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Shree Swaminarayan Gurukul, Zundal

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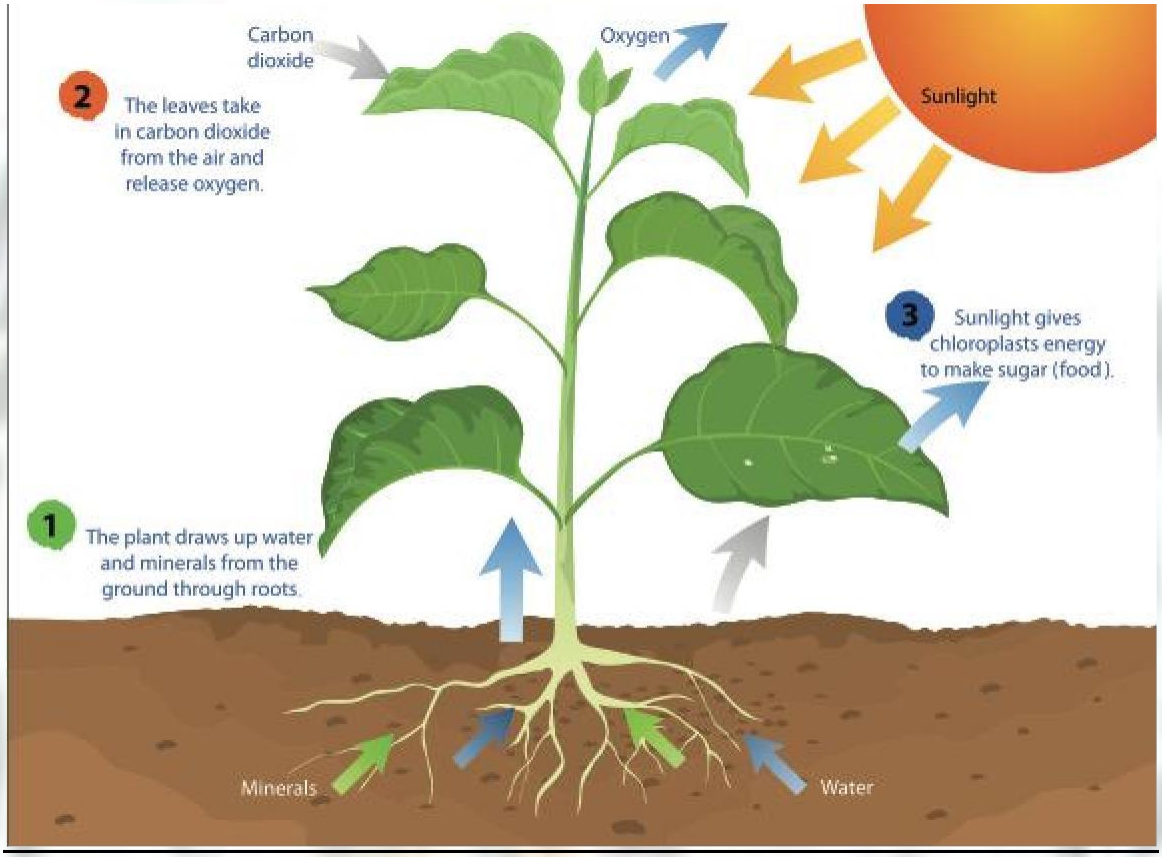
CHAPTER 1

NUTRIENTS IN PLANTS



❖ **Key points to remember :**

- **Nutrition**: It is the mode of taking food by an organism and its utilization by the body.
- **Nutrients**: The components of food that provide nourishment to the body.
- All organisms take food and utilise it to get energy for the growth and maintenance of their bodies.
- Green plants synthesise their food themselves by the process of **photosynthesis**. They are autotrophs.
- Photosynthesis: Green plants prepare their own food with the help of chlorophyll (found in green plants), carbon dioxide and water taken from the environment in presence of sunlight.
- Plants use simple chemical substances like carbon dioxide, water and minerals for the synthesis of food.
- **Chlorophyll** and sunlight are the essential requirements for photosynthesis. Complex chemical substances such as carbohydrates are the products of photosynthesis.
- Oxygen released in photosynthesis is utilised by living organisms for their survival.
- Fungi derive nutrition from dead, decaying matter. They are **saprotrophs.**

