1. Plant Life

Worksheet

A. Answer in one word.

1. The part of spinach that is eaten
2. The thin, green and broad part of a leaf
3. The outermost thin layer of pericarp
4. The process by which leaves manufacture food
5. The single cell produced as a result of fertilisation

B. Identify the error in the given statements. Circle the incorrect word and write the correct word in the blank.

1. The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same species is called germination.
2. A tube-like structure arising from the ovary called stigma.
3. The four whorls of the flower arise from the tip of the pedicel called thallus.
4. In *Hydrilla*, buds are present in the notches on the margins of leaves that get detached from the parent plant and develop into new plants.
5. In pitcher plant, each leaf has long pointed hair on its edges.

C. Match the columns.

Column A	Column B
1. Scale leaves	(a) Pea plant
2. Leaf tendril	(b) Ginger
3. Leaf spines	(c) Banana
4. Reticulate venation	(d) Prickly pear
5. Parallel venation	(e) Mango

D. Answer in short.

1. What is shoot system? Name its parts.
2. What are compound leaves? Give any two examples.
3. What are incomplete flowers? Give any two examples.
4. Give any two characteristics of plants that are pollinated by wind.
5. What is pericarp? Name its parts.

E. Answer in detail.

1. Explain the functions performed by a leaf.
2. Explain the modifications of leaves in pitcher plant and bladderwort.
3. Write a note on parts of a flower.
4. Explain the process of fertilisation in plants.
5. Write a note on types, parts and functions of fruit.

Answers to Worksheet

A. 1. Leaves 2. Lamina 3. Epicarp
4. Photosynthesis 5. Zygote

B. 1. germination ⟶ pollination 2. stigma ⟶ style
3. *thallus* ⟶ thalamus 4. *Hydrilla* ⟶ *Bryophyllum*
5. pitcher plant ⟶ Venus flytrap

C. 1. (b) 2. (a) 3. (d) 4. (e) 5. (c)

D. 1. The aerial part of the plant which grows above the soil is called the shoot system. It consists of stem, leaves, buds, flowers and fruit.

2. In a compound leaf, the lamina is divided into many small parts called leaflets. These leaflets do not have axillary buds. Examples include *Acacia* and rose plants.

3. Flowers that lack any one or more of the four whorls are called incomplete flowers. Examples include oaks, begonia and elms.

4. Two characteristics of plants pollinated by winds are as follows.
   - The flowers are small, and are not brightly coloured or attractive.
   - They do not produce nectar and do not have any smell.

5. Pericarp is a part of fruit that develops from the wall of the ovary. It may be thick or thin. It may be soft and fleshy as in tomato and papaya or dry as in gram. The pericarp consists of three parts—epicarp, mesocarp and endocarp.

E. 1. Following are the functions performed by a leaf.
   - The primary function of a leaf is to manufacture food (sugar and starch) in the presence of sunlight. The food is prepared from carbon dioxide and water in green leaves containing chlorophyll. This process is called photosynthesis. Oxygen is released in this process which supports life on earth.

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{chlorophyll}]{\text{sunlight}} \text{Starch} + \text{Oxygen}$$

   - Many minute pores called stomata are present on the lower surface of the leaves. The exchange of carbon dioxide and oxygen takes place through these pores. During the day, plants take in carbon dioxide and give out oxygen while at night, they take in oxygen and release carbon dioxide.
   - Plants give out extra water from the surface of leaves in the form of vapour through stomata. This process of loss of water through leaves is called transpiration. This helps in keeping the leaves cool.

2. **Pitcher plant:** In a pitcher plant, the leaf is modified into a pitcher. The apex of the leaf forms the lid. The petiole of the leaf coils like a tendril. As soon as an insect enters the pitcher through its opening, the lid closes. The plant then secretes digestive juices which digest the insect.

   Bladderwort: In bladderwort, the leaves are highly segmented. Some of these segments form bladders. Each bladder is a hollow chamber having an opening. The mouth has a trap door which allows only very small flies to enter it. Once they enter, they cannot come out and are digested.

3. A flower has four whorls namely calyx, corolla, androecium and gynoecium.

   Calyx: It is the outermost whorl. It consists of sepals which are green leaf-like structures. Sepals enclose and protect the inner parts of a flower at the bud stage.

   Corolla: It is the second whorl. It consists of petals which are brightly coloured and scented. Petals protect the reproductive parts of a flower. They also attract insects like bees and butterflies which help in pollination.

   Androecium: It is the third whorl. It is the male reproductive part of the flower. It consists of stamens. A stamen has two parts.

