roots (B) Tap roots (C) Supporting roots (D) None of these
10. Potato is an underground :
    (A) Root (B) Leaf (C) Stem (D) Fruits

ASSIGNMENT - 2

1) The plants which have branches at the base are_____
   (A) Herbs (B) Shrubs (C) Creepers (D) Trees
2) Which plant is the example of a herb?
   (A) Mango (B) China rose (C) Wheat (D) None
3) A plant with weak stem is _____
   (A) Mint (B) Sunflower (C) Lemon (D) China rose
4) The plant which takes the support of the neighboring structures and climbs up is
   (A) Tree (B) Shrub (C) Creeper (D) Climber
5) The part of plant which grows above the ground is_____.
   (A) Shoot system (B) Root system (C) both a & b (D) None
6) The part of the stem in between two successive nodes is _____.
   (A) Pistil (B) Root (C) carpel (D) Internodes
7) The root, stem leaves constitute the _____part of the plant body.
   (A) Vegetative (B) Reproductive (C) Both (A) & (b) (D) None
8) Flowers, Fruits & Seeds constitute the _____part of the plant body.
   (A) Vegetative (B) Reproductive (C) Both a & b (D) None
9) The part of the plant which prevents soil erosion is
   (A) Stem (B) Flower (C) Root (D) Leaves
10) Banana has_____roots.
   (A) Tap (B) Lateral (C) Fibrous (D) None

ASSIGNMENT - 3

1. An example of a perennial plant is
   (A) mango (B) carrot (C) rice (D) wheat
2. Which of the following is not a climber?
   (A) rose (B) pea (C) money plant (D) bougainvillea
3. Which of the following has tap root?
   (A) sugarcane (B) wheat (C) neem (D) maize
4. Some plants give out roots from their stems for additional support, such roots are called
   (A) prop roots (B) stilt roots (C) storage roots (D) none of these
5. Which of the following is not the vegetative organ of a plant?
   (A) flower (B) stem (C) leaf (D) none of these
6. An example of a plant in which the stem does the function of the leaf is
   (A) prickly pear (B) sugarcane (C) wheat (D) none of these
7. Which of the following is not a modified stem?
   (A) Sweet potato (B) Potato (C) Ginger (D) corn
8. The function of leaves are
   (A) Manufacture food (B) Exchange gas
   (C) Expel water (D) all of these
9. Stem transports the following from one part of the plant to another
   (A) Water (B) Mineral (C) Food (D) All of these
10. These are the part of leaf
    (A) Lamina (B) Node (C) Corn (D) Tuber

MISCELLANEOUS QUESTIONS

Fill in the blanks

1. Small plants with tender green stems are called_____.
2. Lemon and Rose are examples of _____.
3 _____are tall plants with a hard and thick brown stem.
4 _____have weak stems and climb up with the support of neighboring structures.
5. In_____root number of lateral roots arise from the main root.
6. Maize and barley have_____roots.
7. The angle that leaves make with the stem is called _____.
8. Plants give out extra water from the leaves in the form of vapour through_____.
9 _____is the reproductive part of the plant.
10. Each stamen consists of_____and_____.
11. The swollen portion at the base of the pistil is_____.
12. In_____venation, veins are arranged in a net like pattern on both sides of the midrib.

Match the following

13

Column I	**Column II**
a) Herb	1) Leaf
b) Tap root	2) Ovary
c) Anther	3) Mango
d) Stomata	4) Mustard
e) Ovule	5) Stamen.

14

Column I	**Column II**
a) Grapes	1) tree
b) Rose	2) Loss of water in vapour form
c) Mango	3) A climber
d) Mint	4) Male reproductive part
e) Money plant	5) A herb
f) Stomata	6) Female reproductive part.
g) transpiration	7) A shrub
h) sepals	8) A creeper
i) Stamen	9) exchange of gases.
j) Pistil	10) Outermost whorl of flower.

COMPETITIVE CORNER

1. Which of the following plants have no branches?
   (A) Herb (B) Shrub (C) Trees (D) Creepers
2. Shrub
   (A) are medium sized plants (B) have hard stem
   (C) have green tender stem (D) both (A) and (B)
3. Plants that cannot stand upright and spread on the ground are called
   (A) Climbers (B) Creepers (C) Trees (D) Herbs
4. The place from where the branches and leaves arise on the stem is called the
   (A) node (B) internode (C) axil (D) fruits
5. Choose the correct statement from the following
   (A) Plants whose leaves show reticulate venation have tap roots.
   (B) Plants whose leaves show reticulate venation have fibrous roots.
   (C) Plants whose leaves show parallel venation have fibrous roots.
   (D) Both (A) and (C) are correct.
6. The process that keeps the leaves cool is called
   (A) transpiration (B) photosynthesis (C) respiration (D) None
7. Which of the following is a part of a flower?
   (A) sepals and petals (B) stamen (C) pistil (D) All of them.
8. The male reproductive part of a flower is known as
   (A) Pistil (B) stamen (C) Sepal (D) petal.
9. Female gametes are contained in the
   (A) style (B) stigma (C) ovary (D) anther
10. A pistil consists of
    (A) ovary (B) style (C) stigma (D) All of them

ANSWER KEY

ASSIGNMENT-1

1. (C)	2. (B)	3. (B)	4. (D)	5. (C)	6. (C)
7. (C)	8. (D)	9. (B)	10. (C)		

ASSIGNMENT - 2

1. (B)	2. (C)	3. (A)	4. (D)	5. (A)	6. (D)
7. (A)	8. (B)	9. (C)	10. (C)		

ASSIGNMENT - 3

1. (A)	2. (A)	3. (C)	4. (B)	5. (A)	6. (A)
7. (A)	8. (D)	9. (D)	10. (A)		

MISCELLANEOUS QUESTIONS

Fill in the Blanks

l. HerBs	2. ShurBs	3. Tree	4. ClimBers	5. Tap
6. FiBrous	7. NoDe	8. Stomata	9. Flower	10. Filament, anther
11. ReCeptaCle	12. RetiCulate			

Match the following

13. (a)-4; (b)-3; (c)-5; (d)-1; e)-2

14. (a) 8; (b) 7; (c) 1; (d) 5; e) 3 ; f) 9; g) 2 ; h) 10; i) 4; j) 6

COMPETITIVE CORNERS

1. (A)	2. (D)	3. (B)	4. (A)	5. (D)	6. (A)
7. (D)	8. (B)	9. (C)	10. (D)		

HINTS AND SOLUTIONS

PRACTICE QUESTIONS

VERY SHORT ANSWER TYPE QUESTION

1. Small plants with tender green stems are called herbs.
2. Medium sized plants with hard stems are called shrubs.
3. Tall plants with a hard and thick brown stem are called trees.
4. The main root is called tap root.
5. A number of similar sized roots arise in a cluster below the stem and spread out in the soil. These roots are called fibrous roots.
6. Stem is the main axis of the shoot system which bears the branches, leaves, flowers, buds, fruits and seeds.
7. Leaf is a flattened green structure which arises from the node of a stem or its branches.
8. The flat green portion of the leaf is called the leaf blade.
9. Leaf blade is attached to the stem by a narrow, short stalk called petiole.
10. The arrangement of veins in the leaf blade is called venation.

SHORT ANSWER TYPE QUESTION

11. In some plants, a number of rope-like roots arise from the horizontal branches of the tree. They grow downwards and penetrate the soil acting as pillars to support the main stem and heavy branches of the tree. These roots are called prop roots. These roots are found in banyan tree, sugarcane, screwpine and maize.
12. Radish, carrot, sweet potato, beet etc., plant roots which storege food.
    In some plants like ginger, onion, potato etc. stems grow underground and store food materials.
13. We know that most of the leaves are green in colour. The green colour of leaves is due to a green pigment present in them. This green pigment is called chlorophyll.
14. **Modification of stems** : (i) Storage of food (ii) support (iii) protection.
15. (i) Thorny spines (ii) Leaf tendrils.
16. After fertilization, the ovary of the flower swells up and forms the fruits, like mango, apple, orange etc. The seeds store food usually starch. Hard wall with embryo inside is called the seed.
17. If a green plant does not get sunlight, it cannot prepare its own food by the process of photosynthesis, and plants and animals will die.
18. If all plants on earth had no stems, there will be no tree. We will not get food, shelter and many other things from the plants. All will be herbs and nothing else will be available.
19. The arrangement of veins in the leaf blade is called venation.
    There are two types of venation.
    1) Reticulate venation 2)Parallel venation.
    In reticulate venation veins are arranged in a net like pattern on both sides of the midrib.
    Eg: Pea, petunia, rose.
    In parallel venation, veins run parallel to one another.
    Eg: grass, banana, palms.
20.

21. When a pollen grains fall on a stigma, then the pollination may occur. The pollen grains takes place with in the flower it takes place self pollination, or the pollen grains falls on stigma of another flower of same species, it takes place cross pollination.
22. Air, water, animals, insects, honey bees act as agents of pollination. They carry pollen grains from anther to the stigma.
23. i) If transfer of pollen grains take place within the flower it is known as Self Pollination.
ii) Transfer of pollen grain from anther of one flower to stigma of another flower of same species in called cross Pollination.

MEDIUM ANSWER TYPE QUESTION

24. Green plants are called autotrophs because they prepare their own food. Green plants utilize carbon dioxide from air, water, mineral from soil and sunlight to prepare their own food in the form of carbohydrate or simple sugar. This process of preparing food is called photosynthesis.
25. When a crystal of copper sulphate is put in saturated solution of copper alphate in a beaker, it grows in size. This is called external growth. This growth lifters from living organism in which growth is due to multiplication of cells and tissues. Growth in living organism is internal growth but in non-living, the growth is due to external deposition of particles, which is called external growth.
26. (i) All livings and non-living things have mass-shape and they occupy space.
(ii) They are made up of structural units.
(iii) The structural units of living and non-living things are cells and particles respectively.
27. All the living things are characterised by movement, growth; respiration, excretion, feeding, respiration and sensitivity towards heat, touch, sound and chemicals. .... Non-living things do not characterise these properties.
28. Different organisms have different life spans. The period for which a living being lives is called life span. Animal growth may not occur throughout the life span. Growth in animals is limited and plants and trees grow for a long period. Growth in plants and animals is influenced by several factors.
29. Living organisms show response to external stimuli such as heat, light, sound and touch. Plants move towards light.
30. Young ones : Man, dog, horse, cat, etc.

LONG ANSWER TYPE QUESTIONS

31. All living organisms need food for growth, repair and replacement of worn out cells in the body and energy to perform vital activities. Food provides energy. To perform variety of activities, animals need food. Plants get water and minerals from soil through root hairs to their different parts of plants. Green plants prepare their own food with the help of carbon dioxide, water, chlorophyll and sunlight. The process is known as photosynthesis.
32. We can show that boiled seeds do not respire with the help of the following activity :
Take the seeds in a beaker and boil them for some time. Keep these seeds in a cloth and hang it in another beaker or tumblers which contains lime water. We observe the tumbler and find that there is no change in the lime water of the tumbler. Lime water of the tumbler does not become milky. Boiling of seeds kills them. They do not germinate.
This activity shows that boiled seeds do not respire. No carbon dioxide is produced and lime water does not turn milky.

CHAPTER

4

The Living Organisms and Their Surrounding

SUBTOPICS

1. **Introduction**
2. **Characteristics Of Living Things**
3. **Habitats**
4. **Adaptation**
5. **Actualization**
6. **Components Of Habitat**
7. **Food Chain**
8. **Food Web**
9. **Interdependence Of Plants & Animals**

INTRODUCTION

Make a list of objects you have seen at home, in a garden, on the road, in a zoo or at some picnic place. Does your list include objects, like table, chair, fan, cooler, A.C., stone, pen, pencil, book, ball, bat, etc. or bus, train, car, scooter, etc. or plants like trees, bushes, grass or animals like dog, cat, rat, cow, pigeon, crow, peacock, lizard, frog, toad, etc.?

Objects are different

Study various objects that you see in your surroundings. Do you find all of them to be similar?

You will find that all of them have different shapes and **colours.** They are also of different **sizes.** Not only this, you would have seen your puppy grow. But have you seen your pencil or copy growing or increasing in size? You have seen a dog running, a bird flying and a frog jumping, but have you seen your desk or a stone moving on its own?

Based on some of these characteristics like **growth and movement,** things around us are divided into two categories:

* **Living things:** Only the plants and animals are living things.
* **Nonliving things:** Chalk, stone, pencil, copy, book, table, etc. are nonliving things.

Example 1: We see cranes on trees in rain season where do they come from and where do they go at other times?

Solution: The birds migrate some times to find favorable conditions for living.

Example 2: Lam a living being. I have four legs. I live in water and also on land. Who am I? And guess who are there in my habitat along with me?

Solution: Frog. There are fish, crabs, snails etc.

CHARACTERISTICS OF LIVING THINGS

Living things are called **organisms.** All organisms have some basic characteristics in common. On the basis of these characteristics, living things are differentiated from nonliving things.

Living things have definite shape and size

All organisms of one kind have definite shape and size. That is why you can identify a dog from a cat or a mosquito from a fly. Similarly, you can distinguish a Neem tree from a Peepal or banyan tree or a rose plant from a sunflower plant by the shape of leaves and flowers. Organisms show great variation in size. For example, an elephant is much larger than a man and a whale is many times larger than an elephant. Similarly, a Neem or banyan tree is larger than a rose plant and a rose plant is larger than grass.

Note:

- Whale *is* the largest living mammal. The blue whale may be as long *as* 30 metres, weighing more than 2,00,000 kilograms (200 tonnes).
- The giant redwood or Sequoia trees are the largest trees in the world. They are found in California, USA. The largest of them is about 84 metres tall.

LIVING THINGS ARE MADE UP OF CELLS

The body of living things is made up of tiny units called **cells.** Cell is the smallest unit of structure and function. It is called the **basic unit of life.**

The simplest organisms like bacteria, yeast and *Amoeba* are made up of one cell only. They are called **unicellular.** They are so tiny that we can see them only with the help of a microscope.

Most organisms are formed of many cells They are called **multicellular.** Their body may contain millions or trillions of cells. A newborn human baby has at least 2,001 million cells. Each cell is an organised collection of chemicals. This substance is a living thing:

LIVING THINGS SHOW MOVEMENT

All organisms show movement. The change in the position of any body part is called **movement** and the movement of a whole organism from one place to another is called **locomotion.** Animals show locomotion as well as movement of body parts, but plants show only movements.

Animals move in search of food and shelter. You must have seen a squirrel hopping on tree branches, a lizard crawling on the wall and a bird flying in the sky. Animals use legs for walking and running. Birds use wings to fly. Fishes have fins to swim. Movement in plants is not obvious because plants remain fixed. They do not change their position. However, parts of plants do move in the direction of stimulus. For example, the shoot of a plant moves towards light and the root grows away from light towards soil.

A sunflower moves its head in the direction of the sun. A touch-me-not plant folds it leaves when touched. When a bud opens into a flower, its petals move outwards. These plant movements are called **tropic movements or tropism.**

LIVING THINGS NEED FOOD AND ENERGY

All organisms need food to remain alive grow and get energy for carrying out various life activities. A cow eats grass. Humans eat cooked food. Living things need food.

You have seen animals eating food but not the plants. However, plants also need food and energy. They take energy from the sun and make their food using water and carbon dioxide. The process of preparing food by the green plants is called **photosynthesis.**

Only green plants can make their food from carbon dioxide and water using solar energy are called **autotrophs.** The green plants provide food and energy to all animals on earth. Animals and non green plants do not have green pigment. So they cannot make their own food. They eat plants or other animals to gain energy. They are called **heterotrophs.**

LIVING THINGS RESPIRE TO GET ENERGY

The energy is stored in the food. This stored energy is released when food is burnt inside body cells. The process of burning or oxidation of food to release energy is called **respiration.**

The process of inhaling fresh air and exhaling used air is called **breathing.** It helps in the movement of gases from outside into our body and from our body to outside.

We breathe air through our nose into our lungs. Birds, snakes, dogs, cats, horses, etc. also have lungs. Fishes living in water breathe through gills. They take oxygen dissolved in water. Insects breathe through air tubes.

Plants also respire to release energy. They break down the food prepared during photosynthesis. During daytime, plants neither take in oxygen, nor release carbon dioxide.

* Oxygen produced during photosynthesis is used for oxidation of foodstuff (i.e., respiration).
* Carbon dioxide produced during respiration is utilised in photosynthesis.

