CLASS 9

SELF ASSESSMENT – 1

LAB ACTIVITY 1 IX CLASS

OBSERVATION OF ONION PEEL CELLS

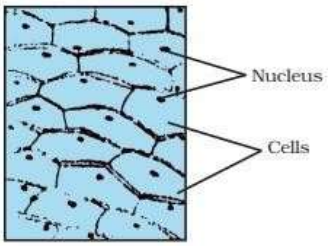
Aim: To observe the onion peel cells and their arrangement.

Materials required: Onion bulb, forceps, watch-glass containing water, safranin solution, slide, coverslip, fine camel brush and microscope.

Precautions: Ensure that there are no folds in the onion peel.

Procedure:

1. Taken a small piece from an onion bulb and peeled off the skin from the inner side of the onion with the help of forceps.
2. Immediately put the peel in a watch glass containing water to avoid the folds and getting dried.
3. Taken a glass slide and put a drop of water on it and transferred a small piece of peel from watch glass to the slide with the help of a brush.
4. Put a small drop of safranin solution on the peel followed by coverslip carefully avoiding the air bubbles.
5. Observed this slide under a compound microscope.
6. Tried the same procedure with different sizes of onions.



Observation:

1. It is observed that the onion peel cells contain the number of cells with rectangular shape which are compactly arranged.
2. It is also observed that the cells of onion peel will look all same regardless of the size of onion bulb.

Inference: These small structures or cells are the building blocks of the onion bulb. It is inferred that all organisms around us are made up of cells.

LAB ACTIVITY 2 IX CLASS

OSMOSIS WITH AN EGG

Aim: Demonstrate osmosis with an egg.

Materials required: An egg, dilute hydrochloric acid, a beaker with pure water and another with concentrated salt solution.

Precautions: Handled the egg carefully.

Procedure:

1. Removed the shell of an egg by dissolving it in dilute hydrochloric acid so as to get an egg with thin outer covering.
2. Put this egg in a beaker containing water for 5 minutes and noted the change.3. Now placed the same egg in another beaker containing concentrated salt solution for 5 minutes and noted the changes.

Observation: The egg swells when placed in pure water and shrinks when placed in concentrated salt solution.

Inference:

1. The egg swells in pure water because the water enters the egg by osmosis.
2. The same egg shrinks in salt water because the water passes out of the egg due to the high concentration of salt solution.

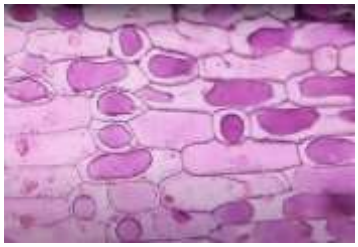
LAB ACTIVITY 4 **IX CLASS**

OBSERVATION OF PLASMOLYSIS

Aim: To observe the plasmolysis in Rheo leaf peel.

Materials required: Rheo leaf, slide, salt solution and microscope.

Procedure:



1. Mounted the peel of a Rheo leaf in water on a slide and examined cells under the high power of microscope.
2. Put a strong solution of sugar on the mounted leaf peel and observed under microscope after a minute.
3. Now taken another Rheo leaf and boiled in hot water for few minutes.
4. Mounted a small piece of this Rheo leaf and examined the cells.
5. Put again a strong solution of sugar on this mounted leaf and observed under microscope.

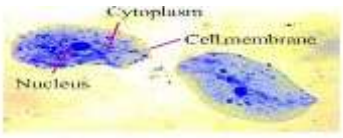
Observation:

1. In first observation it is observed that the protoplasm shrinks due to exosmosis. This is known as plasmolysis.
2. But in second observation protoplasm of the cells does not shrink and did not show any changes. **Inference:** It is concluded the osmosis occurs only in living cells and it is evident by plasmolysis in first mounted leaf peal which is a living specimen. But the osmosis did not occur in boiled cells as they are dead.

LAB ACTIVITY 5 **IX CLASS**

OBSERVATION OF CHEEK CELLS

Aim: To observe the nucleus in cheek cells.