   (i) A thin, long and narrow stalk called filament

   (ii) A small two-lobed structure called anther which consists of fine particles called pollen grains which contain male reproductive cells or gametes

   Gynoecium: It is the innermost whorl. Gynoecium is the female reproductive part of the flower. It consists of carpels or pistils. A carpel has three parts.

   (i) A swollen part situated at the base of the carpel called ovary which contains small, round egg-like structures called ovules.

   (ii) A tube-like structure arising from the ovary called style

   (iii) A disc-like expanded part at the top of the style called stigma

4. Fertilisation is the fusion of male gamete with the female gamete. When a pollen grain reaches the stigma, it germinates to produce a long pollen tube. The pollen tube carries the male gametes and grows through the style to reach the ovule inside the ovary. On reaching the ovary, the male cell present in the pollen grain unites with the egg cell in the ovule. The single cell produced as a result is called a zygote. The zygote then develops into a new plant. This process is called fertilisation. After fertilisation, the ovule develops into seed and the ovary becomes fruit. Other parts like sepals and petals fall off.

5. **Types of fruits**

   There are two types of fruits.

   - **True fruit:** If fruit is developed from the ovary, it is known as true fruit. Some examples are mango, papaya and tomato.
   - **False fruit:** If other floral parts grow and form a part of fruit, it is known as false fruit. Some examples are apple, pear and cashew nut.

   Parts of a fruit

   A fruit consists of two parts—pericarp (fruit wall) and seed.

   Pericarp: It develops from the wall of the ovary. It may be thick or thin. It may be soft and fleshy as in tomato and papaya or dry as in gram.

   The pericarp consists of three parts.

   (i) The outermost thin layer is called epicarp.

   (ii) The sweet and fleshy middle part is called mesocarp.

   (iii) The innermost hard part is called endocarp. It contains seeds.

   Functions of a fruit

   - It protects the seeds from animals and unfavourable environmental conditions.
   - It attracts animals which help in dispersal of seeds.
   - It stores food material.

2. The Cell

Worksheet

A. Fill in the blanks.

1. The longest cells in the body are _____.
2. A network of thread-like structures in the nucleus is called _____.
3. _____ gives shape to the cell and also controls the movement of substances in and out of the cell.
4. Plastids are of three types—_____, _____ and _____.
5. Cell wall is present only in _____ cells.

B. Identify the error in the given statements. Circle the incorrect word and write the correct word in the blank.

1. Every cell has three basic parts—cell wall, cytoplasm and nucleus.
2. All living organisms are made up of two or more cells.
3. Nucleus is present in the nucleoplasm.
4. Vacuoles are sac-like structures containing a fluid called tonoplast.
5. Leucoplasts are coloured plastids that are found in fruits and flowers.

C. Answer in one word.

1. Control centre of a cell
2. Green-coloured plastids
3. Oval-shaped unicellular green alga
4. Largest cell measuring about 23 cm
5. Cells that are involved in the conduction of messages as they are long and thread-like

D. Answer in short.

1. Name the largest, smallest and longest cells.
2. Give examples of any two unicellular and two multicellular organisms.
3. What is protoplasm?
4. What are chloroplasts? Explain briefly.
5. What are vacuoles? Give their function.

E. Answer in detail.

1. Give the contribution of different scientists that formulated the cell theory.
2. Write a note on variation in size of cells.
3. What is a cell membrane? Give its functions.
4. Explain the structure and functions of nucleus.
5. Give the differences between plant and animal cells.

Answers to Worksheet

A. 1. nerve cells 2. chromatin 3. Cell membrane
4. chloroplasts, chromoplasts, leucoplasts 5. plants

B. 1. cell wall ⟶ cell membrane 2. two ⟶ one
3. nucleoplasm ⟶ cytoplasm 4. tonoplast ⟶ cell sap
5. Leucoplasts ⟶ Chromoplasts

C. 1. Nucleus 2. Chloroplasts 3. *Chlamydomonas*
4. Ostrich's egg 5. Nerve cell

D. 1. **Largest cell:** Ostrich's egg

Smallest cell: Bacterial cell

Longest cell: Nerve cell

2. **Unicellular organisms:** *Paramecium* and *Euglena*

Multicellular organisms: Human beings and lion

3. Nucleus and cytoplasm together make up the protoplasm. It is the living substance of a cell.

4. Chloroplasts are green-coloured plastids because they contain the green pigment chlorophyll. They are present in the green parts of the plant. Chlorophyll traps the solar energy to prepare food for the plants. Hence, chloroplasts are also called the 'kitchen of the cell'.