At night, plants also take in oxygen and produce carbon dioxide like animals. They breathe through **stomata** present on the surface of leaves.

LIVING THINGS EXCRETE WASTES

Excretion is the removal of waste and other harmful substances formed in the body. In animals, waste produced includes undigested food, carbon dioxide, urea and excess of salt and water. Undigested food is expelled out as faeces from anus. Carbon dioxide is produced from the oxidation of glucose during respiration. It is removed by lungs. Urea is formed by the breakdown of proteins and is removed by kidneys through urine, Excess of salts and water are also removed as urine or as sweat. Plants excrete oxygen during day time and carbon dioxide at night through stomata. Some plants are able to store harmful or poisonous substances and excrete them as sticky secretions. Some plants store excess of minerals which accumulate inside the cells as crystals. All living things remove metabolic waste products. In animals, it is called excretion and in plants, it is called secretion. Plants secrete three types of excretory products.

* Gum is secreted by *Acacia* tree. It is used as adhesive, in confectionery and in medicines.
* **Resin** is produced by pines and firs. It is used in making varnish and ointments.
* **Latex** is secreted by rubber, banyan and *Calotropis* trees. The latex from rubber plant is used for making rubber.

LIVING THINGS RESPOND TO STIMULI

All living organisms (plants or animals) react to changes in their surroundings. For example, you shiver on a cold day or sweat on a hot day and feel scared on seeing a snake. The change in the environment that evokes an organism to react to it is called a **stimulus.** The reaction to the stimulus is called **response.** The ability of an organism to react to a change in the environment is called **responsiveness.** For example, when you happen to touch a hot pot, your hand is pulled away immediately. Here, the heat of pot is stimulus and pulling away of hand is response.

Observe the following behaviours.

* At night when you switch on the kitchen light, cockroaches start running to their hiding places.
* When you enter a dark room from a brightly lit area, you are not able to see for some time. Similarly, when you come out of a dark room into brightly lit area, you are not able to open your eyes.
* When you move towards a bird, it immediately flies away.
* When you put some food grains, the birds come flying and start eating. Flies gather on uncovered food items.
* On seeing a stranger, the dog starts barking. All these are examples of response to a stimulus. How do plants respond to external stimuli? Plants respond to the changes in light, temperature, touch, moisture, etc. The roots of plants always grow downwards towards water, while the stem always grows upwards towards light. Lotus flowers open in the morning and close by sunset. Stomata of leaf open during daytime and close at night. These are examples of response to stimuli by plants. Only living things respond and change according to the conditions of the surroundings. The change allows an organism to survive or to escape from danger.

LIVING THINGS REPRODUCE THEIR OWN KIND

Reproduction is the ability of living things to produce their own kind. It is a unique property possessed only by living organisms. Both animals and plants reproduce, though the methods of reproduction differ. Animals like fish, frog, snakes, lizards and birds lay eggs which hatch into young ones. Animals like dogs, cats, cows, horses and human beings give birth to young ones.

A cat and a bitch give birth to young ones. Living things reproduce their own kind. Egg-laying animals are called oviparous and the animals which give birth to young ones are called **viviparous.** Plants mainly produce new plants from seeds or spores. This is called **germination.** Pea, gram, wheat, tomato and trees of mango, Neem, Peepal, etc. all grow from their seeds. In some plants, new plants grow from their; stem, root or leaves.

* Rose, jasmine, mint and sugarcane are propagated by stem cuttings.
* Ginger, onion and potato multiply from underground stem.
* In *Bryophyllum,* several tiny plants grow from the leaf margin. A *Bryophyllum* leaf gives rise to new plants. Only living things produce offsprings the nonliving things do not.

Reproduction is essential for the survival and increasing the number of the race.

LIVING THINGS GROW

Growth is an increase in size by the addition of new cells. Growth is a **permanent irreversible change.** All living things grow. Puppies grow into dogs and kittens grow into cats. A baby grows into an adult human being. Plants grow throughout their life but animals stop growing after a particular age.

Growth in single-celled organisms (like *Amoeba,* yeast and bacteria) is due to an increase in the amount of cellular material (i.e., the protoplasm). But multicellular animals and plants grow due to an increase in the number of cells by cell divisions.

It means that in living things, growth is internal. Increase in the size of nonliving things is due to the addition of matter from outside.

LIVING THINGS HAVE A DEFINITE LIFE SPAN

Life span of an organism is the period for which it remains alive. It begins with the birth of an organism and ends with its death.

All living things have a definite life span. Each organism follows a definite life cycle. It starts the life cycle as a single-celled organism, called **zygote.** The zygote undergoes a series of irreversible changes to achieve a final form.

Example 3: Name two sea animals that do not have gills.

Solution: Dolphin and whale.

Example 4: Features of lion help it to survive. How?

Solution: Light brown colour of lion helps it to hide in dry grassland when it hunts; the eyes in the front of face of allow it to have correct idea about location of its prey.

* Terrestrial animals that live on trees are called **arboreal animals** and plants that take support of trees are called **climbers.** Monkeys, tree snakes and squirrels are arboreal animals.
* Birds and insects that fly in the air are called **aerial animals.**
* Organisms which live in both aquatic as well as terrestrial habitats are called **amphibians.** Frogs and crocodiles are **amphibians.** Terrestrial habitat presents great variations in climatic conditions, temperature, rainfall and tide topography. Based on these variations,: terrestrial habitats can be of various types.
* Rainforest habitat
* Temperate forest habitat
* Boreal forest habitat
* Grassland habitat
* Desert habitat
* Tundra habitat
* Mountain habitat

Rainforest habitat: Rainforests are hot and moist. They get plenty of rain throughout the year. They grow near the equator and provide home to different types of animals. These forests have tall trees, creepers and grasses.

Temperate forest habitat: Temperate forests are warm and humid during summer but cold and dry in winter. They have **deciduous trees.**

Boreal forest habitat: Boreal forests grow in Taiga, having short summer and a long winter. They receive heavy snowfall.

Trees in boreal forest are evergreen. They are conical in shape. Their leaves are needle-like.

Grassland habitat: Grassland habitats are hot and partly dry areas where grasses are the main plants and trees are few.

Grasslands provide home and food to both herbivores and carnivores. Zebras, giraffes, deer, buffaloes and elephants are herbivores living in grasslands while lions, tigers, hyenas and foxes are the carnivores found there.

Desert habitat: Desert habitats are very dry places, where rainfall is scarce. About one-fifth of earths land surface is desert.

Deserts can be hot or cold but they are always dry. Gerbils and camels are desert animals; and cacti *(Opuntia),* date palm, *Acacia* and succulents form the desert vegetation.

Tundra habitat: Tundra habitats are always covered with snow. So they are very cold and dry. The vegetation is very scanty and in the form of some grasses.

Polar bears, reindeer, whales, arctic foxes, snowshoe hares and snow dogs are found in tundra habitat. Polar bears have fur and a thick layer of fat under the skin which is called **blubber.**

Mountain Habitat : Mountain habitats are rocky and very cold. Snowfall occurs in winter followed by chilly winds. The trees on mountains are cone-shaped. Their leaves are needle-like so that snow can just slide off. Snow leopard and mountain goat are found on mountains.

Example 5 How do aquatic animals swim
Solution : With the help of Fin

Example 6: Define xerophyte
Solution : Plants growing in desert are called xerophytes

ADAPTATIONS

Organisms live happily in their own habitat in which they are born. This is because they have specific features that enable them to live in their own surroundings.

The presence of specific features or habits which enable an organism to survive in its surroundings is called adaptation. Let us study the features in animals and plants living in different habitats.

AQUATIC ADAPTATIONS

Adaptations in aquatic animals

Aquatic animals like fish have the following adaptations to live in water.

* **Streamlined and spindle-shaped body:**
* This reduces friction with water and helps aquatic animals to swim.
* **Gills:** To breathe in oxygen dissolved in water.
* **Fins:** To propel the fish in water and help in swimming.
* **Caudal fin:** It steers the body and helps in changing the direction of fish while swimming.
* **Scaly and slippery skin:** The hard waterproof scales and slime on the body surface protect aquatic animals from water.

Adaptations in aquatic plants

Aquatic plants (hydrophytes) can be of following three types.

* **Floating plants:** These plants like water hyacinth, *Pistia* and *Lemna* float on the surface of water. They have swollen and spongy stems and leaves.
* **Submerged plants:** These plants like *Hydrilla, Vallisnaria,* etc. have narrow leaves with no stomata and do not possess roots.
* **Fixed plants:** Plants like lotus are attached to the bottom soil of the pond. They have long and hollow stem. Their leaves are long and ribbon-shaped or broad and saucer-shaped.

TERRESTRIAL ADAPTATIONS

Adaptations to rainforest habitat

Rainforests are tropical forests. They have tall evergreen trees. Their leaves form dense canopy which prevents sunlight from reaching the forest floor. Because of excessive rain, the trees have plenty of water to grow.

Plants in rainforests show these adaptations:

* The leaves of trees are large having specialized tips. These are called **drip tips.** The drip tips allow the rain drops to drop off from the leaves. This protects leaves from rotting.
* Due to shortage of light, the growth of vegetation is poor. But some plants like **lianas** creep along the nearby trees to get exposure to sunlight.
* Some forest trees have **buttress roots** to provide extra stability because their main roots are not very deep.

A wide variety of animal species is found in rainforests because of plenty of food and mild weather. The insects are numerous. A **leaf insect** has green leaf-like body,

and stick **insect** resembles a dry stick. So they are not easily spotted out from their surroundings. This blending of animals with their surroundings is called **camouflaging.** They camouflage so that they cannot be identified by their enemies called predators.

Adaptations to temperate forest habitat

To endure the cold during winter, the deciduous trees found in temperate forests shed their leaves in autumn and grow new leaves in spring. During winter, the animals living in temperate forests either migrate to warmer regions or hibernate. Some animals like squirrels and ants gather food and store it for eating during winter.

Adaptations to boreal forest habitat

The needle-like leaves of the trees in boreal forests allow snow to slide down. Thus, they are protected against deposition of snow.

* Boreal trees get less sunlight and, therefore, less energy. They conserve energy by not shedding the leaves.
* Needle-shaped leaves prevent loss of water by evaporation.

Animals in boreal forest have thick layer of fur or feathers to keep them warm. Some animals hibernate during winter or move to warmer places. They are usually white in colour to camouflage them with the snow.

Adaptations to desert habitat

Desert animals have to tolerate scorching heat and water loss during day.

Some desert animals like desert rats, lizards and snakes stay in deep burrows to avoid intense heat during daytime. They become active only at night when it is cool. Such animals are called **nocturnal.** Camels show a number of adaptations to survive in desert.

- Thick skin to prevent loss of water. Excrete concentrated urine.
- Store water by drinking large quantity of water at a time. Hump at the back can store fat which provides them energy and water. Large and padded sole helps in walking on soft sand.

Plants growing in deserts are called **xerophytes.** They face scarcity of water and intense heat.

- Desert plants have long roots to absorb water from deeper layers.
- They have fleshy stems to store water. Therefore, they are called **succulents.**
- To prevent loss of water by evaporation, the leaves in desert plants are modified into spines, as in cactus.
- To carry out photosynthesis, the stems are green.

Adaptations to grassland habitat

Adaptations in herbivores: Herbivorous animals have following adaptations.

* They have strong teeth for chewing and cutting hard grass.
* Their ears are long to detect the movement of predators.
* They have long legs to run fast and escape from predators.
* They have eyes on the sides of their head which help to look in all the directions for predator's presence.

Adaptations in carnivores: Animals that prey upon herbivores are called carnivores. Lion, tiger and hyena are carnivores found in grasslands. They have following adaptations.

* They have sharp claws to catch, hold and tear the body of prey.
* The skin is light brown in colour or patchy so as to hide in the dry grass while hunting for prey.
* The eyes are in the front which help in locating the prey.
* Long and strong canines help in tearing the flesh.

ACCLIMATISATION

The ability of an organism to make small adjustments or changes in the body in a short period of time to adjust itself to the surrounding atmosphere is called acclimatisation. People who visit mountain ranges suffer from altitude sickness due to poor oxygen content in the atmosphere at such heights. Their body gets adjusted or acclimatised to changes

In the surroundings.

COMPONENTS OF HABITATS

Our environment comprises of two types of components.

- **Biotic components:** These are living organisms of a habitat. They include plants, animals and microorganisms.
- **Abiotic components:** These are nonliving components. They include **physical components** (soil, water and air) and **climatic components** (light, wind, temperature, humidity and rainfall). Both biotic and abiotic components of a habitat influence the survival of organisms living there.

ROLE OF BIOTIC COMPONENTS

Biotic components include plants, animals and microorganisms.

Plants are producers

Green plants trap solar energy in chlorophyll (the green pigment) and prepare their food from carbon dioxide and water. This is called **[photosynthesis].** Since plants synthesis their food, they are called **autotrophs** (self-feeding).

Green plants are called **producers** because they produce food for themselves as well as for all animals and human beings present on the earth.

Animals are consumers

Animals cannot make their own food like plants. They depend on plants or other animals for food. So animals are called **consumers.**

* **Herbivorous animals** which eat plants are called **primary consumers** (feeding on producers). Cows, buffaloes, horses, deer and rabbits are all primary consumers. **Carnivorous animals** that feed on primary consumers are called **secondary consumers.** They are also known as **predators.** The herbivores form their prey.
* Human beings, bears and crows are **omnivores.** They eat plants as well as flesh of other animals.

MICROORGANISMS ARE DECOMPOSERS

Certain microorganisms like bacteria and fungi take nutrients from dead plants and animals. They break down the dead bodies into simple substances and are called **decomposers.**

Animals that feed on dead bodies of other animals are called scavengers. Vultures, hyenas and jackals are some examples of scavengers.

Role of decomposers

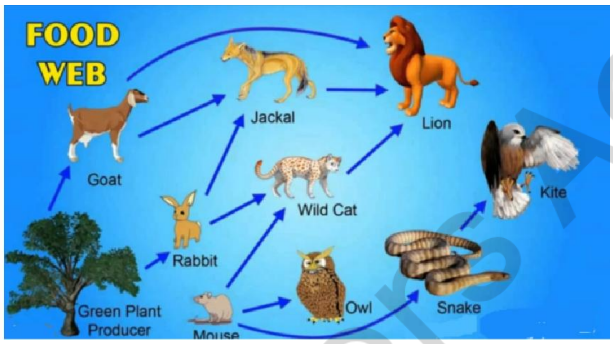
* Decomposers release nutrients from the dead organisms and convert them into usable form. This is called **biodegradation.**
* They help in the recycling of nutrients in the biosphere.
* They help in cleaning the environment by complete disposal of dead remains.

FOOD CHAIN

The flow of energy through food occurs from plants to herbivores and then to carnivores and finally to decomposers. This chain of transfer of energy is called **food chain.**

FOOD WEB

* Net work of food chain is called food web.



Interdependence of plants and animals

Plants and animals depend on each other for various needs.

Animals depend on plants for oxygen, food, medicines, shade and shelter, wood, timber, cotton, gum, spices and other materials. Plants depend on animals for pollination, carbon dioxide and for dispersal of seeds

KEY POINTS

1. **Habitat:** Habitat is a place where living organisms live.
   When plants and animals live in water, it is called **aquatic habitat** and when they live on land is called terrestrial or land habitat.
3. **Components of Habitat**: Habitat comprises of two components that is biotic components which include living organisms such as plants, animals and micro-organisms and abiotic components which are non-living such as air, water, light and soil.
4. **Nutrition In Plants & Animals:** Plants prepare their own food through the process of photosynthesis. Animals depend on plants for their food directly or indirectly.
5. **Abiotic Components**: Abiotic components such as air, light, water, soil and temperature affect the distribution of plants and animals.
6. **Ecosystem:** Where biotic and abiotic components are inter-related and inter-dependent on each other.
7. **Adaptation:** The process of change by which an organism or species becomes better suited to its environment.
8. **Aquatic habitat:** Aquatic animals pertain to animals that live predominantly in different water forms, such as seas, oceans, rivers, lakes, ponds, etc.
9. **Biotic component:** The living things that shape an ecosystem. A biotic factor is any living component that affects another organism, including animals that consume the organism in question, and the living food that the organism consumes.
10. **Desert:** The area where rain fall is very low, is called desert and plants growing there are called xerophyts. They have a long and extensive system. Their leaves are reduced. Camels live in desert.
11. **Excretion:** (In living organisms and cells) The process of eliminating or expelling waste matter.
12. **Growth:** The process of increasing in size.
13. **Reproduction:** The production of offspring by a sexual or asexual process.
14. **Respiration: A** process in living organisms involving the production of energy, typically with the intake of oxygen and the release of carbon dioxide from the oxidation of complex organic substances.