Materials required: An ice cream spoon, glass slide, cover slip, watch glass, needle, blotting paper, 1% methylene blue, normal saline, glycerin, microscope, etc.

Precautions:

1. Do not scrape the cheek too hard as it may injure buccal mucosa.
2. Scrapped material should be spread uniformly on the slide.
3. Excess stain should be drained off.
4. There should be no air bubbles under the cover slip.

Procedure:

1. Wash the mouth and scrape a little of the internal lining of the cheek inside the mouth with a clean ice cream spatula.
2. Place the scrape in a watch glass containing a very small quantity of normal saline.
3. Then place the material on a glass slide
4. Put a drop of methylene blue and wait for a couple of minutes.
5. Wipe off the extra stain with a fine cloth or blotting paper.
6. Put a drop of glycerin over it.
7. Place a cover slip and tap the cover slip with the blunt end of needle so as to spread the cells. **Observation:** Under low magnification it is observed that the cells are shapeless containing a dense nucleus at the center of the cell.

Inference: 1. The dark-colored dot in the cells is known as nucleus. It is the largest and most distinct of all cell organelles.

SELF ASSESSMENT – 1

PROJECT WORK 1 IX CLASS

Lesson: Cell – structure and function

Name of the project: Analysis of differences between plant cell and animal cell.

Aim: Identifying the differences between plant cell and animal cell and analyzing them.

Objectives:

1. Observing the onion peel cell and cheek cell under microscope.
2. Collecting the information about differences between plant cell and animal cell.
3. Tabulating them in a table.
4. Analyzing the differences and concluding.

Procedure: When we started learning about the typical cell, we have observed the plant cell diagram and animal cell diagram. They looked different from each other. So, we have selected this as a project work to identify more differences and analyze them. As the first step we prepared the temporary slides of onion peel cell and cheek cell, observed under microscope and drawn the diagrams. As such we have discussed with our teacher about our observations and tabulated them as follows.

SN	CELL ORGANELL	PLANT CELL	ANIMAL CELL
1	Cell wall		
2	Chloroplast		
3	Big vacuole		
4	Centriole		

Analysis: The plant cell differs from animal cell in many ways like presence of cell wall, vacuole and chloroplast. Because plants are exposed to natural hazards such as wind, rain, etc. So, they have to withstand against these hazards. So, the plant cells have a rigid, tough cell wall which gives it a mechanical strength. It also maintains balance against turgor pressure exerted by cytoplasm due to continuous intake of water. Since the plants continuously absorb water, it creates turgor pressure. So, the vacuole absorbs excess of water and maintains the shape and structure of the cell. In animal cells are free from all these. The centrioles in animal cells help in the formation of spindle fibers during cell division. But in plant cell the cytoskeleton plays its role during cell division. So, the plant cells do not have centrioles. The chloroplast in the plant cell performs photosynthesis and prepares its own food. But animals depend on plants for food.

Conclusion: The structure and the life process in both plant cell and animal cell differ from each other. So, they contain different organelles to sustain their specificity.

Resources: Teacher and text book.

PROJECT WORK 2 **IX CLASS**

Lesson: Cell – structure – function

Name of the project: making of the typical cell model.

Aim: To make a model of typical cell with all the cell organelles.

Objectives:

1. Collecting the information about different cell organelles and their functions.
2. Drawing the diagram of atypical cell.
3. Collecting the things to make a model of a typical cell.
4. Preparing the model

Procedure: In the class room we have learnt about different cell organelles and their functions. We hereby would like to make a model of a typical cell which includes both plant cell and animal cell. As the first step we prepared a table of parts of the cell and cell organelles and their functions.