5. Vacuoles are sac-like structures containing a fluid called cell sap. They are bound by a single membrane called tonoplast. Plant cells have large vacuoles whereas animal cells have many small vacuoles.

Functions

- Vacuoles maintain the turgidity of a cell, that is, the cell remains in shape.
- They store food (sugars, proteins, amino acids and minerals), water and wastes.

E. 1. In the nineteenth century, with the advancement in technology and improvement of microscopes, more scientists studied about cells.

The following scientists and their contributions led to the formulation of the cell theory.

- In 1838, a German botanist, Matthias Jakob Schleiden observed different parts of plants under a microscope and found that all of them were made up of cells.
- In 1839, a German zoologist, Theodor Schwann observed parts of an animal body under a microscope and noticed that they were also made up of cells.
- In 1855, a German doctor and biologist, Rudolph Carl Virchow studied that all cells arise from the pre-existing cells. In other words, the existing cells divide to form new cells.

2. Most cells are microscopic and can be seen only under a powerful microscope. The size of the cells is measured in micrometres or micron (μ). One micron is equal to one-thousandth of a millimetre.

Cells show a great range in their sizes. The smallest cells are those of bacteria, which range from 0.2 to 0.5 μ in diameter. The smallest cells in the human body are the red blood cells measuring 6–8 μ. An ostrich's egg is the largest cell. It measures about 23 cm. The longest cells are the nerve cells. In an elephant, the nerve cells are as long as 3 m.

3. Each cell is bound by a thin, delicate and flexible covering called the cell membrane or plasma membrane which is a living structure.

   It allows only certain substances to pass through it and prevents the entry of other substances. Thus, it is a semipermeable membrane.

   Functions

   - Cell membrane separates the cell from its surroundings.
   - It protects the internal components of the cell.
   - It gives a definite shape to the cell.
   - It controls the movement of materials in and out of the cell

4. Nucleus is a small spherical body present in the cytoplasm. It is the most important part of the cell. It is surrounded by a double membrane called the nuclear membrane. Inside the nuclear membrane is a colourless, dense fluid called nucleoplasm. It contains one or more spherical bodies called nucleoli.

   A network of thread-like structures called chromatin is present in the nucleoplasm. The chromatin network forms small structures called chromosomes at the time of cell division. Chromosomes carry genes which are responsible for transfer of characters from the parents to the offspring. The number of chromosomes is fixed for a particular organism. Different organisms have different number of chromosomes.

   Functions

   - Nucleus is called the control centre of the cell. It controls all the activities that take place within the cell.
   - It helps in the transfer of characters from parents to their offspring.
   - It plays an important role in cell division.

5. **Differences between plant and animal cells**

Plant cell	Animal cell
• They are usually large.	• They are usually small.
• Only a thin layer of cytoplasm is present.	• Cytoplasm is denser and more granular and fills the entire cell.
• Cell wall made of cellulose is present.	• Cell wall is absent.
• Plastids are present.	• Plastids are absent.
• Large vacuole is present.	• Vacuoles are absent. If present, they are very small.

3. Human Body

Worksheet

A. Fill in the blanks.

1. Digestion starts in _____.
2. Food is taken in the body through the mouth which opens into a small chamber called the _____.
3. _____ sharp and pointed for piercing and tearing food.
4. The opening of the windpipe called _____ is guarded by a muscular flap called _____.
5. A heartbeat can be heard by a device called _____.

B. Identify the error in the given statements. Circle the incorrect word and write the correct word in the blank.

1. Plasma carries oxygen and many other substances.
2. Arteries carry oxygenated blood, except the brain artery.
3. Pneumonia is an airborne disease caused by *Mycobacterium tuberculosis*.
4. The process of eliminating the undigested food is called assimilation.
5. The lower portion of the pharynx leads to the voice box called trachea.

C. Match the columns.

Column A	**Column B**
1. Ribs move downwards	(a) Haemoglobin
2. Ribs move upwards	(b) During exhalation
3. Carries impure blood	(c) Arteries
4. Carries pure blood	(d) During inhalation
5. Carries oxygen	(e) Veins

D. Answer in short.

1. What are veins? Describe their structure.
2. What is the function of molars?
3. Explain the events that take place during exhalation.
4. Give the functions of trypsin and amylase.
5. Name any three respiratory diseases.