- Plants like Cuscuta are parasites. They take food from the host plant. A few plants and all animals are dependent on others for their nutrition and are called **heterotrophs**.
- **Parasitic**: Organisms that live on the body of other organisms. All parasitic plants feed on other plants as either:
  (i) Partial Parasites: Obtain some of their nutrition from the host, e.g. painted cup
  (ii) Total Parasites: dependent completely on the host for nutrition, e.g. mistletoe.
- **Saprophytic**: Organisms that obtain nutrition from dead and decaying plant and animal matter.
- Mushrooms, moulds and certain types of fungi and bacteria.
- Insectivorous Plants: Green plants which obtain their nourishment partly from soil and atmosphere and partly from small insects. Example: pitcher plant, bladderwort, and venus fly trap.
- **Symbiosis**: Mode of nutrition in which two different individuals associate with each other to fulfill their requirement of food.
- **Lichens** found on tree trunks are the association between algae and fungus. Algae obtain water from fungus and it in turn obtains food from algae.

❖ Fill in the blanks:

1. The food synthesized by plants is stored as **starch**.
2. During photosynthesis plants take in **carbon-dioxide** and release **oxygen**.
3. In lichenes **algae** and **fungus** live in symbiotic association.
4. In photosynthesis solar energy is captured by the pigment called **chlorophyll.**
5. The occurrence of photosynthesis is tested by the presence of **starch** in the leaf.
6. During photosynthesis **light** energy is converted into the **chemical** energy of food.

❖ Tick the correct answer:

1. Which of the following is a nutrient?
   (a) Protein
   (b) Fat
   (c) Vitamin
   (d) All of these
2. The food making process in plants is called as:
   (a) glycolysis
   (b) photosynthesis
   (c) photolysis
   (d) chemosynthesis
3. Cuscuta is example of :
   (a) Autotrophs
   (b) Parasite
   (c) Saprotrops

(d) Host

4. The plants which traps and feeds on insect is:
   (a) Cuscuta
   (b) China rose
   (c) Pitcher plant
   (d) Rose
5. Which part of the plant produce its food:
   (a) Fruits
   (b) Seeds
   (c) Leaves
   (d) Flowers

❖ **Write True or False:**

1. Solar energy is converted into chemical energy during photosynthesis.(**T**)
2. The product of photosynthesis is not protein.(**T**)
3. Carbon dioxide is released during photosynthesis.(**F**)
4. Plants which synthesize their food are called saprotrophs.(**F**)
5. In absence of chlorophyll, the process of photosynthesis will take place in plants.(**F**)

❖ **Answer in one word:**

1. The small openings on surface of a leaf are called?
   Ans. Stomata
2. The insect-eating plants are called?
   Ans. Insectivorous plants
3. Name a plant that is partially autotrophic?Ans. Insectivorous plant
4. Name a parasitic plant with yellow, slender and branched stem?
   Ans. Cuscuta
5. Name the bacterium which can take nitrogen and convert to usable form?
   Ans. Rhizobium

❖ **Answer in one two sentences:**

1. Why do organisms take food?
   Ans. Organisms require food for their growth, for getting energy for walking, running etc. Food also gives resistance power to fight against disease.
2. Distinguish between a parasite and a saprotroph?
   Ans.

Parasite	Saprotrops
Feeds on living organisms	Feed on dead and decaying animals
The organism on which it feeds is called host	They do not feed on living organism
Example: roundworm	Example: Fungi

3. How would you test the presence of starch in leaves?
   Ans. The presence of starch in leaves can be tested by Iodine test. When we remove chlorophyll from leaf by boiling it in alcohol and then put 2 drops of iodine solution, its colour change to blue indicates the presence of starch.