FACT FILES

1. Light also affects animals. Animals live in caves and burrows have very much reduced eyes. Amblyopsis, a cave dwelling fish, do not have eyes. Some animals such as bats and owls are active during night. These are called noctural animals.

2. Many boreal forest animals hibernate during the coldest months. During hibernation an animal's heart beat slows down and they almost appear to be dead. They prepare for hibernation by eating as much as they can during the warmer months in order to build up fat reserves their bodies will utilize when in hibernation.

3. The wood frog can actually survive becoming frozen for several weeks with over sixty percent of its body fluids fully frozen.

4. Largest flower Rafflesia is an insectivorous plant.

5. Duck Bill platypus and Echidna are oviparous mammals.

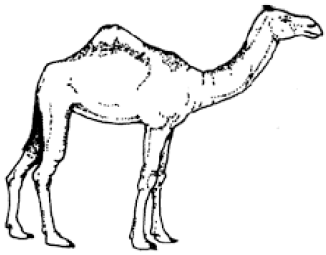
6. Whale is mammal because it respires through lungs instead of gills.

7. Mammals have adapted to this extremely cold weather by growing thick fur coats. These animals include the sable, lynx, marten, and many others.

8. Many animals that live in this region are much larger than animals they are related to found in other areas. A larger animal is able to conserve heat better than a smaller animal.

DIAGRAM BASED QUESTIONS

Q.1. What are adaptive features of the following animal?



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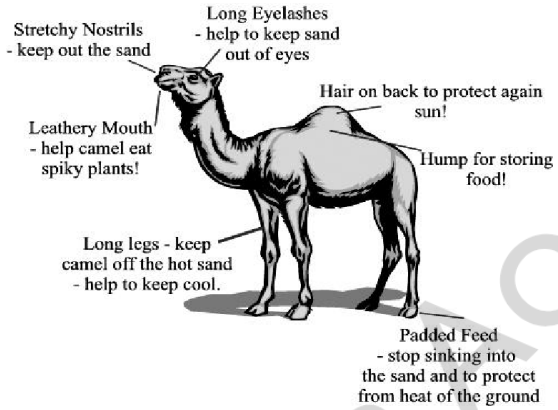
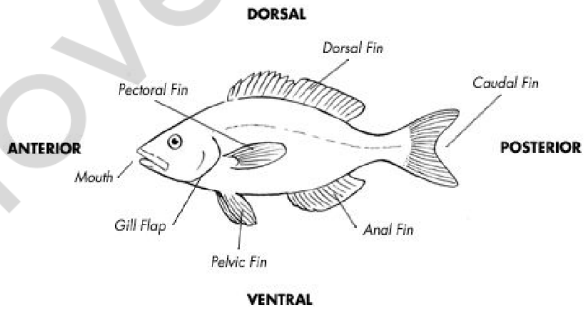


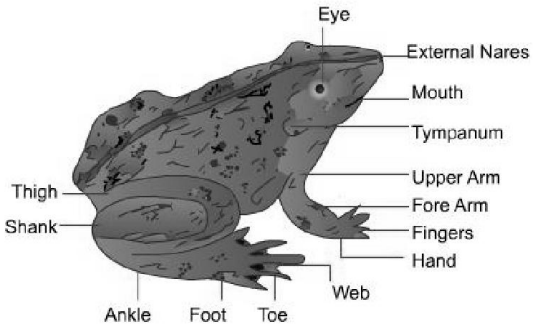
Q.2. Draw labeled diagram of fish.

Ans.

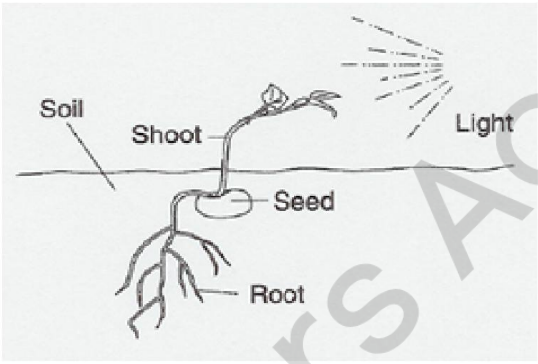


Q.3. Draw the diagram of amphibia with its adaptive features.

Ans.



Q.4. Write the stimulus and response shown by the following plant.



Ans. Stimulus is light and response shown against stimulus is phototropic movement.

NCERT QUESTIONS & ANSWERS

1. What is a habitat?

Ans. The surrounding where a living organism lives is called its habitat.

2. How is cactus adapted to survive in a desert?

Ans. Adaption to survive in a desert:
(i) Leaves are modified into spines which prevent the loss of water.
(ii) Stem is modified into leaf like structures which store water and perform photosynthesis.
(iii) Stem are spongy and have waxy coating which prevents transpiration.
(iv) Roots are deep which can access water from depths.

3. Fill up the blanks

(a) The presence of specific features, which enable a plant or an animal to live in a particular habitat, is called _____ .
(b) The habitats of the plants and animals that live on land are called _____ habitat.
(c) The habitats of plants and animals that live in water are called _____ habitat.
(d) Soil, water and air are the _____ factors of a habitat.
(e) Changes in our surroundings that make us respond to them, are called _____.

Ans. (a) The presence of specific features, which enable a plant or an animal to live in a particular habitat, is called **adaption.**
(b) The habitats of the plants and animals that live on land are called **terrestrial** habitat.
(c) The habitats of plants and animals that live in water are called **aquatic** habitat.
(d) Soil, water and air are the **abiotic** factors of a habitat.
(e) Changes in our surroundings that make us respond to them, are called **stimuli.**

4. Which of the things in the following list are nonliving?

Plough, Mushroom, Sewing machine, Radio, Boat, Water hyacinth, Earthworm

Ans. Plough, sewing machine, radio, boat

5. Give an example of a non-living thing, which shows any two characteristics of living things.

Ans. Car (shows motion and creates sound) is an example of a non-living thing which shows two characteristics of living things.

6. Which of the non-living things listed below, were once part of a living thing?

Ans. Butter, Leather, Soil, Wool, Electric bulb, Cooking oil, Salt, Apple, Rubber

7. List the common characteristics of the living things.

Ans. (i) It shows growth.
(ii) Needs nutrition.
(iii) It reproduce.
(iv) It responds to stimuli.
(v) It respires.

8. Explain, why speed is important for survival in the grasslands for animals that live there. (Hint: There are few trees or places for animals to hide in grasslands habitats.)

Ans. Speed is important for survival in the grasslands for animals that live there because it helps them in protecting themselves from their predators. In grasslands, there is very less numbers of suitable places available there where animals can hide so speed helps them in escaping from their predators.

PRACTICE QUESTIONS

VERY SHORT ANSWER TYPE QUESTION

1. Name the habitats of the following:
   (i) Cactus. (ii) Coconut trees
   (iii) Indian tiger (iv) Cockroach
   (v) Monkey.
2. How do plants obtain their food ?
3. Give examples of water and terrestrial habitats.
4. How can you say that mountain is a special terrestrial habitat?
5. What are the biotic components ?
6. Name abiotic components.
7. How do plants prepare their own food ?
8. Find the odd one out:
   (i) *Water lily, lotus, opuntia, water hyacinth.*
   (ii) *Cactus, Acacia, Zizyphes (Ber), Hydrilla.*
   (iii) *Camel, Desert rat and snakes, whales*

SHORT ANSWER TYPE QUESTION

9. Light is necessary for plants and animals. Why ?
10. What are the characteristics of xerophytes ?
11. Why do desert animals have thick skin ?
12. How is camel adapted to live in desert ?
13. How cold place animals protect themselves from cold?
14. Define hydrophytes.

MEDIUM ANSWER TYPE QUESTION

15. What adaptations are found in hydrophytes?
16. Give some examples of sea water animals.
17. How fishes are adapted to live in water?
18. How is soil important for plants?
19. How does air affect biotic components?
20. How do plants balance oxygen and carbon dioxide in the atmosphere?
21. Distinguish between aquatic and terrestrial habitate.
22. Explain, why is light essential for plants?

LONG ANSWER TYPE QUESTIONS

23. How are biotic components related to abiotic components?
24. How biotic components such as plants and animals are related with abiotic components such as light, water, temperature, air and soil?

ASSIGNMENT - 1

Choose the correct answer from the following:

1. Which one of the following is an aquatic plant?
   (A) Opuntia (B) Hydrilla (C) Mango (D) Noneof these

2. Which one is not a noctural animal?
   (A) Bat (B) Owl (C) Camel (D) Cockroach.

3. Which one is odd one ?
   (A) Agave (B) Opuntia (C) Zizyphus (D) Lotus

4. Which one of the following is a cold habitat animal ?
   (A) Camel (B) Whales (C) Snow-bear (D) Proteus.

5. Which of the following is not a terrestrial animal?
   (A) Horse (B) Crow (C) Sheep (D) Fish.

6. Which one of the following is not a very cold habitat animal?
   (A) Yak (B) Polar-bear (C) Camel (D) Penguin

7. Find the odd one out:
   (A) Snow-bear (B) Fox (C) Dog (D) Cat

8. Pond is an example of habitat:
   (A) Terrestrial (B) Aquatic (C) Desert (D) Noneof these

9. Which of the following is not a physical condition?
   (A) oxygen (B) food
   (C) light (D) temperature

10. Plants that grow in water are called:
    (A) mesophytes (B) hydrophytes
    (C) Xerophytes (D) none of them

ASSIGNMENT – 2

1. Animal that lives in water only.
   (A) Frog (B) Fish
   (C) Crocodile (D) Duck

2. Propagation of a rose plant is through:
   (A) Flowers (B) stem
   (C) Fruits (D) Roots

3. The animal that reproduces by laying eggs is:
   (A) Cat (B) Dog
   (C) Cow (D) Fish

4. Smallest beings that cause diseases:
   (A) Ant (B) Virus
   (C) Bacteria (D) Lice

5. Which of the following is the largest among animals?
   (A) Rhinoceros (B) Elephant
   (C) Blue whale (D) Crocodile

6. The living beings which cannot synthesis food on their own are called:
   (A) Autotrophs (B) Heterotrophs
   (C) Blue-green algae (D) Plants

7. The energy releasing process in living organisms is:
   (A) Reflex action (B) Respiration
   (C) Blood circulation (D) Reproduction

8. An example for animal that lives both on land and in water is:
   (A) Whale (B) Fish
   (C) Frog (D) Crocodile

9. Liver and small intestine are the parts of:
   (A) Digestive system (B) Respiratory system
   (C) Nervous system (D) Reproductory system

10. Sunlight is present for only a short span of time in:
    (A) Polar regions (B) Subtropical regions
    (C) Desert regions (D) Himalayan region

ASSIGNMENT – 3

1. In respiration:
(A) Chlorophyll synthesizes food from carbon dioxide and water in the presence of sunlight.
(B) Oxygen absorbed from air or water is made to combine with carbon dioxide to produce food.
(C) Chlorophyll absorbs oxygen from air or water and releases carbon dioxide.
(D) Oxygen is absorbed from air or water and made to combine with food and carbon dioxide is released.

2. The process of expelling waste from the organism is called:
(A) Digestion (B) Ingestion
(C) Excretion (D) Reflex action

3. An animal that is active during night time is:
(A) Bat (B) Crow
(C) Fish (D) Low

4. Reproductive part of plant is.
(A) Stem (B) Flowers
(C) Roots (D) Seeds

5. Sweating is a part of:
(A) Blood circulation (B) Water circulation
(C) Excretion (D) Respiration

6. Plants excrete gases through:
(A) Microscopic pores in leaves (B) Small porous roots
(C) Flowers (D) Seeds

7. The animals which lives in polar regions is:
(A) Nightingale (B) Frog
(C) Polar bear (D) Fish

8. The rubber we obtain from rubber plants is:
(A) Plant food (B) Plant tissue
(C) Plant waste (D) Plant fruit

9. When we touch the leaves of a touch-me-not plant, they bend down. This is an example of:
(A) Respiratory process (B) Response to stimulus
(C) Circulatory system (D) Reproductory system

10. An example of a plant that lives in water is:
(A) Opuntia (B) Hydrilla
(C) Touch-me-not (D) Calotropis

MISCELLONOUS PROBLEMS

1. The organisms which are smaller than bacteria are:
   (A) Viruses (B) Frogs
   (C) Vallisnaria plants (D) Fungus

2. The process of movement of plant towards light.
   (A) Phototropism (B) Geotropism
   (C) Reflex action (D) Spectroscopy

3. Jasmine reproduces from:
   (A) Branches (B) Seeds
   (C) Flowers (D) Stem

4. Both living things and nonliving things are made of:
   (A) Cells (B) Molecules
   (C) Tissues (D) organs

5. Man and dog reproduce by:
   (A) Laying eggs (B) Hatching eggs
   (C) Produce young ones (D) Through their roots

6. Kidneys, lungs, gills and sweat glands are parts of ..... System in animals.
   (A) Digestive (B) Excretory
   (C) blood circulation (D) Nervous

7. Microscopic pores in plants through which they expire air are called:
   (A) Stigma (B) Thalamus
   (C) Gills (D) Stomata

8. Rabbit is a ..... animal.
   (A) Parasite (B) Autotroph
   (C) Herbivorous (D) Canivorous

9. In which of the following properties does an animal and a plant differ?
   (A) Presence of organs (B) Growth
   (C) Reproduction (D) Synthesis of food.

10. The medium-sized plants which grow to a height of 8 – 9 feet are called:
    (A) Shrubs (B) Herbs
    (C) Trees (D) Long trees

COMPETITIVE CORNER

SINGLE CORRECT ANSWER TYPE QUESTIONS

1. Amphibians are animals that live:
   (A) on land (B) on trees
   (C) in water (D) both on land and in water

2. Which of the following is not a biotic component:
   (A) plants (B) animals
   (C) water (D) none of these

3. Which animal moves away from light:
   (A) earthworm (B) rat
   (C) cow (D) snake

4. The leaves of which plants are reduced to spines:
   (A) hydrophytes (B) xerophytes
   (C) mesophytes (D) all of these

5. Animals respire to get:
   (A) carbon dioxide (B) oxygen
   (C) nitrogen (D) none of these

6. A plant which shows movement of leaves is:
   (A) *mimosa* (B) money plant
   (C) mint (D) rose

7. Which of the followings is not the habitat:
   (A) Water lily and fish in the lake,
   (B) Chair and table in the restaurant.,
   (C) Trees and birds in a forest,
   (D) Cacti and camel in a desert.

8. Propagation by stem cutting is carried out in ...
   (A) Rose (B) Jasmine (C) Both a & d (D) Sugarcane

9. Match the items of column 'A' with the items of column 'B'

Column A	**Column B**
(k) Hydrilla	(p) Cold habitat animal.
(l) Opuntia	(q) Micro organisms.
(m) Bacteria and Fungi	(r) Aquatic plant.
(n) Snow-bear	(s) Desert plant.

   (A) (k)—(s), (l)—(r), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(r), (m)—(p), (n)—(q)
   (C) (k)—(r), (l)—(s), (m)—(q), (n)—(p) (D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)

10. Match the terms in column 'A' with the definition in column

Column A	***Column B***
(k) *Habitat*	(p) *Plants and animals line on land*
(l) *Terrestrial*	(q) *Plants and animals live in water.*
(m) *Aquatic habitat*	(r) *A place with many trees.*
(n) *Forest*	(s) *Place where animal and plant live*

(A) (k)—(s), (l)—(r), (m)—(q), (n)—(p)
(B) (k)—(s), (l)—(p), (m)—(q), (n)—(r)
(C) (k)—(r), (l)—(s), (m)—(q), (n)—(p)
(D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)

ANSWER KEY

ASSIGNMENT - 1									
1	2	3	4	5	6	7	8	9	10
B	C	D	C	D	C	A	B	B	B
ASSIGNMENT - 2									
1	2	3	4	5	6	7	8	9	10
B	B	D	B	C	B	B	C	A	A
ASSIGNMENT - 3									
1	2	3	4	5	6	7	8	9	10
D	C	A	B	C	A	C	C	B	B
MISCELLANOUS PROBLEMS									
1	2	3	4	5	6	7	8	9	10
A	A	A	B	C	B	D	C	D	A
COMPETITVE CORNER									
1	2	3	4	5	6	7	8	9	10
D	C	A	B	B	A	B	C	C	B

HINT SOLUTION

PRACTICE QUESTIONS

VERY SHORT ANSWER TYPE QUESTION

1. (i) Desert, (ii) Submerged land, (iii) Forest, (iv) Sever and dark place, (v) Land and trees.