E. Answer in detail.

1. Write a note on assimilation of food.
2. In what ways can we keep our heart healthy?
3. Explain gaseous transport and cellular respiration.
4. Describe the structure of the heart.
5. What is heartbeat? Explain the events that occur during heartbeat.

Answers to Worksheet

A.
1. mouth
2. buccal cavity
3. Canines
4. glottis, epiglottis
5. stethoscope

B.
1. Oxygen ⟶ carbon dioxide
2. brain ⟶ Lung
3. Pneumonia ⟶ Tuberculosis
4. Assimilation ⟶ egestion
5. Trachea ⟶ larynx

C. 1. (b) 2. (d) 3. (e) 4. (c) 5. (a)

D.
1. Blood vessels that carry blood back to the heart from all parts of the body are called veins. Veins lie closer to the surface of the skin and can be seen as greenish-blue lines in our hands and legs. Veins have thinner walls than arteries. Valves are present in the veins to stop the backward flow of blood.
2. There are six molars in the upper jaw and six in the lower jaw. They are used for chewing and grinding food.
3. Two things happen simultaneously during exhalation.
   - Ribs move downwards and inwards as the muscles relax.
   - The diaphragm relaxes and moves upwards.

   As a result, the space inside the chest cavity decreases and the air pressure increases. Thus, air rushes out of the lungs deflating them.
4. Amylase (ptyalin) breaks down starch into maltose. Trypsin acts on proteins, proteoses and peptones and changes them into polypeptides.
5. Bronchitis, pneumonia and tuberculosis

E.
1. All digested and absorbed nutrients are not utilised by our body instantly. Some are converted into another form and stored for later use. This process is called assimilation.
   - Liver converts excess glucose into insoluble glycogen and stores it. When required by the body, the liver converts glycogen into glucose again. Excess of glucose is also converted into fat and stored in the adipose tissue.
   - Fatty acids either provide energy or are converted into fats and deposited under the skin.
   - Amino acids are used for synthesis of proteins. Excess amount of amino acids are converted into urea which is removed by the kidneys.
2. Too much fatty substances (such as cholesterol) in the blood can reduce or slow down the blood supply to the heart. Cutting down the amount of fat in the diet is helpful in keeping the heart healthy. This can be achieved by limiting foods like dairy products (cheese, *paneer* and ghee), oily food and meat, which contain high amounts of fat. Also, when a fat-rich diet is consumed regularly, a person becomes obese. This puts extra strain on the heart, as it has to push the blood to the greatly enlarged body. This extra strain on the heart and the accumulation of fatty substances in the arteries can lead to heart attack.

Obesity can be overcome by eating a balanced diet and increasing physical activity by exercising on a regular basis. Exercise also helps in relieving tension, and a person feels and looks better.

3. **Gaseous transport:** The air which reaches the alveoli is rich in oxygen. The blood capillaries of the alveoli contain blood rich in carbon dioxide. The oxygen diffuses from the walls of the capillaries into the blood. This oxygen now combines with the haemoglobin present in the red blood cells of the blood forming oxyhaemoglobin. In this form, the blood carries oxygen from the lungs to all the cells of the body. It delivers oxygen to the cells and becomes haemoglobin again.

   Cellular respiration: In the cell, a series of chemical reactions take place which breakdown glucose into carbon dioxide and water, and energy is released. The energy is stored in the form of ATP (adenosine triphosphate). The carbon dioxide combines with the haemoglobin and forms carbaminohaemoglobin. In this form, the blood carries carbon dioxide to the alveoli from where carbon dioxide is released and exhaled through the nose.

4. The human heart is four-chambered. It is divided into two halves. Each side of the heart has two chambers. The two upper chambers are called the atria (singular—atrium) or auricles and the two lower chambers are called the ventricles. The right auricle opens into the right ventricle and the left auricle opens into the left ventricle. There are valves between the auricle and the ventricle on each side. The valves allow blood to flow only in one direction, thus preventing the backflow of blood. There are no valves in between the two auricles or in between the two ventricles, i.e., the right side of the heart remains completely separated from the left side of the heart and there is no mixing of the deoxygenated blood (rich in carbon dioxide) with the oxygenated blood (rich in oxygen).

5. The regular rhythmic contraction and relaxation of the heart is called heartbeat. Each heartbeat is heard as two sounds—lub-dub. The contraction of auricles produces a weaker sound 'lub', while the contraction of ventricles causes a stronger sound 'dub'. A heartbeat can be heard by a device called stethoscope. It amplifies the sound of a heartbeat so that it can be heard clearly. The heart beats at an average of 72 times per minute.