4. Wheat dough if left open for some days, release a foul smell. Give reason?
   Ans. Carbohydrates in wheat dough encourage growth of yeast and other saprophytic fungi which emit a foul smell.

❖ **Long answer questions:**

1. Give a brief description of the process of synthesis of food in green plants?

   Ans. Green plants use a process called as photosynthesis to prepare their food. The process is as follows:

   Water is taken from the roots of the plant, and it is transported to leaves of the plant.

   Carbon dioxide from air enter the leaves through pores called stomata. This diffuses the cell containing chlorophyll.

   Water molecule is broken down into Hydrogen and Oxygen with the help of sunlight.

   Hydrogen combines with Oxygen and Hydrogen to form carbohydrates.

   Photosynthesis is represented by the following equation:

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \underset{\text{(glucose)}}{\text{Carbohydrate}} + \text{Oxygen}$$

2. Why do farmers grow many fruits and vegetable crops inside large greenhouses? What are the advantages to the farmers?

   Ans. Fruits and vegetable crops are grown in large greenhouses because it protects crops from external climatic condition and to provide suitable temperature for the growth of crops.

   Advantages to farmers while growing fruits and vegetable crops inside greenhouses are

   - It protects crops from diseases and adverse climatic conditions.
   - It protects crops from wind and rodents

3. **How Nutrients replenish in the soil ?**

Ans. We know that plants absorb nutrients from the soil. Crops require much nitrogen to make protein. After the harvest, the soil becomes deficient in nitrogen. Plants cannot use the nitrogen gas available in the atmosphere directly. The actionof rhizobium can convert this nitrogen into a soluble form but that bacteria cannot make its own food. In return, leguminous plants provide food and shelter to the rhizobium bacteria. Thus, they have a symbiotic relationship. This association is significant for the farmer, as they do not need to add nitrogen fertilizers to the soil in which leguminous plants are grown.In this way, you can see that every living organization needs some energy and nutrientmaterials to ensure that the life-processes go on smoothly.

4. **Show with the help of a sketch that plants are the ultimate source of food.**

Solution:

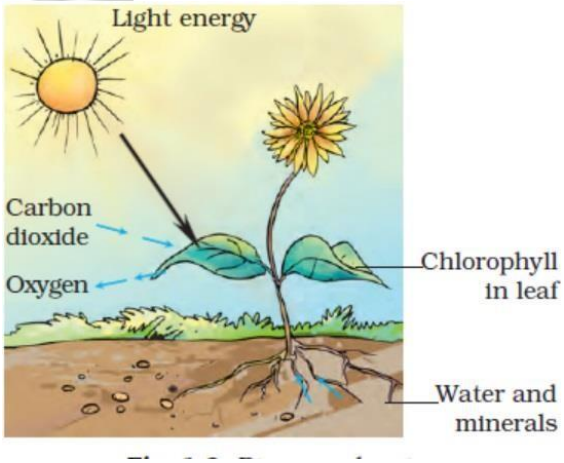


Diagram showing photosynthesis

❖ **HOTS**:

1. Why most of the things are spoiled by fungi during rainy season only?

   Ans: Spores of fungi germinate and grow when they get wet and warm conditions. Rainy season provides them the hostile condition, so they grow and spoil most of the things in rainy season only.
2. Potato and ginger are both underground parts that store food. Where is the food prepared in these plants?