2. Plants prepare their own food by the process of photosynthesis, with the help of carbon dioxide, water and presence of sunlight. They obtain water and minerals from the soil by their roots.

3. Ponds, river, lakes and oceans are examples of aquatic habitats and water is a medium.

Forest is an example of terrestrial habitat. Deserts, tea garden and mountains are also terrestrial habitats.

4. Mountain is a special terrestrial habitat because at mountain tempera-ture is very low and most of the areas are covered by snow. Plants like grasses, mosses and lichens generally grow there. Animals like snow-bear, water fowl and musk deer are found in this habitat. Therefore, we can say that mountain is a special terrestrial habitat. •

5. Plants and animals are part of biotic components. In addition, there are small organisms like bacteria and fungi in the habitat, which cannot be seen with naked eyes. These are called micro-organisms. They are also a part of biotic components of different habitat.

6. Soil, water and stones are non-living. They are abiotic components. Air, heat, light are also a part of abiotic components.

7. Plants prepare their own food. They use water, carbon dioxide, and sunlight to prepare their own food by the process of photosynthesis, so they arc called autotrophs. During this process, they release energy.

8. (i) opuntia, (ii) Hydrilla, (iii) whales.

SHORT ANSWER TYPE QUESTION

9. Plants and animals cannot survive without light. Plants prepare their own food in the presence of sunlight and animals get food from plants. They totally depend on plants for their food. So sunlight is essential for the survival of the biotic components. In the absence of light, plants become weak and delicate and their leaves become yellow. In the absence of light plants cannot produce fruits and flowers.

10. The plants which grow in hot and dry places are called xerophytes They have long and extensive roots, which goes deep in the soil in search of water. Leaves and stems of some plants become thick and store water. For example : Agane and opentia, their stems and leaves have thick cuticle layer, to prevent extensive loss of water by transpiration as in zinziphus (Ber) leaves also reduced and divided into small segments.

11. Animals living in hot places, such as snakes, desert rats and lizards are not able to get sufficient water. So these animals have a thick skin, which prevents evaporation. Since they do not sweat, they can survive without water for a longer time.

12. Camel lives in desert. It has long legs which help it to lift its body above the ground. Thus camel is able to avoid direct contact with the hot ground. The camel drinks water 50 litre or above in one time and store it in its body. So it lives without water for longer time. Its skin is also thick which prevents transpiration of water. Thus camel is suited to live in desert.

13. The animals which live in cold places like seals, and penguins have thick skin which protects them from cold. They also have thick fur.

14. Plant like hydrilla, water lily, water hyacinth and lotus grow in fresh water. Water growing plants may be submerged or partially submerged, floating and rooted in muddy soil. These plants are called hydrophytes.

MEDIUM ANSWER TYPE QUESTION

15. Hydrophytic plants are best suited to water by the presence of air storage parts in the stem and petioles to give buoyancy to plants for floating. Some rooted aquatic plants have the roots fixed in muddy water. In some plants, the floating leaves have waxy coating on the upper surface of the leaves and air cavity. For example lotus, water lily etc.

16. Almost all types of animals live in sea water. Most of the sea water animals are actively swimming animals like fishes and whales. Animals like corals, star fish and urchin live at the bottom of the sea.

17. Fishes are best suited to live in water. They have boat-like structure which help them in swimming in water. They have gills from which they get oxygen and food. The body of fishes contain different types of fins which help them for swimming in water. Fishes shape tapers which provide least resistance in swimming water.

18. Top soil is most important for growing plants. Most of the organic matters, minerals, air and water are present in this layer. Water and air are very important

for the growth of plants. Plant's roots get oxygen for respiration. In this way, we can say that soil is important for plants.

19. Air is essential for the survival of plants and animals. Air contains oxygen and carbon dioxide. Animals cannot live without oxygen and plants cannot live without carbon dioxide. In the form of wind, air also affects plants and animals. Strong wind may break the branches of trees and uproot them. Some diseases caused by fungi and bacteria are spread by air.

20. Plants balance the oxygen and carbon dioxide ratio in the atmosphere. Plants release oxygen in the atmosphere during the process of photosynthesis and carbon dioxide released by animals is used by plants during the process of photo-synthesis for preparing their own food. In this way, plants maintain balance of oxygen and carbon dioxide in atmosphere.

21. The place where organisms live is called habitat. When they live in water, it is known as water or aquatic habitat. Water is a medium for aquatic habitat.

When they live on land, it is known as land or terrestrial habitat and land is a medium for terrestrial habitat.

Pond, oceans, rivers and lakes are examples of aquatic habitats and forests, deserts, tea gardens and orchards etc. are example of land habitats.

22. Plants prepare their own food with the help of sunlight. Plants cannot survive without sunlight. All animals depend for their food on plants directly or indirectly. Indoor plants become weak without light. Their colour becomes yellow. They should shifted in the sunlight for sometime.

LONG ANSWER TYPE QUESTIONS

23. Biotic components such as plants, animals and microorganisms, are influenced by abiotic components such as water, air, light, oxygen and temperature in different ways. Green plants prepare their own food and animals depend on plants for their food directly or indirectly. They provide shelter to animals. Thus all the organisms are related through food chain.

After death and decay of plants and animals, they are decomposed into simple minerals in the soil. These minerals are again used by plants through the roots. It shows that organisms do not live in isolation. They live in the company of other organisms and share common surroundings. Thus we see that all biotic components and the abiotic components such as air, water, light and soil are interrelated and interdependent on each other in the habitat.

24. Biotic components such as plants and animals are affected by abiotic components such as light, water, soil and air.

Plants prepare their own food in the presence of sunlight, carbon dioxide and water. Animals get food from plants. They cannot live without food, and plants cannot live without sunlight. So sunlight is essential for the survival of biotic components. Light also affects the animals. Some animals live in burrows and caves have much reduced eye. Some are noctural animals. Some places are very hot and some are very cold. This affects the habitats of animals.

All living organisms need water for their survival. We get water from different sources such as ponds, lakes, river, seas, oceans, snow and rain. Some plants and animals live in water. They adopt to live in water. Water is essential for vital activities of plants and animals.

Soil is also important for biotic components. It supports plants for their growth. Soil contains water and minerals which are important for the growth of plants.

Some micro-organisms such as fungi, bacteria, insects and earthworms live in the soil. They obtain organic matter, air and water from the soil for their survival.

Air is also a very important abiotic factor. Without air, plants and animals cannot survive. Plants cannot live without carbondioxide and animal cannot live without oxygen. In the form of wind, air also affects animals and plants. Moving wind may break the branches of trees and uproot them. It also transports harmful bacteria and fungus from one place to another place.

Thus biotic components and abiotic components are interrelated and inter-dependent on each other in the habitats.

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CHAPTER	
4	**Body Movement**

SUBTOPICS
Introduction
Levels Of Organisation
Types Of Bones
Types Of Joints
Movements Of Arm
Types Of Locomotion

INTRODUCTION

You know that cell are called structural units or building blocks of living organisms, because all the organisms (plants or animals) are formed of cells. The body organisms may be composed of a single or of thousands or millions of cells. Basis on this feature, the organisms are classified as **unicellular and multicellular organisms.**

The body of unicellular organisms is formed of one cell. *Amoeba, Euglena, Paramecium,* etc. are unicellular animals. In them, a single cell performs all the life processes.

In multicellular organisms, the body is formed of a large number of cells. Different cells are dedicated to carry out different jobs that are performed by living organisms.

Complex multicellular organisms have **tissues, organs and organ systems.**

LEVELS OF ORGANISATION

In multicellular organisms, cells form tissues; tissues join together to form **organs** and organs work together to form a **system.**

TISSUE

A tissue is a group of similar cells that jointly perform a special function. Muscles, bones and blood are the tissues in our body.

The muscular tissue is responsible for the movement of body parts.

ORGAN

A number of tissues working together to perform the same function make up an **organ.** For example, the eyes are the organs of sight, lungs are the organs of respiration, and the heart pumps blood to all the parts of body.

The heart never takes rest, i.e., it never stops working. It stops working only when an animal dies.

ORGAN SYSTEM

When many organs work together for one major life function, they form an **organ** system. For example:

* Mouth, gullet, stomach, intestine and rectum together form the **digestive system.**
* Heart and blood vessels form the circulatory system.

ORGANISM

All the systems together form an organism.

ORGAN SYSTEMS IN HUMAN BODY

The human body is made up of a number of systems. Each one performs a particular function. The systems also communicate and interact through nervous system and blood.

SKELETAL SYSTEM

Skeletal system forms the supporting framework of the body. It is made up of many bones and cartilages. The bones are hard and brittle, while cartilages are comparatively soft and elastic.

TYPES OF SKELETON

There are two main types of skeleton: **exoskeleton and endoskeleton.**

Exoskeleton

The skeleton present on the body surface (outside) is called **exoskeleton.** It is formed of nonliving substances. It occurs in the form of scales in fish, epidermal scales and bony scales in reptiles, wings, feathers and claws in birds and hair, nails, claws and hoofs in mammals.

Endoskeleton

The hard skeletal framework inside the body is called **endoskeleton.** It is formed of cartilages or bones or both. In sharks, the endoskeleton is cartilaginous. In bony fishes and frogs, the endoskeleton comprises of both cartilages and bones. In birds and mammals, endoskeleton is bony. Cartilage is found mainly at the joints, to absorb shock and to reduce friction between the bones.

FUNCTIONS OF THE SKELETAL SYSTEM

The main functions of the skeletal system are:

* Skeletal system forms the framework that supports the body.
* It gives proper shape to the body. It surrounds and protects inner delicat organs, like lungs, heart, brain, eyes, etc.
* It provides attachment to the skeletal muscles and helps in the movement of body parts like arms, legs, etc.
* Skeletal system with muscles helps in locomotion and handling of various objects.
* Red blood corpuscles (RBC) and white blood corpuscles (WBC) are produced in the bone marrow of some bones.
* Bones store essential body minerals like calcium and magnesium.

TYPES OF BONES

The skeleton is formed of three types of bones namely, **long bones, short bones and flat bones.**

Long bones: These are found in arms and legs. Each bone has a long cylindrical shaft with thick and broad ends. Ribs are long bones and serve as levers. **Short bones:** These are found in the wrist and ankle. The short bones of vertebral column are ring-shaped.

Flat bones: These are bones of skull, ribs, shoulders and hips. A flat bone has two hard and bony plates with a softer material (bone marrow) between them. Flat bones protect vital organs of the body.

SOMETHING MORE

Bones *are so* hard that x-rays cannot pass through them. This makes the study of human bones easier by taking their x-ray photographs. Doctors generally use x-ray photographs to detect bone fracture or dislocation or deformity of bones.

THE HUMAN SKELETAL SYSTEM

Human skeleton is formed of 206 bones. Though an infant at birth has 300 bones, some of them fuse as the baby grows and only 206 bones are found in an adult.

Parts of human skeleton

The various parts of human skeleton are:

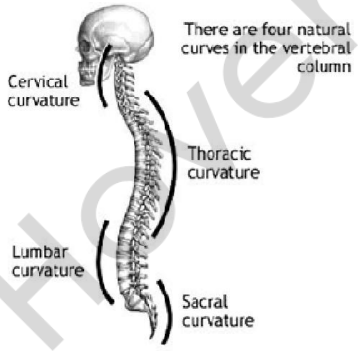
Skull

The skull consists of two main parts, namely **cranium** and **facial bones.**

Cranium: It is the brain case. It encloses and protects the brain. It is formed of bones. The cranial bones are flat and are joined firmly by zipper-like structures. A pair of eye sockets is also attached to the cranium.

Facial bones: The facial bones form upper and lower jaws and some nearby structures. The upper jaw is firmly attached to the anterior end of cranium. The lower law is movable. Its movement enables us to eat, talk and sing. The base of nose is also formed of a bone.

Backbone or vertebral column



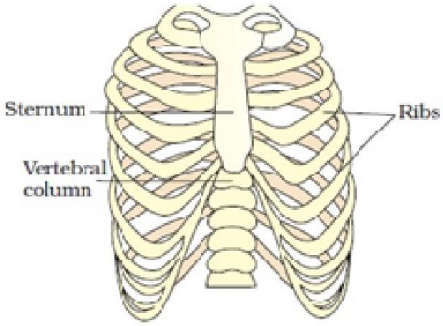
The backbone extends from the base of skull to the hips. It is also called **spine.** The backbone is formed of 33 small ring-like bones, called **vertebrae** and is differentiated into the following five regions.

Neck region (cervical) — 7 vertebrae
Chest region (thoracic) — 12 vertebrae
Belly region (lumbar) — 5 vertebrae
Hip region (sacral) — 5 vertebrae
Tail region (caudal) — 4 vertebrae

The first 24 vertebrae (cervical, thoracic and lumbar) are joined serially end to end through a pad of elastic cartilage. These are called **intervertebral discs.** The 5 vertebrae of hip region are fused. The 4 caudal vertebrae are reduced and fused.

The vertebrae are ring-like and joined end to end. Thus, they form a bony tube. The spinal cord passes through this tube.

Chest bone : The chest region is supported by a cone-shaped bony cage. It is formed of 12 pairs of **ribs** and a median plate-like **sternum or breast bone.** It is also called **ribcage.**



The ribs are long, curved, rod-like bones .attached to the chest and belly vertebrae of [the backbone. The first 10 pairs of these ribs are attached to the breast bone. The ends of tlast two ribs are free. The chest bones protect Plungs and heart.

Shoulder bones

The shoulder region of the body is supported by a pair of **shoulder blades** and a pair of collar **bones.** These are connected to the anterior part of chest region.

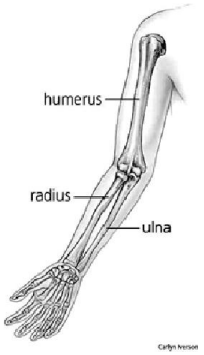
The bones of arms are connected to the shoulder blades. The head of the bone of each upper arm rotates in the cavity of shoulder blade. Because of this articulation, we are able to rotate our arms in a circular movement.

Bones of forelimb (arm)

The forelimbs consist of upper arm, forearm, wrist, palm and fingers. Each limb is formed of 30 bones.

Humerus Radius Ulna Palm bones

* The upper arm has one long bone (hurnerus), which is attached to the shoulder blade.
* The forearm has two long bones: radius and ulna.
* The wrist is formed of eight small pieces of bones.
* The palm is made up of 5 bones.
* The hand has 5 fingers and each finger consists of three small bones except the thumb which has just two bones.
* Hands are modified for grasping objects.



Hip bones

Hip region is supported by two large and flat bony pieces. These are called **pelvic girdles.** Each hip bone is formed by the fusion of three bones.

The hip bones along with hip and tail vertebrae form a large bony bowl. This is called **pelvis.** It encloses reproductive organs, large intestine and rectum.

BONES OF HINDLIMB (LEG)

Legs consist of thigh, lower leg, ankle, foot and toes. Each leg is formed of 30 bones.

Thigh bone (femur) is the longest and strongest bone in the body.

The lower leg is formed of two long bones: tibia and fibula.

Ankle consists of seven small bones.

The foot has five long bones.

The foot has five toes and each toe has three small bones.

A plate-like cap in the frontal part of knee is called **patella.** It protects the knee joint.

The feet help in walking and running.

Example 1: How many ribs are found in the rib-cage of humans?
Solution: There are 12 pairs of ribs in the rib-cage of humans
Example 2 : If backbone was made up of only one long bone, will you be able to bend?
Solution: No

:

JOINTS:

Joints are points where two bones are joined together. The movement of our body or its parts is possible because of joints.

At joints, the bones are held together by bands of flexible connective tissue. These bands are called **ligaments.** They keep the bones in position.

The muscles are attached to the ends of bones by the bands of tough fibrous connective tissue, called **tendons.** The ends of the bones are covered with soft cartilage. It acts as a cushion between the bones and prevents them from rubbing. The cartilage reduces friction between bones and absorbs the shock. The cartilage pads are present between the vertebrae and at the ends of long bones.