SN	PART OF THE CELL &CELL ORGANELL	FUNCTIONS
1	Cell wall	Protects the cell from outer and inner pressures and gives shape and mechanical energy to the plant cell
2	Cell membrane	Semipermeable membrane and protects the cell
3	Nucleus	Contains genetic material, controls all the processes of the cell.
4	RER	Protein synthesis and neutralizes the poisonous substances.
5	SER	Lipid synthesis
6	Golgi bodies	Stores and transports the proteins.
7	Lysosomes	Digest the damaged pars and microorganisms
8	Ribosomes	Protein synthesis
9	Mitochondria	Cellular respiration and stores energy, power houses of the cell
10	Chloroplast	Photosynthesis
11.	Centrioles	Participates in cell division

Material collected to make the model:

Method:

Conclusion: By gaining good information about the cell we could make the model of cell.

Resources: text book and teacher.

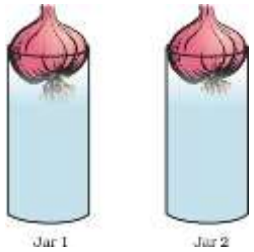
SELF ASSESSMENT - 2

LAB ACTIVITY 1

OBSERVATION OF GROWTH IN ROOT TIPS

Aim: Observe the growth in root tips of onion bulb.

Materials required: 2 Onions, Glass jars and water. **Procedure:**



1. Take two glass jars and fill them with water.
2. Take two onion bulbs and placed one on each jar as shown in the diagram.
3. Observe the growth of roots in both the bulbs for a few days and measured the length of roots on day 1, 2 and 3.
3. On day 4 cut the root tips of the onion bulb in jar 2 by about 1 cm.
5. Observe the growth of the roots in both the jars and measured their lengths each day for five more days.
4. Recorded the observations in a table.

Observation:

Lenth	Day 1	Day 2	Day 3	Day 4	Day 5
Jar1	0.5 cm	1 cm	1.5 cm	2 cm	3 cm
Jar2	0.5 cm	1 cm	1.5 cm	1.5 cm	1.5 cm

Inference: The roots of the onion in jar 1 grow continuously as their tips are not cut. But the roots of onion in jar 2 are not grown as their tips are cut. With this observation it is concluded that the tips play a major role in the growth of the roots.

LAB ACTIVITY 2

OBSERVATION OF EPIDERMAL CELLS WITH STOMATA

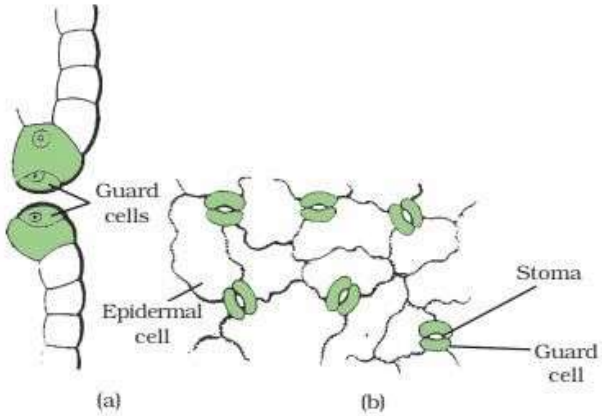
Aim: To observe the epidermal cells and stomata in Rheo leaf.

Materials required: Rheo leaf, Petridish, safranin, slide and microscope.

Procedure:

1. Take a freshly plucked leaf of Rheo.
2. Stretch and broke it by applying pressure gently so that some peel projects out from the cut.
2. Remove this peel and put it in a Petridis filled with water.
3. Add a few drops of safranin and left it for few min.
4. Transfer it onto a slide, gently placed a coverslip over it and observed under microscope.

Observation: The epidermal cells with stomata are observed which is made of a single layer of cells as shown i



SELF ASSESSMENT - 2

PROJECT WORK - 1

Lesson: Tissues

Project Title: Vascular Tissue in Plants

Aim: Collecting the information about the types of vascular tissues and their functions.

Procedure: We have learnt about the plant tissues in the classroom and learnt that there is a special tissue for transportation of water and nutrients in the plants. They are said to be the Vascular Tissue. We would like to take up a project work to learn more about it. In this connection we have collected some information regarding.