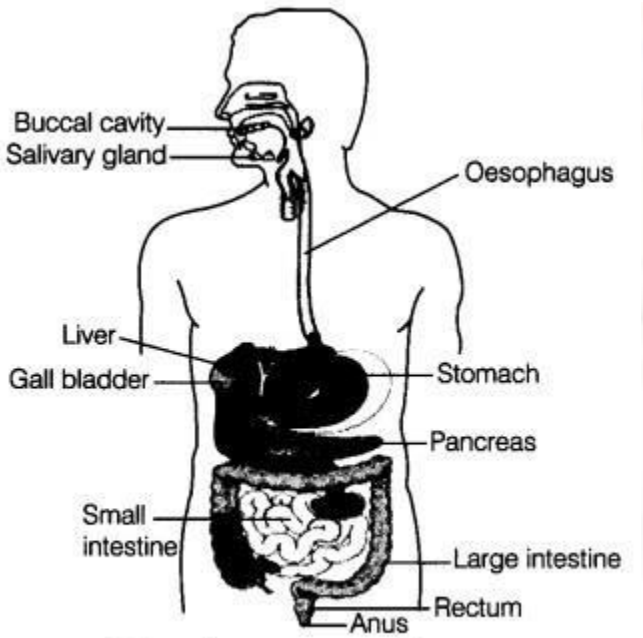
   Ans: Food is prepared in the leaves of these plants and then it is transported to underground parts for storage.

❖ **Activity:**

- Name any 5 types of autotrops, heterotrops and saprotrops each, other than given in your textbook and if possible stick the pictures of them. You can take help of internet.

CHAPTER 2

Nutrition in Animals



Digestive system of human

❖ **Keypoints to remember:**

- Animals nutrition includes nutrient requirement, mode of intake of food and its utilization.
- Classification based on eating habits:
  - (i) **Herbivorous**: Animals that eat plants or plant products. Example: cow, sheep, goat, deer, elephant, kangaroo, giraffe, etc.
  - (ii) **Carnivorous**: Animals that eat only flash of other animals. They never eat plants Example: tiger, lizard, lion, etc.
  - (iii) **Omnivorous** : Animals consume plants as well as other animals as their food. Example: bear, dog, human being, etc.
  - (iv) **Parasites**: Organisms that obtain their food from other animals either by living inside or outside their body. Example: tapeworm and roundworm, tick and lice.
  - (v) **Scavengers**: Animals which feed on the remains of dead animals preyed by predators. Example: vultures, crows, jackals, etc.
- The human digestive system consists of alimentary canal and secretary glands. It consist of
  - (i) Buccal cavity
  - (ii) Oesophagus
  - (iii)Stomach
  - (iv)Small intestine
  - (v) Large intestine ending in rectum
  - (vi)Anus

- Digestion of carbohydrates, like starch, begins in buccal cavity. The digestion of protein starts in stomach. The bile secreted from liver, the pancreatic juice from the pancreas and digestive juice from the intestinal wall complete the digestion of all components of food in small intestine. The digested food is absorbed by blood vessels from small intestine.
- The undigested residues are expelled out of body through anus.
- The grazing animals like cows, buffaloes are known as ruminants. They quickly ingest, swallow their leafy food and store it in the rumen. Later, the food returns to mouth and animal chews it peacefully.
- **Amoeba** ingests its food with help of its false feet or pseudopodia. The food is digested in the food vacuole. It pushes out finger-like pseudopodia which engulf the prey.

❖ Fill in the blanks:

1. The main steps of nutrition in humans are **ingestion, digestion, absorption, assimilation** and **egesting**.
2. The largest gland in the human body is **Liver**.
3. The stomach releases hydrochloric acid and **digestive** juices which act on food.
4. The inner wall of the small intestine has many finger-like outgrowths called **villi**.
5. Amoeba digests its food in the **food vacuole**.
6. Large intestine absorbs some of **water** and **salts** from the undigested food.
7. Tongue is attached from **back** with floor of mouth cavity and is free at the **front**.

❖ Tick the correct answer:

1. Bile is produced in
   (a) Gall bladder
   (b) Blood
   (c) Liver
   (d) Spleen
2. The enzymes present in saliva convert
   (a) Fats into fatty acids and glycerol
   (b) Starch into simple sugars
   (c) Protein into amino acid
   (d) Complex sugars into simple sugars
3. Cud is the name given to the food of ruminants which is:
   (a) swallowed and undigested.
   (b) swallowed and partially digested.
   (c) properly chewed and partially digested.
   (d) properly chewed and completely digested.