TYPES OF JOINTS

Based on the degree of freedom of movement, the joints are of three types:

Immovable joints or fixed joints

The joints found between the skulls "bones are **immovable joints or fixed joints.**

The bones of an immovable joint together form a single protective covering.

PARTIALLY MOVABLE JOINTS

These joints allow partial movement of bones as in case of vertebrae. The joints between ribs and breastbone are also partially movable joints.

FREELY MOVABLE JOINTS

These are the joints where one bone moves freely on the other. Such joints are called **synovial joints.** Shoulder joints, hip joint, knee joint, elbow joint and joints between the wrist bones are examples of freely movable joints.

In a synovial joint, there is space between the articulating bones. This space is called **Bonepnovial cavity.** It is filled with **synovial fluid** which lubricates the bones and other parts of the joint, reduces the friction between them. The ends of bones are covered with **synovial cartilage.**

Freely movable joints are of these types:

* Hinge joint
* Gliding joint
* Saddle joint
* Pivot joint

Ball and socket joint: In a ball and socket joint, the end of one bone is rounded as a ball. It fits into a socket in the other bone. The bone with ball-like head is freely movable in all directions.

Examples: The joints between the head of upper arm bone and shoulder, and between thigh bone and hip bone are ball and socket joints.

Hinge joint: It is such a joint which allows movement of one of the two bones in one direction and only upto 180°. The movement of bone on hinge joint is similar to that of a hinge door.

Examples: Elbow joint between upper arm and forearm, and knee joint between thigh bone and lower leg are hinge joints.

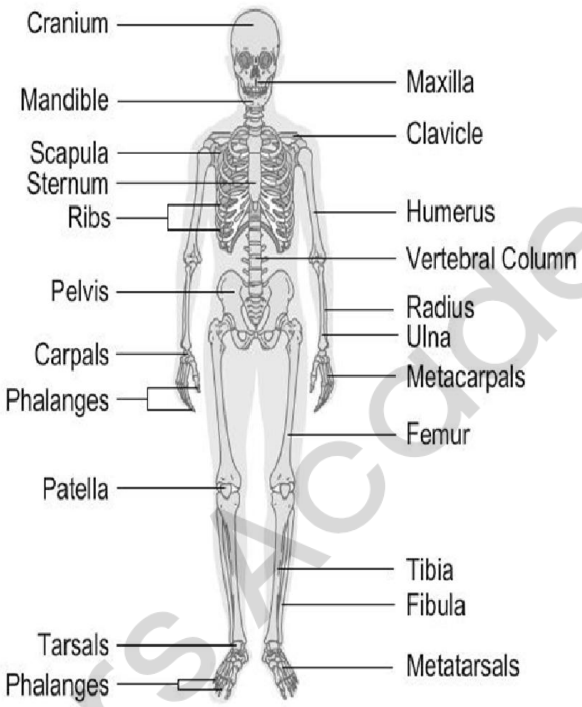
Pivot joint: In a pivot joint, one bone can rotate on the rounded or conical surface of the other bone in many places: up and down, and side to side.

Example: The joint between skull and first vertebra of backbone, and between first (atlas) and second (axis) vertebrae.

Gliding joint: In gliding joint, the two bones can slide upon each other. These joints allow sideways as well as forward and backward movement.

Examples: Joints between wrist bones (carpals) and between the bones of ankle (tarsals) are gliding joints.

Saddle joint: It is an imperfect ball and socket joint in which one bone is movable on the other fixed bone in many directions. Examples: Thumb joint, i.e., the joint between first metacarpal and carpal.



Human bones and Joints

Example 3 : Give an example of pivot joint in the human body.
Solution: The joint between skull and first vertebra

Example 4 : The joint between the upper jaw and rest of head is.....

Solution: Fixed joint

MOVEMENT OF ARM

The up and down movements of our arm are controlled by two muscles: **biceps and triceps.**

When you raise your arm, the biceps contract. They become shorter and fatter pulling the arm up.

When you lower your arm, the triceps contract and the biceps relax. It means triceps become shorter and broader while biceps return to their original shape.

Bones cannot move by themselves. The muscles attached to the bones make them move at the joints. Muscles work in pairs by contraction and relaxation. When one muscle of the pair contracts, the other one relaxes. The bones provide *leverage for* rapid contraction and relaxation of muscles. It means bones and muscles work together.

All animals do not have bones. Only animalks with a backbone have bones. They are called **vertebrates.** Fish, frog; snakes lizards, birds and mammals including man are vertebrates. Animals without a backbone do not have bones. They are called invertebrates. worms, leeches, snails, starfishes, sea urchins, corals and jellyfishes are invertebrates.

LOCOMOTION IN ANIMALS

The movement of an animal as a whole from one place to another is termed as locomotion.

Need for locomotion

Animals move from place to place for:

* food
* shelter
* mate for reproduction
* self defence

TYPES OF LOCOMOTION

Animals move by crawling, creeping, walking, running, hopping, flying and swimming. The mode of locomotion depends on the habitat and body structure. Let us study locomotion in some animals which we see in the surroundings.

LOCOMOTION IN EARTHWORM

Earthworm moves by crawling produced by the alternate contraction and relaxation of muscles of the bodywall.

The bodywall of earthworm has a layer of circular muscles and a layer of longitudinal muscles. The contraction of circular muscles makes the body short and thick, and the relaxation of longitudinal muscles makes the body long pushing it forward. The contraction of longitudinal muscles makes the body long.

The bristle-like projections called **setae** provide grip to earthworm on the surface. While moving, an earthworm holds the rear part of the body to the surface and extends its front part. Then the extended front part holds the surface and the rear part is released. The body shortens and the rear end is pulled forward. By repeating these movements, the earthworm creeps ahead on the ground.

LOCOMOTION IN SNAIL

The body of a snail is enclosed in a calcareous shell. The shell is hard and inflexible, and forms exoskeleton. It has an opening on the lower side covered with an operculum. During locomotion, the shell aperture opens and a large muscular foot and head of the snail come out. The glands in the foot secrete a slippery substance and the snail creeps slowly by the slippery movements of the foot caused due to contraction of foot muscles.

Locomotion in cockroach

Cockroach can fly as well as run because it has two pairs of wings for flying and three pairs of legs for walking and running. The body of cockroach is covered with a hard chitinous exoskeleton which is divided into rings around the body. These rings permit body movements.

Cockroach has three pairs of legs. The distal ends of legs have claws and adhesive pads. The first pair of legs pulls the body forwards and the third pair of legs pushes the body from behind. The claws and adhesive pads help the cockroach to climb.

The two pairs of wings attached to the thorax of a cockroach help in flying. The hindwings move up and down by the action of flight muscles attached to them. At each downward movement of hindwings, the air is pushed downwards and backwards, and the body is pushed upwards and forwards. The forewings do not beat. They are held at right angle to the body.

* Cockroaches can fly for short distances and for a short duration. They can run very fast on their hindlegs.
* Scientists have designed robots that walk in a manner similar to the cockroach.

LOCOMOTION IN FISH

Fishes are aquatic animals. To make their way in water, they have to overcome the resistance offered by water. The fish has the following features for swimming:

Body is spindle-shaped or boat-shaped and streamlined. This body shape offers least resistance while swimming.

* Body muscles create wave-like movements of the body to push the fish forward. :
* Tail is muscular having a tail fin. Its side to side movements push the water downwards and backwards which in turn pushes the body upwards and forwards.
* Tail also helps in changing the direction of movement while swimming.
* The paired fins and the median dorsal fins keep the balance of body while swimming.
* During swimming, muscles in the front part of the fish body make it to curve to one side. The tail curves in the opposite side. This creates a jerk and pushes the body forward.

LOCOMOTION IN SNAKES

Snakes do not have legs. Their body is long and cylindrical supported with a long backbone. The well-developed body muscles are connected to each other and to the vertebrae, ribs and skin. The contraction of muscles creates curves or loops along the body. Each loop creates a push and the snake moves in a zigzag manner.

Locomotion in birds

Birds have wings to fly in the air. They also have a pair of legs for walking on the ground. Some birds like ducks also swim in water. The following body structures help a bird in flying:

* Body is spindle-shaped or streamlined to make its way in the air.
* Bones are hollow but strong. They make the body of the bird light for flying in the air.
* Their forelimbs are modified into wings.
* Their shoulder bones are strong.
* The breast bone is broad for the attachment of breast muscles.
* Powerful breast muscles move the wings up and down (flapping of wings).

Birds fly by flapping their wings. By the contraction of flight muscles, wings move downwards and forwards. This downstroke of the wings pushes the air downwards and backwards, and the body is pushed upwards and forwards. When the wings move upwards the bird moves downwards.

Illustrations 1 : How can earthworm move?

Solution: Earthworm can move by muscle expansions and contraction. Its body secrete a slimy substance to help in movement

Illustrations 2 : How fish swims?

Solution: The body of fish is streamlined. The skeleton of fish is covered with strong muscles. During swimming the muscles make the front part of body to one side and tail swings towards opposite side. Then quickly the body and tail are curved to other side. This makes a jerk and pushes body forward.

FACT FILES

1. The human skeletal system is formed of 206 bones.
2. The skull protects the brain while vertebral column or backbone protects the spinal cord.
3. The ribcage protects heart and lungs. It consists of breast bone, backbone, 12 pairs of ribs and collar bones.
4. Cockroaches have wings but they cannot fly actively. However, they can walk and run very fast with three pairs of legs.
5. Snakes crawl in a zigzag fashion on sandy surface.
6. At birth the human skeleton is made up of around 300 bones. By adulthood, some bones have fused together to end up with 206 bones.
7. Human bones grow continually from birth till our mid 20's. Our skeleton's bone jmass is at its maximum density around the age of 30.
8. The axial skeleton part of the human skeleton has 80 bones. It includes the vertebral column, the rib cage and the skull and helps us maintain our upright posture, by spreading the weight in the head, and upper areas down to the lower areas near the hips.
9. The appendicular skeletal section of our skeleton has 126 bones. It includes the pectoral (shoulder) girdles, the pelvic girdle and the bones of the lower and upper limbs. Its function is for movement of the body and to protect some organs.
10. The longest bone in the human body is the thigh bone called the femur.
11. The smallest bone found in the human body is located in the middle ear. The staples (or stirrup) bone is only 2.8 millimetres (0.11 inches) long.
12. Our teeth form part of the skeletal system, but are not counted as bones.
13. Bone marrow makes up 4% of a human body mass. It produces red blood cells which carry oxygen all over the body. Marrow is also produces lymphocytes, key components of the lymphatic system, which support the body's immune system.
14. Many of us think that bones are dead cells. However, bones are alive when they are in human body. They have network of nerves and blood vessels. They can store calcium and have living cells.

KEY POINTS

1. **Bones are alive**: Many of us think that bones are dead cells. However, bones are alive when they are in human body. They have network of nerves and blood vessels. They can store calcium and have living cells
2. Backbone: The series of vertebrae extending from the skull to the pelvis; the spine.
3. Socket joint: A natural or manufactured joint or coupling, such as the hip joint, in which a partially spherical end lies in a socket, allowing multidirectional movement and rotation.
4. Cartilage: firm, flexible connective tissue found in various forms in the larynx and respiratory tract, in structure such as the external ear, and in the articulating surface of joints. It is more widespread in the infant skeleton, being replaced by bone during growth
5. Fixed joint: A synovial joint, also known as diarthrosis, is the most common and most moveable type of joint in the body of a mammal. As with most other joints, synovial joints achieve movement at the point of contact of the articulating bones.
6. Gait of animals: The pattern of movement of the limbs of animals, including humans, during locomotion over a solid substrate. Most animals use a variety of gaits, selecting gait based on speed , terrain, the need to maneuver, and energetic efficiency.
7. Hinge joint: (Ginglymus) is a bone joint in which the articular surface are molded to each other in such a manner as to permit motion only in one plane.
8. Muscle: A band or bundle of fibrous tissue in a human or animal body that has the ability to contract, producing movement in or maintaining the position of parts of the body.
9. Pelvic bones: The body of pubic bone forms the wide, strong, medial and flat portion of the pubic bone which unite in the pubic symphysis.
10. Pivotal joint: In pivot joints. The axis of a convex articular surface is parallel with the longitudinal axis of the bone.

NCERT QUESTIONS AND ANSWERS

1. Fill in the blanks:
   (a) Joints of the bones help in the _____ of the body.
   (b) A combination of bones and cartilages forms the _____ of the body.
   (c) The bones at the elbow are joined by a _____ joint.
   (d) The contraction of the _____ pulls the bones during movement.

Ans. (a) Joints of the bones help in the movement of the body.
(b) A combination of bones and cartilages forms the skeleton of the body.
(c) The bones at the elbow are joined by a hinge joint.
(d) The contraction of the muscles pulls the bones during movement.

2. Indicate true (T) and false (F) among the following sentences.
   (a) The movement and locomotion of all animals is exactly the same. ( )
   (b) The cartilages are harder than bones. ( )
   (c) The finger bones do not have joints. ( )
   (d) The fore arm has two bones. ( )
   (e) Cockroaches have an outer skeleton. ( )

Ans. (a) False (b) False (c) False (d) True (e) True

3. Match the items in Column I with one or more items of Column II.

Column I	Column II
Upper jaw	have fins on the body.
Fish	has an outer skeleton.
Ribs	can fly in the air.
Snail	is an immovable joint.
Cockroach	protect the heart.
-	shows very slow movement.
-	have a streamlined body.

Ans.

Column I	Column II
Upper jaw	is an immovable joint.
Fish	have fins on the body, have a streamlined body.
Ribs	protect the heart.
Snail	shows very slow movement.
Cockroach	has an outer skeleton, can fly in the air.

4. Answer the following:
   (a) What is a ball and socket joint?
   (b) Which of the skull bones are movable?
   (c) Why can our elbow not move backwards?

Ans. (a) In a ball and socket joint, the rounded end of one bone fits into the cavity (hollow space) of the other bone. It can allows movement in all directions.
(b) Lower jaw bone (Mandible bone) is the only movable bone in skull bone.
(c) Elbow joint has hinge joint. This joint allows movement in a plane only and hence it is not able to move backwards.

PRACTICE QUESTIONS AND ANSWERS

VERY SHORT ANSWER TYPE QUESTION

1. How many vertebrae are found in our back bone ?
2. What are the regions of a backbone ?
3. Which bone forms the shoulder bone ?
4. How many bones does our skeleton have ?
5. Our forearm has ..... bones.
6. How are bones joined together ?
7. What are hinge joints ?
8. How do muscles move the bones ?
9. Define movement.
10. What is locomotion ?
11. How do fishes move ?
12. How does a cockroach move ?

SHORT ANSWER TYPE QUESTION

13. Give two examples of each : tissues and organs.
14. Why do animals move ?
15. What is the function of our brain ?
16. How does a cockroach move ?
17. Are nails and hairs organs ?
18. Define movement in snakes.
19. How many organ systems do we have ? What major functions do they perform ?
20. Define skeletal system.
21. What are chest bones ?
22. How many parts does our skull have ?
23. How many regions are there in our backbone ?
24. Define the bones present in our hand.
25. What is the correct sitting postures ?
26. Define the following :
    (a) Fixed joints, (b) Ball and socket joints.

MEDIUM ANSWER TYPE QUESTION

27. What are bone joints and from what are they joint ?
28. How do muscles move the bones ?
29. What is locomotion ? Where is it found ?
30. Answer the following questions :
    (a) What is an organ system ?
    (b) Which of the skull bones are movable ?
    (c) Which of the external organs are supported by cartilages ?

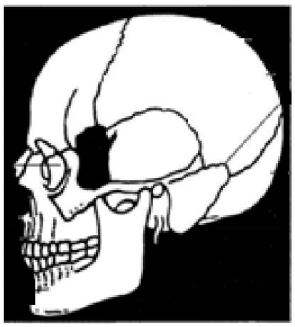
LONG ANSWER TYPE QUESTIONS

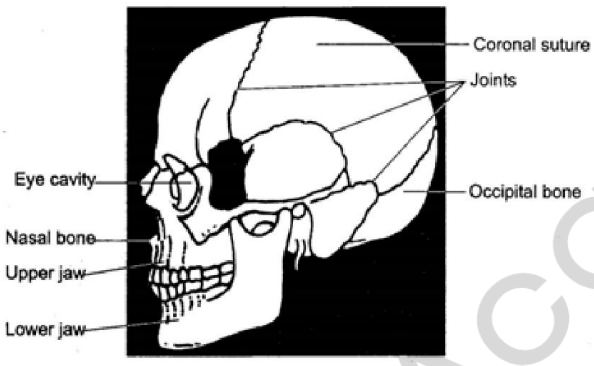
31. Define the locomotion in snail.
32. How does an earthworm move?
33. Define tissue, organ and organ system.