Introduction Vascular tissue is a complex conducting tissue that provides a transport system for water, minerals, and nutrients throughout a plant. These tissues form the basis of growth, survival, and adaptation of plants on land. Without vascular tissues, plants could not grow tall or survive in diverse environments. There are two main types of vascular tissue: **xylem** and **phloem**. These tissues are arranged into vascular bundles.

Vascular Bundles

In most plants, the xylem and phloem are grouped together into structures called **vascular bundles**. The arrangement of these bundles varies depending on the plant part.

Arrangement of Vascular Bundles

1. **Conjoint** – Xylem and phloem are together. (common in stems and leaves)

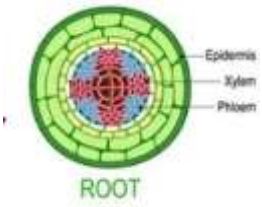
a) Collateral: Phloem outside, xylem inside. ex: Sunflower

b) Bicollateral: Phloem on both sides of xylem. ex: pumpkin

2. **Concentric** – One tissue surrounds the other. ex: fern
2. **Radial** – Xylem and phloem arranged separately in different radial (seen in roots).
3. **Types of Vascular Tissue**

Xylem: The function of xylem is to transports **water and minerals** from the roots to the aerial parts of the plant. Direction of transportation is **Unidirectional** (only upward).

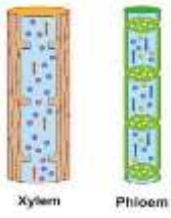
Components of Xylem are as follows.



- Tracheids – elongated cells with tapering ends that help in conduction.
- Vessels – tube-like structures for rapid water movement.
- Xylem Parenchyma – stores food.
- Xylem Fibres – provide mechanical strength.

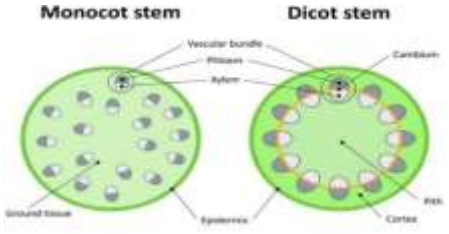
Phloem: The function of phloem is to transports **prepared food (mainly sugars)** from leaves to all parts of the plant. Direction of transportation is **Bidirectional** (upward and downward).

Components of Phloem are as follows



- Sieve Cells– conduct food.
- Sieve Tubes – conduct food.
- Companion Cells – support sieve tubes in transport.
- Phloem Parenchyma – stores food and other materials.
- Phloem Fibres – provide mechanical support.

Conclusion: Vascular tissues are the **lifelines of plants**, performing the same role as blood vessels in animals. Xylem and phloem together form a continuous network, transporting water, minerals, and food to every part of the plant.



ABOUT

SELF ASSESSMENT - 2
PROJECT WORK - 2

Lesson: Tissues
Project title: Blood in Human Beings
Aim: to collect the information related to the composition of blood and other relative information. **Procedure:** Blood is one of the connective tissues. After discussed about this in the classroom it is decided to take up the project work to collect information about blood. In this regard I have collected the following information.
Introduction: Blood is a specialized connective tissue that plays a vital role in the human body. **Composition of Blood:** Blood is composed of two main parts, Plasma (55%) – A yellowish fluid and Formed Elements (45%) – Cells and cell fragments suspended in plasma
1) Plasma: It is about 90% water and contains Proteins (Albumin, Globulin, Fibrinogen), Nutrients (Glucose, Amino acids), Hormones, Gases (Oxygen and Carbon Dioxide), Waste products (Urea, Creatinine)
2) Blood cells
a. Red Blood Cells (RBCs): These are biconcave in shape, containing Haemoglobin that is useful for transportation of Oxygen. Its life span is 120 days. They are of 4 to 6 million per mm^3 of blood.
b. White Blood Cells (WBCs): They defend the body from infections and are of various types such as Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils. They are of 4000 - 11000 per mm^3 of blood
d. Blood Platelets: They help in blood clotting. Their life Span is 5–9 days. They are of 1.5 - 4.5 lakhs per mm^3 of blood
3. Functions of Blood
a. Carries oxygen from lungs to tissues and Carries carbon dioxide from tissues to lungs
b. Delivers nutrients from digestive tract to cells and also removes waste products to be excreted by kidneys.
c. It maintains constant body temperature by distributing heat as regulates heat.
d. WBCs defend against harmful microbes
4. Blood Groups: Human blood is classified into four groups based on the presence of antigens: A, B, AB and O and also, the Rh factor (+ or –) is important in blood transfusions.
Importance of Blood Donation