4. How many premolars teeth found in mouth?
   (a) 2
   (b) 4
   (c) 6
   (d) 8
5. Which of the following pair of teeth differ in structure but are similar in function?
   (a) canines and incisors
   (b) molars and premolars
   (c) incisors and molars
   (d) premolars and canines

❖ **Write true or false:**

1. Digestion of starch starts in the stomach. (**F**)
2. The tongue helps in mixing food with saliva. (**T**)
3. The gall bladder temporarily stores bile. (**T**)
4. The ruminants bring back swallowed grass into their mouth and chew it for some time. (**T**)
5. Pitcher plant is common example of insectivorous plant. (**T**)

❖ **Answer in one word:**

1. Which part of digestive canal is involved in chewing of food?
   Ans: Buccal cavity
2. The first set of teeth which grows during infancy are termed as what?
   Ans: Milk teeth
3. The grass is rich in which type of carbohydrates?
   Ans: cellulose
4. What is a sac like structure in rabbit and horse, between oesophagus and small intestine called?
   Ans: Caecum

❖ **Answer in one or two sentence:**

1. Where is the bile produced? Which component of the food does it help to digest?
   Ans: The bile juice is produced by the liver. It plays an important role in the digestion of fats.
2. Name the type of carbohydrate that can be digested by ruminants but not by humans. Give the reason also.
   Ans: The name of the carbohydrate is cellulose. It is digested by ruminants but not by humans because enzymes which digest cellulose are not present in humans.
3. Why do we get instant energy from glucose?

Ans: Glucose is the simplest form of carbohydrates and easily gets absorbed by the blood and hence provides instant energy.

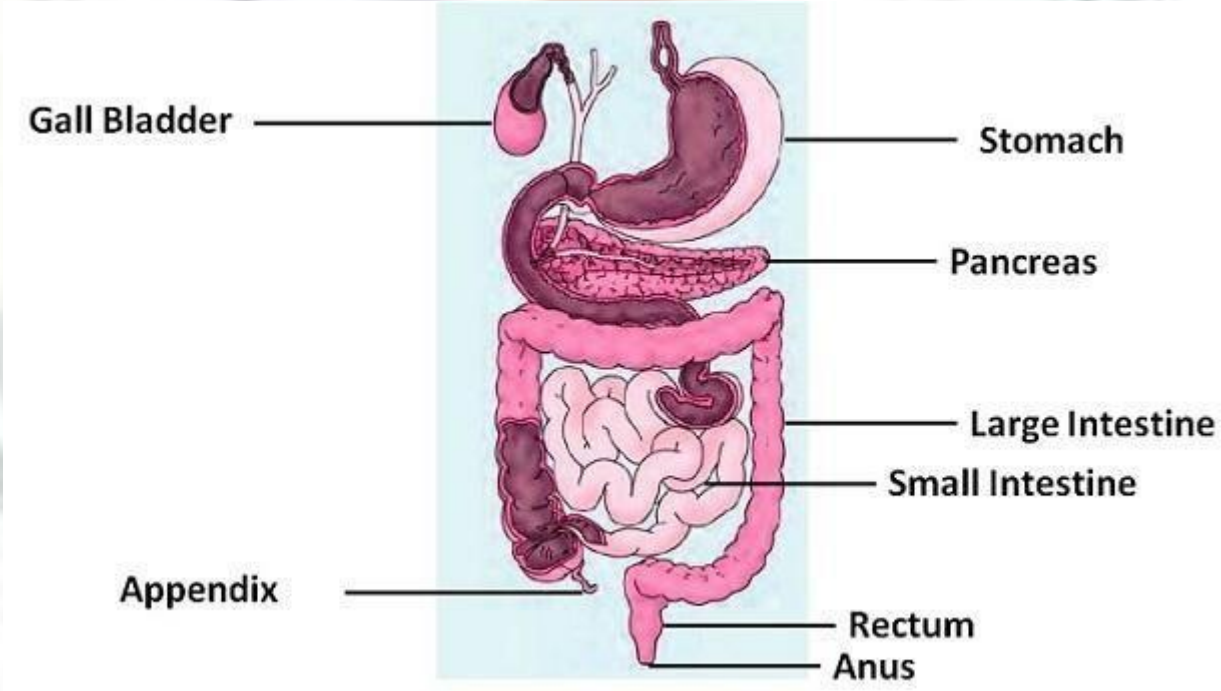
4. Write one similarity and one difference between the nutrition in amoeba and human beings.
   Ans:
   Similarity: Human and amoeba both need digestive juices for the digestion of food.