DIAGRAM BASED QUESTIONS AND ANSWERS

1. Labeled the following diagram.

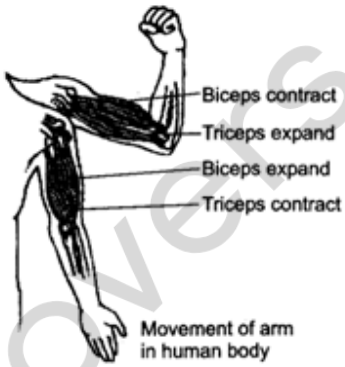
ANS.



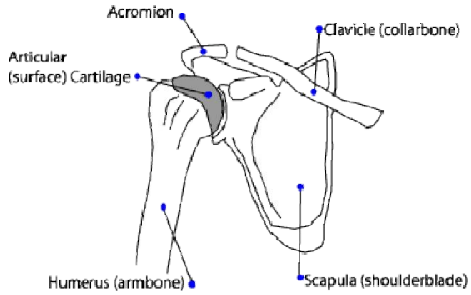


2. Show the biceps and triceps muscles of fore limb.

Ans.



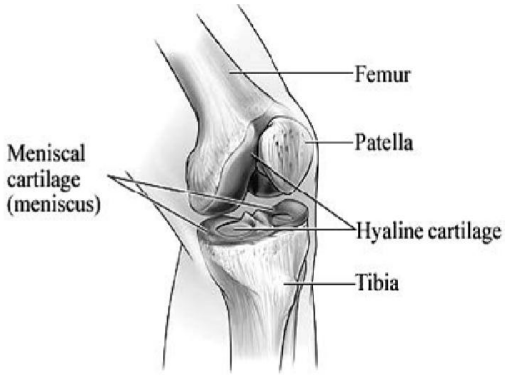
3. Write the name of the joint shown in the following figure.



Ans. Ball and socket joint.

4. Draw a labelled diagram of Knee joint.

Ans.



ASSIGNMENT - 1

Choose the correct answer from the following:

1. Which of the following is a unicellular animals ?
   (A) Jelly fish (B) Mimosa pudica
   (C) Amoeba (D) None of these

2. Which one of the following is a vertebrate ? .
   (A) Butterfly (B) Earthworm
   (C) Amoeba (D) Frog

3. Our skeleton has ..... hones.
   (A) 306 (B) 206
   (C) 406 (D) 506

4. A group of similar cells and similar functions is called :
   (A) organ system (B) organ
   (C) body (D) tissues

5. Which one of the following is not an organ ?
   (A) Hand (B) Foot
   (C) Hairs (D) Chest

6. Which one of the following is not an external organ ?
   (A) Hand (B) Heart
   (C) Eye (D) Mouth

7. Our finger has ..... bones.
   (A) 4 (B) 5 (C) 3 (D) 2

8. Find the odd one from the following :
   (A) Snakes (B) Elephant (C) Crabs (D) Insects

9. In which of the following animals exoskeleton is not found ?
   (A) Fishes (B) Birds (C) Horse (D) Snakes

10. Cockroach has ..... of joint legs.
    (A) Two pairs (B) Three pairs (C) Five pairs (D) Four pairs

ASSIGNMENT – 2

1. At which parts of our body can we bend?
   (A) Knee (B) Elbow (C) Neck (D) All of these
2. Movement of our body is helped by:
   (A) Long bones (B) Backbone (C) Limbs (D) Joints
3. Which of the following statements is correct?
   (A) The finger bones do not have joints.
   (B) The skeleton is formed by only bones.
   (C) cartilage is softer than bones and can be bent
   (D) All animals show similar movements
4. Which part of our body has a pivotal joint?
   (A) Shoulder (B) Knees (C) Ribs (D) Neck
5. The joint which helps in movement in all directions?
   (A) Pivotal joint (B) Ball and socket
   (C) Hinge joint (D) Fixed joints
6. Hinge joints are present in the ..... region.
   (A) Neck (B) Shoulder (C) Elbow (D) Skull
7. ..... gives a shape and structure to our body.
   (A) Bones (B) Skin
   (C) Colour (D) Skeleton
8. . ..... gives a better image of the human skeleton.
   (A) Camera (B) X-ray
   (C) Infra red rays (D) None of these
9. Which of the bone structure protect the lungs in our body?
   (A) Rib cage (B) Skull
   (C) Vertebral column (D) All of these
10. The hip region consists of:
    (A) Shoulder bones (B) Pivotal joint
    (C) Rib cage (D) Pelvic bones

ASSIGNMENT – 3

1. How many muscles are used in the movement of a bone?
   (A) 1 (B) 2 (C) 3 (D) 4
2. 'Gait' means:
   (A) Manner of nutrition in animals (B) Manner of movement
   (C) Manner of reproduction (D) The habitat of animals.
3. In which of the following animals are bones not present?
   (A) Earthworm (B) Snail
   (C) Cockroach (D) All of these
4. A cockroach has ..... pairs of legs.
   (A) 2 (B) 3 (C) 4 (D) 6
5. A snail moves with the helps of its:
   (A) Shell (B) Wings (C) Bristles (D) Feet
6. Birds can fly because of:
   (A) Feathers (B) Wings (C) Hollow bones (D) All of these
7. A fish swims in water with the help of its:
   (A) Scales (B) Stream lined body
   (C) Fins (D) Both B & C
8. Underwater divers wear.....to move easily in water.
   (A) A head torch (B) Oxygen cylinder (C) Flippers (D) A watch
9. A snake moves:
   (A) In a straight line (B) By making loops
   (C) By its scales (D) By its hollow bones
10. Which of the following statements is not true?
    (A) The cartilage is not as hard as bones.
    (B) A snake moves by making loops.
    (C) All animals show exactly similar movements
    (D) Snails move with the help of their muscular feet.

MISCELLANEOUS QUESTIONS

1. The number of bones that makes up the skull is:
   (A) 22 (B) 20 (C) 24 (D) 21
2. What are produced in the bone marrow?
   (A) White blood cells (B) Red blood cells
   (C) Both A & B (D) None of these
3. Bones are held together by tough tissues called:
   (A) Tendons (B) Ligaments
   (C) Cartilage (D) None of these
4. This protects the delicate internal organs in the body:
   (A) Muscles (B) Blood
   (C) Skeleton (D) None of these
5. The number of bones that make up the vertebral column is:
   (A) 33 (B) 30
   (C) 32 (D) 24
6. Fixed joint is found in:
   (A) Cranium (B) Knee
   (C) Fingers (D) Elbow
7. Which of these have least number of moveable joints:
   (A) Backbone (B) Skull
   (C) Legs and feet (D) Arms and hands
8. A group of similar cells specialized to perform specific functions:
   (A) Organ (B) Organ system
   (C) Tissue (D) Organism
9. The total number of bones in the human skeleton are:
   (A) 206 (B) 196
   (C) 296 (D) 106
10. The back bone consists of:
    (A) 13 vertebrae (B) 23 vertebrae (C) 33 vertebrae (D) 43 vertebrae

COMPETITION CORNERS

1. Which of the following parts of our body help us in movement?
   (i) Bones (ii) Skin (iii) Muscles (iv) Hert
   Choose the correct answer from the option below.
   (A) (i) and (iii) (B) (ii) and (iv)
   (C) (i) and (iv) (D) (iii) and (ii)
2. Which of the following joints is immovable?
   (A) Shoulder and arm (B) Knee and elbow
   (C) Upper jaw and skull (D) Lower jaw and upper jaw
3. Which of the following organisms does not have both muscles and skeleton for movement?
   (A) dog (B) snail
   (C) earthworm (D) human being
4. Underwater divers wear fin-like flippers on their feet to
   (A) swim easily in water.
   (B) look like a fish.
   (C) walk on water surface.
   (D) walk over the bottom of the sea (sea bed).
5. Snail moves with the help of its
   (A) shell . (B) bone
   (C) muscular foot (D) whole body
6. How many muscles work together to move a bone?
   (A) One (B) Two (C) Three (D) Four
7. Which of the following is an organ?
   (A) Hand (B) Nails (C) Hairs (D) Nerves
8. Which of the following are the types of movable joints?
   (A) Ball and socket (B) Hinge
   (C) Both a & b (D) None of these
9. Match the items of column 'A' with the items of column 'B'

Column A	**Column B**
(k) Leg	(p) 33, ring-like vertebrae
(l) Snakes and fishes	(q) Brain box
(m) Skull	(r) Shank
(n) Backbone	(s) scales

   (A) (k)—(r), (l)—(s), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(r), (m)—(p), (n)—(q)
   (C) (k)—(r), (l)—(p), (m)—(q), (n)—(s) (D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)
10. Match the terms in column 'A' with the definition in column

Column A	***Column B***
(k) Snails	(p) where two bones meet
(l) Earthworm	(q) can fly in the air
(m) Joints	(r) covered with hard shell
(n) Birds	(s) friend of farmer

   (A) (k)—(s), (l)—(r), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(p), (m)—(q), (n)—(r)
   (C) (k)—(r), (l)—(p), (m)—(q), (n)—(s) (D) (k)—(r), (l)—(s), (m)—(p), (n)—(q)

ANSWERS

ASSIGNMENT - 1									
1	2	3	4	5	6	7	8	9	10
C	D	B	D	C	B	C	B	C	B

ASSIGNMENT - 2									
1	2	3	4	5	6	7	8	9	10
D	D	C	D	B	C	D	B	A	D

ASSIGNMENT - 3									
1	2	3	4	5	6	7	8	9	10
B	B	D	B	D	D	D	C	B	C

MISCELLANEOUS									
1	2	3	4	5	6	7	8	9	10
A	C	B	C	A	A	B	C	A	C

COMPTITIVE									
1	2	3	4	5	6	7	8	9	10
A	C	C	A	C	B	A	C	A	D

HINTS SOLUTION

CBSE CORNER

VERY SHORT ANSWER TYPE QUESTION

1. The back bone is composed of 33 small ring-like vertebrae joined end to end.
2. Back-bone has five regions. From the top they are neck, chest, belly, hip and tail. ,
3. Shoulder bone is formed by the collar bone and the shoulder blade.
4. Our skull has 206 bones.
5. Two.
6. Bones are held together at joints by strong cords called ligaments.
7. These joints allow movement only in one plane not more than 180 degrees.
8. The muscles move the bones by contraction.
9. When organisms move their body parts without changing their position.
10. When animals move from one place to another place. This kind of movement is called locomotion.
11. They move with the help of tail fins and anal fins.

12. Cockroach has distinct muscles attached with skeletal process. These muscles move the body.

SHORT ANSWER TYPE QUESTION

13. **Tissues** : Muscles tissues, Nerve tissues.
Organ : Heart, stomach.

14. Animals move from one place to another place due to the following reasons:
(i) In search of food, (ii) In search of mate and (iii) to protect from enemies.

15. Brain controls our body activity. It is also the centre of memory and learning.

16. Cockroach also walks and climbs on the wall and flies in the air. It has three pairs of joined legs attached to the breast region. These help in walking. It has distinct muscles in the breast region which move the wings during flight.

17. No, our hairs and nails have important uses. They are produced by the skin, but they are not organs. Because as they grow, they become dead. They can be cut without pain or bleeding.

18. Locomotion in snakes is like swimming on land. They make many loops at the sides. It is mainly the forward thrust to move forward. They also hitch the skin and body alternately dragging the ventral scales on the ground. Some snakes can swim well in water.

19. We have ten organ systems. They perform all the functions that are needed to keep us alive. They provide all the essential services to the body to **keep** us fit and healthy.

20. Our skeletal system is made up of many bones and cartilages. The bones are hard and cartilages are soft and elastic. It gives support to the body. It protects internal organs. Together with muscles it gives shapes to our body. Narrow bone produces red blood cells and some white blood cells.

21. Chest is a cone-shaped cage. It encloses the hearts and the lungs. At the back are the vertebrae—12 pairs of ribs curve round the sides. Ribs are attached to the sides of each vertebrae. Ten of them are also attached by cartilage to the breast bone at the front. Two ribs are free.

The ribs are joined in such a way that they allow the needed movement of the chest during breathing.

22. Our skull has two main parts : (i) Cranium or the brain case and (ii) the facial bone. The bones of cranium are flat and held firmly. It protects brain. The facial bones comprise upper and lower jaw.

Lower jaw is movable. Skull has a pair of eye sockets.

23. The backbone has five regions. From the top they are the neck, chest, belly, hip and tail regions. The five vertebrae of the hip are inseparable. They are fused together. The four vertebrae of the tail are also fused.

24. The hand comprises the upper arm, fore-arm, wrist, palm and fingers. The upper arm has one long bone, and fore-arm has two long bones. Wrist is made up of several small bones. The palm is composed of fine slightly longer bones. There are three small bones in each finger.

25. In correct position, one should sit straight and relaxed. One should not bend in front or lean backwards. The fore-arm should be at the same level. The feet should be in rest on the floor. Lower leg should be erect making a right angle at the knee.

26. (a) **Fixed joints** : Some attachments do not allow movements. They are fixed joints. Joint of cranium is a fixed joint.

(b) **Ball and socket joints**: The rounded end of one bone fits into the hollow space of the other bone. Such a kind of joint allows movements in all directions. **Examples**: The joints between the upper arm and shoulder, the thigh and the hip joint.

MEDIUM ANSWER TYPE QUESTION

27. The place where two bones or more than two bones meet together is called a joint. There are various kinds of joints. "They are held together at joints by strong cords called ligaments.

28. The muscles cover the bones. Muscles are attached to bones by tough cords called *tendons.* The muscles move the bones by contraction. When contracted, the muscles becomes shorter, stiffer and thicker. It pulls the bone. For movement of a bone, two muscles work. When one of them contract the bone is pulled in that direction. The other muscles of the pair relaxes. A muscle only pulls and another muscle can push.

29. Animals move from one place to another for various purposes. This kind of movement is called locomotion. Locomotion is found only in animals. Locomotion helps them in search of food and shelter. It also helps them escape from their enemies. .:

30. (a) When several organs group together as a team to carry out a major activity, such a set of organs is called an *organ system.*

(b) The facial bones comprise the upper and lower jaws and a few other bones. The bones of lower jaw are movable.

(c) The back bone and its 24 vertebrae are joined by cartilages. Thus it forms a hollow bony tube. Nose, ear and various joints are joined by this.

LONG ANSWER TYPE QUESTIONS

31. The body of a snail is covered with a hard and flexible shell. It has an opening with a lid. Through the opening of the shell, a strong muscular foot and head comes out. The foot is a part of its belly. When it starts moving, the wavy motion of the foot can be seen. The movement is very slow.

32. The body of a mature earthworm seems to be made of many rings joined end to end. From the paler under surface of the body a large number of minute bristles project out. The bristles are connected with muscles at their bases.

The bristles help to get a good grip on the ground. There are muscles in the body wall which help to extend and shorten the body. During movement, the earthworm first extends the front part of the body, keeping the rear fixed to the ground. Then it fixes the front end and releases the rear end. Thereafter it shortens the body and pulls the rear end forward. The earthworm follows this process repeatedly to move ahead. On a slippery surface, its movement is affected due to the loss of the grip on the surface.

33. **Tissue** : A group of similar cells to perform special functions. These group of cells are called tissues.

Organ : Groups of different kinds of tissues which perform special functions are called organs. Each organ of the body has a different structure.

Organ system : A large number of related organs together form an organ system. Cells —> organ —> organ system —> human body.

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CHAPTER

6

Garbage In Garbage Out

SUBTOPICS
Introduction
Classification Of Wastes
Biodegradable And Nonbiodegarable Wastes
Hazards Of Waste Accumulation
Plastic Menace
Practising The Three – R's

INTRODUCTION

Waste is anything which is no more used and is thrown away. For example, after eating banana we throw away the peel in dustbin because it is a waste. Similarly, after eating a candy, we throw away its wrapper. The banana peel and candy wrapper were protecting the food items. But once they were eaten, the banana peel and candy wrapper were of no use and hence thrown away as wastes.