- Saves lives during accidents, surgeries, and diseases
- Donated blood helps patients suffering from anaemia, leukaemia, and haemophilia
- Blood donation is safe and voluntary

Precautions for Healthy Blood

- Balanced diet rich in iron and vitamins
- Proper hydration
- Regular health check-ups
- Avoid smoking and alcohol

Conclusion
Blood is a life-supporting fluid that performs essential functions in the human body. Understanding its composition and functions helps us appreciate its importance and encourages us to maintain good health and contribute to society by donating blood.

SELF ASSESSMENT - 3

LAB ACTIVITY 1

(IMPROVEMENT IN FOOD RESOURCES)

Aim: To make the sample compost in a glass tub.

Materials required: Glass tub, farm waste material like cow dung, dried leaves, cow dung, vegetable waste, animal refuse, domestic waste, straw, eradicated wastes, etc.

Procedure:

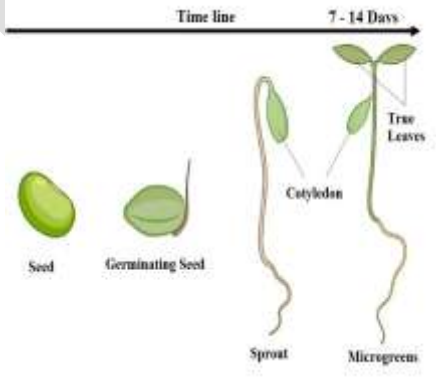
1. Take a glass tub in a rectangular shape and put the above taken waste material in layers.
2. Add 15 to 20 earthworms into this waste material.
3. Cover the tub with green leaves or gunny bags.
4. Sprinkle with water regularly.
5. Mix the contents in the tub every3 days regularly.

Result: The compost is ready which is very rich in nutrients required for plant's growth.

PROJECT WORK

Name of the lesson: Improvement in Food Resources

Title of the Project: Growing Microgreens for Improved Nutrition. **Aim:** To explore the potential of microgreens as a sustainable and efficient way to improve access to fresh, nutrient rich food.



Objectives:

1. Explain the benefits of microgreens.
2. Create a simple and low-cost microgreen growing system.
3. Observe the growth and development of microgreens from seeds to harvest.
4. Compare nutrients in microgreens and mature greens.
5. Share this knowledge with others to promote healthy eating.

Concept / Theory: Microgreens are very young plants, harvested just after the first true leaves appear. They contain more vitamins and minerals than mature leafy vegetables. They need very little space, soil, water, and time to grow. Growing microgreens helps us eat healthy and supports sustainable food habits.

Procedure: Taken a shallow container and filled it with soil and level the surface. Make small drainage holes if needed. Sprinkled seeds evenly on the soil. Lightly pressed them. Sprayed water gently to keep the soil moist. Ensured not to overwater. Kept the container in a bright, sunny spot. Observed daily and noted changes in height, colour, and leaf growth. After 7–10 days, when plants are 1–2 inches tall, cut them with clean scissors.

Nutrient Comparison: Microgreens have more vitamins and minerals than mature greens.

Conclusion: Microgreens are very easy to grow and need little space. They grow fast and contain more nutrients than mature greens. This project shows that microgreens can help us eat healthier and support sustainable food practices.

Remember, even small contributions, like growing tiny greens on your windowsill, can make a big difference in promoting both personal well-being and environmental sustainability.