   Difference: Humans need to chew the food on the other hand amoeba does not need to chew the food.

5. Can we survive only on raw, leafy vegetables/grass? Discuss.
   Ans: No, we cannot survive for a very long time by only eating leafy and raw vegetables/grass. We need a balance diet to live long and healthy life. Also, the grass contains cellulose which can be digested by the human body.

❖ **Long question answer:**

1. Draw and label the figure of human digestive system? Also write different parts through which food pass.
   Ans:



The food passes through a continuous canal which begins at the buccal cavity and ends at the anus. The canal can be divided into various parts:
(1) the buccal cavity,
(2) food-pipe or oesophagus,
(3) stomach,
(4) small intestine,
(5) large intestine ending in the rectum and
(6) the anus.

2. What is role of tongue?
   Ans: The tongue is a fleshy muscular organ attached at the back to the floor of the buccal cavity. It is free at the front and can be moved in all directions. We use our tongue for talking. Besides, it mixes saliva with the food during chewing and helps in swallowing food. We also taste food with our tongue. It has taste buds that detect different tastes of food.

3. What is villi. Write role of it in digestive system?
   Ans: The inner walls of the small intestine have thousands of finger-like outgrowths. These are called villi (singular villus).
   The villi increase the surface area for absorption of the digested food. Each villus has a network of thin and small blood vessels close to its surface. The surface of the villi absorbs the digested food materials. The absorbed substances are transported via the blood vessels to different organs of the body where they are used to build complex substances such as the proteins required by the body.

❖ **HOTS:**

1. Can you tell which kind of food items are not digested easily when gall bladder of a person is removed surgically? Why?
   Ans: Food items rich in fats cannot be digested easily when gall bladder of a person is removed. Gall bladder stores bile juice in concentrated form which is secreted in small intestine when needed. Bile juice breaks the larger molecules of fats into smaller one.
2. What is the role of fibrous food in bowel movement?
   Ans: Fibrous food increases the stool bulk, so it ease the bowel movement and reduce constipation.
3. How food moves in the opposite direction during vomiting?
   Ans: When food is not accepted by our stomach, then the wall of the alimentary canal pushes back the food in upward direction and it is vomited out.
4. Why it is advised not to eat hurriedly and talk or laugh while eating.
   Ans: This is because inside the throat, air and food share a common passage. When we talk flap-like valve of wind pipe opens and when we eat or swallow food it remains close. When we eat hurriedly and talk or laugh while eating, the valve of windpipe get open or does not close properly. If, by chance food particles enter the windpipe, we feel choking or get hiccups.

❖ **Activity:**

➢ Find out what vitamins are and get the following information:

(a) Why are vitamins necessary in diet?
(b) Which fruits or vegetables should be eaten regularly to get vitamins?

Write a one-page note on the information collected by you. You may take help of a doctor, a dietician, your parents, or from any other sourc

CHAPTER 3

FIBRE TO FABRIC

❖ **Keypoint to remember:**

- **Fibres**: Long, fine, continuous threads or filaments are obtained from plants and animals.
- Two types of fibres: (i) Animal fibres (ii) Plant fibres
- Silk and Wool are common animal fibres Silk comes from silkworms and wool is obtained from sheep, goat and yak. Hence silk and wool are animal fibres. The hairs of camel, llama and alpaca are also processed to yield wool.
- **Scouring**: Sheared hair is cleaned and washed in tanks to remove grease, dust and dirt.
- **Sorting**: Cleaned hair is sent to a factory where hairs of different textures are separated.
- Weavers weave silk threads into silk cloth.