WASTE GENERATION

Almost every human activity generates wastes. The food we eat or water we drink generates waste in the form of excreta and urine. Each household generates a large amount of wastes every day in the kitchen, bathroom, etc. Lots of wastes are also formed in schools, factories, fields, etc.

CLASSIFICATION OF WASTES

Wastes can be classified on the following bases.

* **Impact of wastes on human health :** nontoxic, toxic and pathogenic wastes.
* **Decaying nature of waste :** biodegradable and nonbiodegradable wastes.
* **Sources of generation :** domestic waste, agricultural waste, community waste, industrial waste and sewage sludge.
* **Physical state of waste :** solid, liquid and gas.

Nontoxic waste is harmless to human beings, plants, animals and their environment. Most domestic waste is nontoxic.

Toxic or hazardous wastes are harmful and create several health problems in man and domestic animals. They spoil the environment also. Industrial waste, biomedical waste and electronic waste are usually toxic. They pollute air, water and soil.

Pathogenic waste contains disease-causing microorganisms. Hospital waste usually contains infectious microorganisms.

BIODEGRADABLE AND NONBIODEGRADABLE WASTES

Biodegradable waste means organic substances from plants and animals which are decomposed by microorganisms (bacteria and fungi) into simpler compounds. On decomposition, this waste produces **compost** which is used as manure for crops. The process of converting waste into compost is called **composting.**

Biodegradable waste includes peels of fruits and vegetables, paper, old clothes, pieces of wood, fallen leaves, rotten fruits, dead plants, animal excreta, dead and decaying animals. These wastes are recycled in nature.

Nonbiodegradable waste is not decomposed by microorganisms. It accumulates and pollutes the surroundings.

Nonbiodegradable waste includes chemical wastes, detergents, paints, varnishes and the most problematic polythene bags. Metals, metallic compounds, glass, mercury, lead, tin, etc. are also nonbiodegradable waste.

Note

A plastic bag may take as long as 500 years to decay. However, scientists are working for developing biodegradable plastic.

DOMESTIC AND COMMUNITY WASTES

The waste generated by household activities is called **domestic waste.** It includes waste food, fruits, vegetables, their peels, paper, plastic, rubber, glass pieces, garden litter, etc. and waste water from kitchens, bathrooms and tiolets.

The solid waste from schools, offices, shops, streets, hospitals, playgrounds, public gardens, etc. form **community waste.**

The domestic and community wastes are collectively called **municipal solid waste.**

You know the solid waste in urban areas is managed by municipal authorities.

Community waste includes **garbage** and **rubbish.**

* Garbage is the organic part of the waste. It gets decomposed in a few days. It includes peels of fruits and vegetables, their pieces, leftover food and garden litter.
* Rubbish includes paper, plastic, polythene bags, glass pieces, rubber, clothes, etc.

Agricultural, industrial and commercial wastes

Waste generated in farms and livestock shelters is called **agricultural waste.** This includes animal dung, crop residue and waste generated by fruit and vegetable processing.

The industrial waste includes coal ash, furnace slag, metallic scrap, acids, oils, paper scrap, alkali, acids, bleaching powder, etc.

The commercial waste includes wastes from shops, stores, restaurants, offices and market places, like paper, plastic wrappers, soft drink cans, packaging material and leftover food.

Biomedical waste or hospital waste (Biomedical waste) is generated in the hospitals, clinics and medical or pathological laboratories.

The remains left after the treatment of domestic and industrial waste are called sewage sludge.

Electronic waste or e-waste consists of discarded electronic parts from computers, televisions, music system, etc.

Solid, liquid and gaseous wastes

Home, industries, gardens, agricultural and commercial activities are the main source of **solid waste.** It includes organic matter in the form of plant products or discarded metals and plastic. Solid waste is both biodegradable and nonbiodegradable.

Effluents from industries, tanneries, distilleries, textile, chemical and pharmaceutical industries, sewage sludge, water from kitchens and toilets, all introduce **liquid waste** into the surroundings.

Gases released by chemical industries, metallurgical furnaces and vehicles (cars, buses, motorbikes, planes) are **gaseous waste.**

It includes harmful gases like sulphur dioxide, carbon monoxide, hydrogen and ammonia.

HAZARDS OF WASTE ACCUMULATION

Accumulation of waste is hazardous for the environment as well as for the public health.

* Accumulated waste causes pollution of soil, water and air. Sewage, industrial affluents, agricultural chemicals like insecticides, pesticides and chemical fertilisers add chemicals in the soil and water, and cause ill-effects on our health.
* Accumulated garbage contains leftover food and worms. These attract birds. A bird may hit an aircraft causing it to crash.
* Diseases like gastroenteritis, diarrhoea, cholera, jaundice, typhoid, etc. are caused by polluted or contaminated water.
* Waste accumulation generates foul odour.
* Accumulation of leftover construction material and garbage occupies a lot of space and even causes accidents.
* Polluted soil and water are hazardous to plants and animals.
* Accumulated waste spoils the asthetic look of the area around.
* Generation of too much of carbon dioxide is producing greenhouse effect which is leading to disastrous consequences for the entire world.
* Chloroflourocarbons (CFC) used in refrigeration and air-conditioning are responsible for the depletion of ozone layer in the atmosphere. This is leading to increased solar radiation and ultraviolet rays on the earth surface.

PLASTIC MENACE

Plastic is a nonbiodegradable material. Plastic bags, bottles and containers are thrown everywhere. They clog the soil and affect its fertility. They choke drains and damage the municipal sewage system. They accumulate in nullahs or drains.

Plastic bags in the garbage are responsible for the death of stray animals especially cattle. Cattle eat leftover food and edible wastes from the garbage and consume plastic bags along with the food. These accumulate in their stomach causing death by choking.

Plastic dumped in water bodies causes death of many fish, turtles and other aquatic animals.

WASTE DISPOSAL

Waste disposal means getting rid of the waste in such a way that it causes no or minimum damage to the surroundings and to the environment.

* In olden times, humans lived close to the nature. They used natural goods like natural fibres, earthenware, houses built from mud and medicines derived from plants. All these were biodegradable and were recycled in nature by the action of microorganisms.
* Modern lifestyle and use of a variety of man-made nonbiodegradable goods has greatly increased waste production and the problem of environmental pollution.

Waste generation increases with increasing population and economic development. Urban population produces more nonbiodegradable waste while village population produces mainly biodegradable waste. The electronic and nuclear wastes are difficult to dispose off.

PRACTISING THE THREE R'S

The management of waste needs three major steps: Reduce, Reuse and Recycle.

* **Reduce:** We need to reduce the amount of waste generation by reducing our level of consumption.
* **Reuse:** Use objects which can be used again and again, such as metallic utensils, rechargeable batteries, plastic bags, etc.
* **Recycle:** Making useful things from waste materials is known as recycling. Materials like glass, metals, plastics and paper can be collected, separated and sent to recycling plants. New products can be prepared from these materials. Recycled paper can be used for making bags, gift wrappers and greeting cards.

Recycling of paper: Paper is recycled in industries to regenerate new paper. Paper that is suitable for recycling is called scrap paper.
You can recycle old newspapers, magazines, notebooks and used envelopes.
Waxed papers, oil-soaked papers, paper contaminated with food, carbon paper, thermal
fax paper, plastic laminated paper, stickers cannot be recycled.

Steps involved in recycling paper

Paper is torn into small pieces.
Soak these pieces in water for a day.
Make a thick paste and spread it on a net or sieve.
Let water drain off completely.
Use an old cloth or newspaper to remove the extra water from the paste and dry it.
Use this paste to get beautiful patterns.

RECYCLING PAPER AND PLASTICS

Questions: What are the Colours of two different dustbins provided by Municipality for garbage?
Solutions: Blue and Green
Questions: **Blue coloured dustbins are meant for what type of garbage**
Solution: For materials that can be used again such as plastics, metals and glasses.

MANAGEMENT OF SOLID WASTE

Scientific management of solid waste includes the collection and segregation of waste, and its disposal.

Collection and segregation of wastes

The first step in the process of waste management is the collection and segregation of wastes. The sorting requires separation of **compostable** and **recyclable wastes. The compostable** or **biodegradable waste** includes kitchen waste, food residue, decaying fruits and vegetables, peels and other organic waste, garden litter, etc. The **recyclable waste** includes paper, plastic, metals, glass and various inorganic wastes.

In major cities, municipal corporation provides separate garbage bins — usually **green bins** and **blue bins** — for separately collecting, compostable and recyclable garbage from each house. Green bins are for collecting compostable waste while blue bins are for collecting recyclable materials, like plastic, paper, metals and glass.

DISPOSAL OF COLLECTED SOLID WASTES

Different methods are used to manage solid waste. These include: **open dumping, landfilling, composting and incineration.**

Open dumping: Solid waste or garbage is dumped in an open uncovered area. However, uncovered waste attracts flies, rats and worms. It also produces foul smell. The open dumps can be a source of disease-causing organisms.

Landfilling: Solid waste is collected from various places and is dumped outside the city on a piece of land or in a huge ditch. Each day the waste is deposited and finally the landfill is compressed and levelled, covered with a layer of soil.

Composting: It is a biological process in which some decomposing microorganisms decay the organic matter (plant and animal materials) under controlled conditions and convert it into humus.

Composting can be done by the following methods:

* **Anaerobic method:** the organic matter is put in pits and is covered with a thick layer of soil. In the absence of oxygen, the organic matter decomposes.
* **Aerobic method:** the organic matter is decomposed in the presence of air.
* **Vermicomposting:** the domestic waste is decomposed by using special earthworms. Worms eat the organic substances and digest them. The excreta of these worms contribute to the compost.

DISPOSAL OF LIQUID WASTE

Disposal of sanitary sewage, domestic sewage and effluents from factories is done through sewer or drainage system. The liquid sewage is carried upto the water treatment plants or septic tanks. Here, it is treated and water is purified to be reused.

At first, the solid waste is removed from the liquid waste. The solid waste thus separated is called **sludge** and is carried to the landfill where it is decomposed by microorganisms.

In the second stage, the liquid waste is treated to make the water biologically safe and free from harmful bacteria. Finally, chemicals and toxins are removed, and purified water is supplied to the public distribution system.

GARBAGE DISPOSAL AND VERMICOMPOST

Example 1: Rag pickers always suffer from diseases why?

Solution : Garbage dumps have flies, cockroaches and mosquitoes, which later turn into breeding grounds for micro-organisms that may cause disease. When rsg pickers go near these garbage dumps, they get infected by these microorganisms and fall sick.

Example 2:Why earthworm's are called farmer friend?

Solution : An earthworm helps in vermicomposting and thus helps in increasing the fertility the soil. Thus they are called farmer's friends.

Role of an individual and various agencies in proper waste management

Role of an individual

Each one of us can play an important role in reducing the wastes as well as in the proper management of wastes.

* Create as less waste as possible by using cloth or jute bag to carry things, and stop using plastic bags.
* Reuse as much things as possible.
* Keep separate garbage bins for the segregation of biodegradable and nonbiodegradable wastes.
* Ensure that the garbage generated in your neighbourhood is thrown in the community bins.
* Never litter the public places.
* Excreta of pets should be disposed off properly.
* Set up a central compost pit for composting biodegradable waste.

Role of municipal corporation or government agencies

* Take suitable measures to prevent littering.
* Prevent burning of wastes in the open or near habitation.
* Ensure proper disposal of wastes generated from construction of buildings, etc.
* Control stray animals roaming in the open.
* Create awareness and educate people about the three R's (reduce, recycle and reuse) of waste.

Role of government

* Government should identify issues associated with waste management, set guidelines and make laws.
* Encourage and provide facilities to **Non-Governmental Organisations** (NGO) to ensure proper management of waste and organising public awareness activities.
* Establish **Waste Minimisation Circles** (WMC).
* Take steps for the minimisation of air pollution by automobiles (such as use of CNG in place of diesel and petrol).
* Projects should be developed for cleaning and purifying water of rivers and lakes.
* Procecute factories which release industrial effluents directly into the water bodies.

KEY POINTS

1. Waste can be biodegradable or nonbiodegradable.
2. Biodegradable waste is broken down by microorganisms and is converted into manure.
3. The process of formation of manure from biodegradable waste is called composting.
4. Nonbiodegradable substances, like metals, polythene bags, paper, glass, ceramics and plastic can be recycled.
5. Hazardous waste is generated from industries, hospitals and agricultural chemicals (insecticides, pesticides and chemical fertilisers).
6. Waste management involves collection, sorting, treatment and disposal.
7. Solid waste can be disposed through open dumping, landfills or composting.
8. Vermicomposting is the process of preparation of compost by using earthworms.
9. Municipal corporation has the responsibility of collection, transportation and disposal of waste and maintaining cleanliness.
10. Government should make rules and regulations to provide better environment, clean water and neat surroundings.

FACT FILE

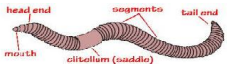
1. Glass keeps its color when recycled and is not usually changed – so green glass is used again as green glass in its next life.
2. 41 million tires are thrown away in California each year
3. Glass never wears out and can be recycled over and over.
4. A used aluminum can is recycled and back on the grocery shelf as new can in as little as 60 days. That's closed loop recycling at its finest!
5. There is no limit to the amount of times an aluminum can be recycled
6. 70% less energy is required to recycle paper compared with making it from raw materials.
7. The largest lake in the Britain could be filled with from the UK in 8 months.

DIAGRAM BASED QUESTIONS

1. **How many average trees can be saved by recycling one tonne of paaper ?**

Ans: 17 Trees

2. **Draw the Diagram of worm which is best suited for composting food waste ?**



Ans:B) Earthworms

3. **Who is this person, why do they always suffer from diseases?**

Ans: These peoples are rag pickers. Garbage dumps have flies, cockroaches and mosquitoes, which later turn into breeding Grounds for micro-organisms that may cause disease. When rag pickers go near these Garbage dumps, they get infected by these microorganisms and fall sick.

4. **Why the below given bags should be avoided for garbage disposal?**

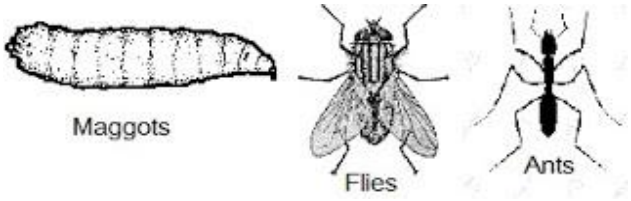
Ans: Plastics thrown casually get into drains and sewages, often blocking the way and causing water-logging. So polythene bags should not be used for garbage disposal

NCERT QUESTIONS AND ANSWERS

1. (a) Which kind of garbage is not converted into compost by the redworms?
(b) Have you seen any other organism besides redworms, in your pit? If yes, try to find out their names. Draw pictures of these.

Answer

(a) The garbage which are non-biodegradable in nature like iron strips, plastics, poly bags etc. are not converted into compost by the redworms.
(b) Yes, these organisms include maggots, flies, cockroaches etc.



2. Discuss :
(a) Is garbage disposal the responsibility only of the government?
(b) Is it possible to reduce the problems relating to disposal of garbage?

Answer

(a) No, garbage disposal is not only the responsibility of the government. It is sole responsibility of both government and the people. Each and every citizen must be responsible for maintaining proper sanitation and disposable of waste materials produced. People should not litter at public places. They should also take care for the effective disposal of the waste produced at home, schools, hospitals etc.

(b) Yes, it is possible to reduce the problems relating to disposal of garbage by taking following measures:
(i) People should concern about generating less waste products and creating awareness among them.
(ii) Each and every product should be used efficiently.
(iii) Biodegradable and non-biodegradable wastes should be separated.
(iv) Waste products or garbage must be recycled and setting up centre for the treatment of them.
(v) We should minimize the use of plastic bags and use recyclable products.

3. (a) What do you do with the left over food at home?
(b) If you and your friends are given the choice of eating in a plastic plate or a banana leaf platter at a party, which one would you prefer and why?

Answer

(a) The left over food at home is given to animals on road, thrown in garbage or some times we use it to make compost.

(b) I will prefer to eat in banana leaf because it is a biodegradable product and environment friendly and can be decomposed.

4. (a) Collect pieces of different kinds of paper. Find out which of these can be recycled.
(b) With the help of a lens look at the pieces of paper you collected for the above question. Do you see any difference in the material of recycled paper and a new sheet of paper ?