APBSTF

SELF ASSESSMENT – 4

LAB ACTIVITY 1 (IMPROVING FOOD RESOURCES)
STUDY OF POULTRY FARMING PRACTICES

Aim: To study the basic practices involved in poultry farming.

Materials Required: Chart or pictures of poultry birds (hen, chick, rooster)**,** Sample poultry feed (grains like maize/wheat or pictures)**,** Notebook and pen

Procedure:

1. Observe the given pictures or charts of poultry birds.
2. Identify different types of poultry birds used for egg and meat production.
3. Study the components of poultry feed and note their importance.
4. Discuss housing conditions required for poultry birds (cleanliness, ventilation, light).
5. Record observations in the notebook.

Observations

1. Poultry birds are mainly reared for eggs and meat.
2. Balanced feed is necessary for healthy growth and good egg production.
3. Clean and well-ventilated housing prevents diseases.

Result / Conclusion: Poultry farming requires proper feeding, housing, and disease control to ensure healthy birds and higher production.

Precautions: Handle samples or charts carefully. And maintain cleanliness during the activity.

LAB ACTIVITY 2 (IMPROVING FOOD RESOURCES)
(BEE KEEPING - EPICULTURE)

Aim: To study the importance of beekeeping and the structure of a beehive.

Materials Required: Chart or diagram of a beehive**,** Pictures of honey bees (queen, worker, drone) Notebook and pen

Procedure

1. Observe the given diagram of a beehive carefully.
2. Identify different types of bees present in the hive – queen, worker, and drone.
3. Note the functions of each type of bee.
4. Observe the structure of the beehive and its cells.
5. Record observations in the notebook.

Observations:

1. The beehive consists of hexagonal wax cells.
2. There are three types of bees:
    - Queen bee: Lays eggs.
    - Worker bee: Collects nectar, makes honey, protects the hive.
    - Drone bee: Helps in reproduction.
3. Honey is stored in honeycomb cells.

Result / Conclusion:

Beekeeping is an important agricultural activity that provides honey and wax. Proper management of beehives increases honey production.

Precautions

- Do not disturb real beehives.
- Use charts or models for observation in the lab.

SELF ASSESSMENT – 4

PROJECT WORK

Name of the Project: Dairy Farming.

Aim: To collect information about dairy farming and ways to increase milk production.

Objectives:

1. To study different cattle breeds.
2. To understand feeding and housing.
3. To learn how health care affects milk yield.

Materials Required: Notebook, pen, mobile (optional).

Procedure:

1. Visit a nearby dairy farm and look at the animals.
2. Ask the farmer about feed, water, health care, and milking.
3. Observe the shed, cleanliness, and how milk and dung are handled.
4. Write down all information clearly in the data table.

Data Collection Table:

SN	Item Studied	Information Collected
1	Cattle breeds	Jersey, Holstein Friesian (HF), Sahiwal, Gir, Murrah (buffalo).
2	Type of feed	Green fodder, dry fodder, oil cakes, mineral mixture.
3	Water supply	Clean water given 2–3 times a day.
4	Housing	Clean shed, good ventilation, proper drainage.
5	Milking method	Hand milking and machine milking.
6	Health care	FMD, HS, BQ vaccines every year.
7	De-worming	Done every 6 months.
8	Milk yield/day	HF - 15 L, Jersey - 12 L, Sahiwal -10 L, Gir - 8 L.
9	Shed cleaning	Twice daily.
10	Dung handling observed	Dung used for biogas and organic manure.

Data Analysis:

1. HF and Jersey give more milk because they are high-yield breeds.
2. Indigenous breeds such as Sahiwal and Gir give milk with higher fat content and have better disease resistance.
3. Murrah buffalo milk is thick and, so it is good for making ghee, khoa and sweets.
4. Clean sheds and regular vaccination keep animals healthy and prevent disease.
5. Balanced feed with minerals increases milk quantity and quality.
6. Machine milking reduces contamination and improves hygiene.

Conclusion:

Good breed selection, proper feed, clean housing, and regular health care increase milk production.

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