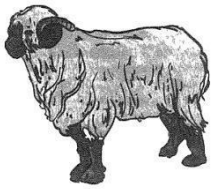


Fig. 3.1. Sheep with thick growth of hair

Fig. 3.2. Shearing a sheep

Fig. 3.3. Scouring in tanks

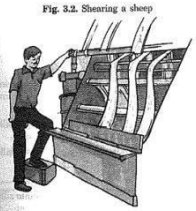


Fig. 3.4. Scouring by machines

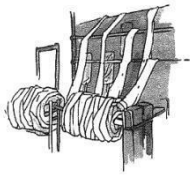


Fig. 3.5. Rolling into yarn

❖ Fill in the blanks:

1. Liama and Alpaca also yield **wool** and are found in **South America**.
2. Angora wool is obtained from **Angora goats**
3. Rampur bushair yield **brown** fleece.
4. Lohi and Nali are breeds of **Rajasthan and Punjab.**
5. The process of selecting parent sheep for obtaining special characteristics in their offspring's is called **selective breeding.**

❖ Tick the correct answer:

1. Which one of the following is not a breed of sheep?
   (a) Murrah
   (b) Marwari
   (c) Lohi
   (d) Nali
2. What is the scientific name of mulberry tree?
   (a) Magnifera indica
   (b) Morus alba
   (c) Desmodium girence
   (d) None of these
3. Silk is derived from
   (a) cocoon
   (b) pupa
   (c) egg
   (d) moth

4. Selective breeding is a process of
   (a) selecting the offspring with desired properties.
   (b) selecting the parents with desired properties.
   (c) selecting an area for breeding.
   (d) selecting fine hair for good quality wool.
5. The general process that takes place at a sheep shearing shed is:
   (a) removal of fleece.
   (b) separating hair of different textures.
   (c) washing of sheep fibre to remove grease.
   (d) rolling of sheep fibre into yam.
6. Which of the following is not a type of silk?
   (a) Mulberry silk
   (b) Tassar silk
   (c) Mooga silk
   (d) Moth silk
7. Paheli wanted to buy a gift made of animal fibre obtained without killing the animal. Which of the following would be the right gift for her to buy?
   (a) Woollen shawl
   (b) Silk scarf
   (c) Animal fur cap
   (d) Leather jacket

❖ **State True or False:**

1. The process of taking out threads from the cocoon for use as silk is called reeling the silk. (**T**)
2. The most common silk moth is mooga silk. (**F**)
3. During processing of Wool sorting is done before scouring. (**F**)
4. The Nali breeds of sheep are found in Rajasthan, Haryana and Punjab. (**T**)
5. Patanwadi breeds of sheep are used in carpet wool. (**F**)

❖ **Answer in one word:**

1. The female silk moth lays eggs, from which hatch larvae which are called?
   Ans: Caterpillars
2. What is covering on caterpillar called?
   Ans: Cocoon
3. What is the process of rearing of silkworms for obtaining silk called?
   Ans: Sericulture
4. Name the bacterium which can cause fatal blood disease called sorter's disease?
   Ans: Anthrax

❖ **Answer in one or two sentences:**

1. Which parts of the black sheep have wool?
   Ans: The hairy skin called fleece has wool in black sheep.
2. What is meant by the white fleece of the lamb?
   Ans: White fleece of the lamb means the white coloured hairy skin.
3. What is meant by Rearing?
   Ans: The process of keeping, feeding, breeding and medical care of useful animals is called rearing of animals. These animals produce one or more useful products for htiman beings.
4. What keeps the wool yielding animals warm?
   Ans: The wool yielding animals like sheep, goat, yak, etc., have a thick hair on their body. Hair trap a lot of air. Air is a poor conductor of heat, which does not allow the heat absorbed to release from their body and keeps them warm.