Answer

(a) Papers without having plastic coating on it can be recycled.
(b) The recycled is slightly yellowish in color than the new sheet of paper. Recycled paper is also rough and of low quality than new sheet of paper.

5. (a) Collect different kinds of packaging material. What was the purpose for which each one was used? Discuss in groups.
(b) Give an example in which packaging could have been reduced?
(c) Write a story on how packaging increases the amount of garbage.

Answer

(a) Different kinds of packaging materials and its uses:
(i) Paper packaging materials: Mostly used for packing of light and durable and hard products like soaps, blades, chocolates etc.
(ii) Plastic packaging materials: Used for liquid items and medium weighted too like oils, drinking water bottles, shampoo etc.
(iii) Poly bags: Used for carrying groceries, vegetables etc.
(iv) Clothes and Jute packaging materials: Used for heavy weighted as well as medium weighted too like carrying clothes, grains, vegetables, fruits etc.

(b) If people started carrying their own carry bags for buying groceries and vegetables and fruits then there will be no need for packing those materials by using plastics and thus the packaging could have been reduced.

(c) Packaging increase the amount of garbage as the it is quite useless ones the product is delivered or been utilised. These useless packaging materials are thrown away and just add loads to the garbage. Many packaging materials can't even be reused. Some of them are made of plastics and thus a non-biodegradable item which add hazards to the environment.

6. Do you think it is better to use compost instead of chemical fertilisers? Why?

Answer

Yes, i think it is better to use compost instead of chemical fertilisers because:
(i) It is environment friendly and add natural fertility to the soil.
(ii) It doesn't have adverse effect on nature and creates no pollution.
(iii) The food items grown are also healthy and do not contains any chemicals.
(iv) It is cheaper than the chemical fertiliser.
(v) Soil will never loss its fertility if we use compost.

PRACTICE QUESTIONS

VERY SHORT ANSWER TYPE QUESTION

1. What type of garbage is collecting in green colour dustbin ?
2. Should we burn the dried leaves ?
3. Define 'Vermicomposting'.
4. Name few things we use that are made of plastics.
5. How plastics are harmful for our health ?
6. How plastic bags are harmful for stray animals ?
7. What are the problems we face. When plastic bags thrown away on roads ?
8. Name one method by which we minimise garbage.
9. What do you know about wastes ?
10. Define domestic wastes.
11. What is incineration ?
12. Define vermiculture.

SHORT ANSWER TYPE QUESTION

13. How many types wastes can be divided ?
14. Define municipal wastes.
15. What are biodegradable wastes ?
16. Define the term domestic wastes.

MEDIUM ANSWER TYPE QUESTION

17. Burning of lianes are harmful to us. Explain.
18. How earthworms are called farmers' friends ?
19. How do you prepare vermicompost ?

LONG ANSWER TYPE QUESTIONS

20. Define recycling of paper.
21. What is meant by the spoilage of landscape ?
22. What are the health problems faced by the rag-pickers ?

ASSIGNMENT - 1

1. Which of the following is responsible for the increase in waste generation?
   (A) increase in population (B) increase in urbanisation
   (C) modern lifestyle (D) all of these

2. Vehicular air pollution can be reduced by using
   (A) diesel (B) petrol (C) CNG (D) all of these

3. Composting is the process of
   (A) recycling of waste (B) reuse of waste
   (C) decomposition of waste by microorganisms
   (D) treating waste with chemicals

4. Liquid waste disposal does not involve
   (A) landfills (B) sewer lines
   (C) septic tanks (D) sewage plants

5. Landfills deteriorate surroundings by
   (A) polluting air (B) polluting water
   (C) attracting flies and insects (D) all of these

6. Garbage can be used for
   (A) generating electricity (B) generating cooking gas
   (C) producing compost (D) all of these

7. Which of the following items cannot be recycled?
   (A) Groundnut shells (B) Old clothes
   (C) Slippers (D) Paper from a notebook

8. Which of the following rot completely and do not smell?
   (A) Left over food (B) Broken glass
   (C) Aluminium wrapper (D) Polythene bags

9. Dried leaves and husk should be:
   (A) Burnt (B) Recycled
   (C) Converted into useful compost (D) Thrown away

10. Find the odd one out.
    (A) Cotton shirt (B) Shoe
    (C) Pen (D) Paper

ASSIGNMENT – 2

1. Find the statement that is not true for plastics.
   (A) Plastics are used in most of the articles
   (B) Plastics are light and attractive
   (C) Plastics can be burnt to dispose the waste
   (D) All of these
2. Which of the following is an undesirable effect of disposing plastic bags in gardens and parks?
   (A) Animals may eat them and die
   (B) They make the place dirty for other people
   (C) They stop the flow of water in the place
   (D) All of these
3. Which of the articles can be recycled and used again?
   (A) Newspaper (B) Bread
   (C) Raincoat (D) Plastic bags
4. Which of the following happens when the garbage in dumped into the rivers?
   (A) Fishes and water plants die
   (B) Water becomes unfit for drinking
   (C) The inlets and ground water sources are blocked
   (D) All of the above
5. Biodegradabe pollutant is
   (A) Mercury (B) Sewage
   (C) Asbestos (D) Pastic
6. Cause of minamata disease is pollution of
   (A) Oil spillin water (B) Arsenic into the atmosphere
   (C) Organic waste into drinking water
   (D) Industrial waste mercury into fishing water
7. World environment day is observed on
   (A) 5th June (B) 7th August
   (C) 10th April (D) 28th February
8. Most toxic of the following is
   (A) SO_2 (B) Carbon
   (C) CO (D) CO_2
9. Threat to Taj mahal in pollution from
   (A) Oxygen (B) Hydrogen
   (C) Chlorine (D) Sulphur dioxide
10. Water pollution is caused by
    (A) Oxygen (B) Carbon dioxide
    (C) Sulphur dioxide (D) Industrial discharge

ASSIGNMENT – 3

1. Which of the following is biodegradable?
   (A) Orange peel (B) Aluminium foil
   (C) Aluminium (D) Plastic bottle

2. Which of the following is non-biodegradable?
   (A) Cardboard (B) Cotton cloth
   (C) Leather shoes (D) Glass bottle

3. To reduce plastic waste we should
   (A) Burn it (B) Bury in the earth
   (C) Dump it in sea (D) Minimise its use

4. Burning of waste:
   (A) Is not good for environment (B) Pollutes the environment
   (C) Affects on health (D) All of above

5. The layer of atmosphere extending from 50 to 80km above the earth's surface is.
   (A) Thermosphere (B) Stratosphere
   (C) Mesosphere (D) Exosphere

6. Which of the following is not a component of clean air?
   (A) Carbon dioxide (B) Water vapour
   (C) Nitrogen (D) Carbon monoxide

7. The gas which supports burning is
   (A) Carbon dioxide (B) Oxygen
   (C) Nitrogen (D) Methane

8. Arrange the following gases in the order of percentage
   (A) Nitrogen < oxygen < carbon dioxide
   (B) Nitrogen < carbon dioxide < oxygen
   (C) Oxygen < nitrogen < carbon dioxide
   (D) Carbon dioxide < oxygen < nitrogen

9. Animals use oxygen for
   (A) Photosynthesis (B) Burning
   (C) Respiration (D) All of these

10. Garbage collected from our houses should be dumped in
    (A) Garden (B) A playground
    (C) Land fill (D) The road side

MISCELLANEOUS QUESTIONS

1. Which of these is biodegradable?
   (A) Cotton (B) Paper
   (C) Dead plants (D) All of these
2. No biodegradable materials like plastic and metals should be
   (A) recycled (B) incinerated
   (C) composted (D) All of these
3. Kitchen waste should be
   (A) recycled (B) incinerated
   (C) composted (D) dumped in landfills
4. Hospital waste is usually
   (A) recycled (B) incinerated
   (C) composted (D) dumpted in landfills
5. The three 'R's used in connection with reducing waste are
   (A) reduce, reuse, recycle (B) reduce, reserve, recycle
   (C) reduce, resell, redeem (D) revise, resell, reuse
6. Waste can be clasified as
   (A) domestic (B) industrial
   (C) agricultural (D) biomedical
7. Incineration is a method of disposing waste by
   (A) thermal treatment (B) burning
   (C) decomposing (D) packaging
8. Match the items of column 'A' with the items of column 'B'

Column A	**Column B**
(k) Biodegrable	(p) Food wraper
(l) Non Biodegrable	(q) Newspaper
(m) Recyclable	(r) Vegetable waste
(n) Reusable	(s) Pepsi cane

   (A) (k)—(r), (l)—(s), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(r), (m)—(p), (n)—(q)
   (C) (k)—(r), (l)—(p), (m)—(q), (n)—(s) (D) (k)—(p), (l)—(r), (m)—(q), (n)—(r)
9. Match the terms in column 'A' with the definition in column

Column A	***Column B***
(k) Plastic	(p) increase soil fertility
(l) Vermicompost	(q) fruit peels
(m) Incineration	(r) burning of grabage
(n) Biodegradable	(s) non-biodegradable

   (A) (k)—(s), (l)—(r), (m)—(q), (n)—(p) (B) (k)—(s), (l)—(p), (m)—(r), (n)—(q)
   (C) (k)—(r), (l)—(p), (m)—(q), (n)—(s) (D) (k)—(r), (l)—(s), (m)—(q), (n)—(p).
10. To minimize garbage we should:
   (A) Recycle paper
   (B) Use vermin composting at home and deal with our kitchen waste.
   (C) Insist on the use of paper bags
   (D) All of these

COMPETITIVE CORNER

1. Major reason for for pollution in big cities is
   (A) Acid rain (B) Heat dispersion
   (C) Fossil fuel (D) None of these
2. Pollution can bring about change in
   (A) Biotic environment (B) Abiotic environment
   (C) Biogeochemical cycling (D) None of these
3. BOD
   (A) Biosphere oxygen demand (B) Bidogical oxygen demand
   (C) Biological oxygen deficit (D) None of these
4. Acid rains are formed of
   (A) Excess production of NH_3 by industry and coal
   (B) Excess NO_2 from burning fossil fuels
   (C) Excess formation of CO_2 by combustion and animals respiration
   (D) None of these
5. Jaundice is caused by pollution of
   (A) Thermal (B) Land
   (C) Air (D) Mercury
6. Most hazardous metal pollutant of automobile exhausts is
   (A) Cadmium (B) Lead
   (C) Copper (D) Mercury
7. Which country contributed maximum to hole formation in ozone layer?
   (A) Japan (B) India
   (C) USA (D) Germany
8. Green house gases include
   (A) CO_2, O_2, N_2, NO_2 and NH_3 (B) CO_2, CFC, CH_4 and NO_2
   (C) CFC, CO_2, NH_3 and N_2 (D) None of these
9. Green house effect is associated to
   (A) Global waming (B) Development of terrace gardens
   (C) Increased growth of green algae (D) Cultivation of vegetables in houses
10. Ozone hole is maximum over
    (A) India (B) Africa
    (C) Antarctica (D) Europe

ANSWER KEY

ASSIGNMENT - 1									
1	2	3	4	5	6	7	8	9	10
D	C	C	A	D	D	C	A	C	C
ASSIGNMENT - 2									
1	2	3	4	5	6	7	8	9	10
C	D	A	D	B	D	A	C	D	D
ASSIGNMENT - 3									
1	2	3	4	5	6	7	8	9	10
A	A	D	D	B	A	D	C	C	C
MISCELLNEOUS									
1	2	3	4	5	6	7	8	9	10
B	B	C	A	A	D	A	A	B	C
COMPETITIVE									
1	2	3	4	5	6	7	8	9	10
C	A	B	B	D	B	C	B	A	C

HINT SOLUTION

PRACTICE ANSWERS

VERY SHORT ANSWER TYPE QUESTION

1. Materials such as kitchen and other plant or animal wastes.
2. No, we should not burn the dried leaves.
3. The method of preparing compost with the help of redworms is called 'Vermicomposting'.
4. Toys, shoes, bags, pens, combs and tooth brushes, etc. are few things , that we use in daily life made of plastics.
5. Burning of plastics give out harmful gases, which may cause many health problems including cancer in humans.
6. Stray animals look for food in these bags, they end up swallowing these, sometimes they die due to this.
7. When we throw away plastic bags on roads or other places, they get into drain and sewer system. As a result drain get choked and water spills on the road.
8. We make a minimum use of plastic bags. We reuse the bags whenever it is possible to do so without any adverse affects.
9. Wastes are the useless and unwanted materials discarded by humans.
10. Domestic wastes include sewage, kitchen wastes, and garbage, etc.
11. The process of burning of wastes in a large furnace is called-incineration.

12. The process of getting manure from biodegradable wastes by adding earthworms to the compost, is called vermiculture.

SHORT ANSWER TYPE QUESTION

13. On the basis of physical, chemical and biological characteristics wastes can be divided into, the following categories :

(a) **Biodegradable wastes** : Wastes which comprise of materials which has the ability to break down softely and quickly by micro-organisms for example : dead and decaying remains of plants and animals, faecal remains water etc,

(b) **Non-biodegadable wastes** : Which do not breakdown into simple and harmless products by natural agents like bacteria and fungi are called non biodegadable wastes.

For example, metallic oxides, murcury, lead, DDT and radioactive wastes.

14. Municipal wastes referred as garbage, etc. Municipal wastes is a combination of wastes. They are papers, food wastes, plastics, metals, ash, glass, and others.

15. Biodegradable wastes comprise of material which has the ability to break down safely and quickly by microorganisms. These originate from natural organic sources animals and plant based products.

16. Human beings discard many things in our day to day life activities. They are considered as domestic wastes. Domestic wastes are :

(i) Sewage, (ii) kitchen wastes, (iii) garbage, (iv) others.

Human excreta and wastes from bathroom and kitchen come in category of sewage. Vegetables, fruits and other food wates are kitchen wastes whereas papers, rags, hairs, and house dust come in garbage category and plastic bags and rubber things are come in other categorties.

MEDIUM ANSWER TYPE QUESTION

17. Garbage heaps of dried leaves are burnt most of the time. Farmers too often burn the husk dried leaves and part of crop plants in their fields. Burning of these, produces smoke and gases that are harmful to our health.

18. Earthworms are farmers friends because they help to increase the fertility of the soil. They eat dust and make soil fertile. They are used to prepare vermicopot, which gives many nutrients to soil and ultimately to crop plants. So they are called farmers' friend.

19. Vermicompost is prepared by the help of redworms. A pit of 30 cm deep is dug and a comfortable home is made for the redworms in it. Spray a thick layer of sand in it, stalk of plants' husk or green leaves spread over the sand layer. Sprinkle some water to make this layer wet. Now put some redworms in this pit. Cover it with a sheet of cloth over the pit. Redworms eat fruits wastes' coffee and tea remains. They grind their food. They eat equal to their weight. After 3/4 weaks soil like material is seen in the pit. This is vermicompost. Remove it from the pit and use after dried in sunlight.

LONG ANSWER TYPE QUESTIONS

20. Collect old newspapers, magazines, used envelops, note-books and other papers and take a frame fitted with a net. Tear the paper into small pieces, put them in a tub and pour water over it. Let the paper remain submerged in water for a day. Make a thick paste of paper by pounding it.

Now spread the wet pastes on the wire mesh fixed to the frame. Put it gently to make the thickness of layer of paste as uniform as possible. Wait till waste drains

off. Now remove the layer of paste from the frame, spread it on a sheet of newspaper by putting some weights so that these do not curl up. Thus recycled paper is prepared.

21. Spoilage of landscape is directly related to the improper waste management specially solid waste. The solid wastes may be slag heaps from mines, in paper mills, sugar mills, fertilizers and our household. They make our surrounding unhygenic. These spoils the landscape and destroy greenary of some areas. Soil becomes toxic in nature wastes accumulated places often becomes home of rats, house flies, mosquitoes and bacteria. These things destroy the beauty and usefulness of the place.

22. Rag-pickers manually separate non-biodegradable wastes from the heap of garbage in the cities. These people are always exposed to biomedical wates like tape worms, liver flube eggs, sharp materials, broken glass, used syringes, needles etc. which can harm them to a great extent.

Some of the occupational hazards associated with these wastes handling are infectious of different types like skin and eye and respiratory, intestinal. Some diseases also result due to bites of animals. Exposer to dust and can result in cancer. Exposer to toxic agents is usually followed by its absorption and entry into the blood cancer.

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