❖ **Long Answer questions:**

1. What are the various steps for processing fibres into wool?

   Ans: The processing of fibres into wool involves various steps such as shearing, scouring sorting, dyeing and rolling. They have been discussed below in brief:

   Step 1. Shearing: First of all, the woollen coat or fleece from the animals along with a thin layer of skin is removed from their body. The process is called shearing.
   Step 2. Scouring: The sheared skin with hair is thoroughly washed in tanks to remove grease, dust and dirt from the wool. This is called scouring.
   Step 3. Sorting: It is done after scouring. The hairy skin is sent to a factory where hair of different textures are separated or sorted.
   Step 4. The small fluffy fibres called burrs, are picked out from the hair. The fibres are scoured again and dried. Now the wool is ready to be drawn into fibres.
   Step 5. The fibres are dyed in various colours because the natural fleece of sheep and goats is black, brown or white.
   Step 6. Finally the fibres are straightened, combed and rolled into yarn. The longer fibres are made into wool for sweaters and the shorter ones are spun and woven into the woollen cloth.

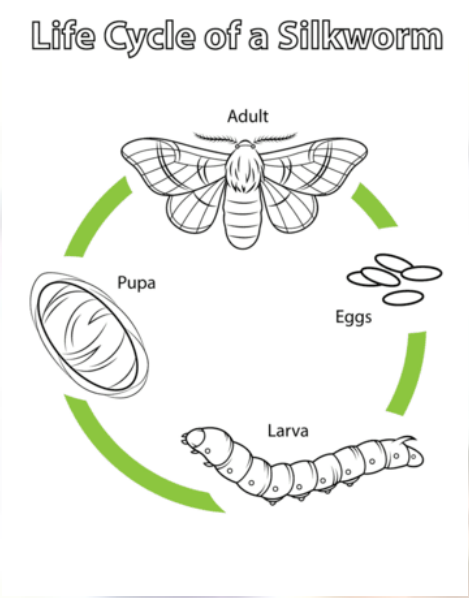
2. Describe the life history of a silk moth with the help of figures of each stage?

   Ans: Silk fibres are also known as animal fibres. They are soft, light in weight and strong. Silk fibres are obtained from the cocoons of the silk moth or silkworm. The life history of silk moth involves mainly four stages:

   Eggs → Caterpillars or Silkworms → Pupa → Adult silk moth

   The female silk moth lays eggs, from which hatch larvae called caterpillars or silkworms. They grow in size and when they are ready to enter the next stage called pupa, they first weave a net to hold themselves. Then they swing their heads from side to side in the form of the figure 8.

During these movements, they secret fibres made of a protein which hardens on exposure to air and becomes silk fibre. Soon the caterpillars completely cover themselves by silk fibres and turn into pupae. This covering is known as cocoon. The further development of the pupae into moths continue inside the cocoons. Moths are reared and their cocoons are collected to get silk thread for obtaining silk.



3. What are occupational hazards? What occupational hazards are linked with wool and silk production?
   Ans: Health risks faced by the workers of a particular occupation or industry are called occupational hazards. In wool industry, wool sorter's can get infected by a bacterium which causes fatal blood disease, called anthrax or sorter's disease. In silk industry workers handling dead worms with bare hands may get infection. Fine hair on caterpillars may cause asthma or conjunctivitis.

❖ **HOTS:**

1. What is silk route?
   Ans: The route, the traders and travellers travelled to introduce silk to other countries is called silk route.
2. Why natural fibres are costlier than synthetic fibres?
   Ans: Natural fibres are obtained either from plants or animals. The process of obtaining fibres from these natural sources is comparatively labour intensive process than production of synthetic fibres on large scale from other raw materials or chemicals.
3. What are occupational hazards? What occupational hazards are linked with wool and silk production?
   Ans: Health risks faced by the workers of a particular occupation or industry are called occupational hazards. In wool industry, wool sorter's can get infected by a bacterium which causes fatal blood disease, called anthrax or sorter's disease. In silk industry workers handling

dead worms with bare hands may get infection. Fine hair on caterpillars may cause asthma or conjunctivitis.

- **Activity:**
  - Name any 5 types of fabric other than given in your textbook and find how they are made.