St. Andrews Scots Sr. Sec. School

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Class:IX	Subject:Biology	Lesson: 6	Topic:Tissues (Part-1)

Tissue

A group of cells that are specialized to perform a particular function forms a tissue.

Tissues are mainly classified into two types:
1.Plant Tissues 2. Animal Tissues

1.Plant tissues

→ Plants do not move, i.e., they are stationary.

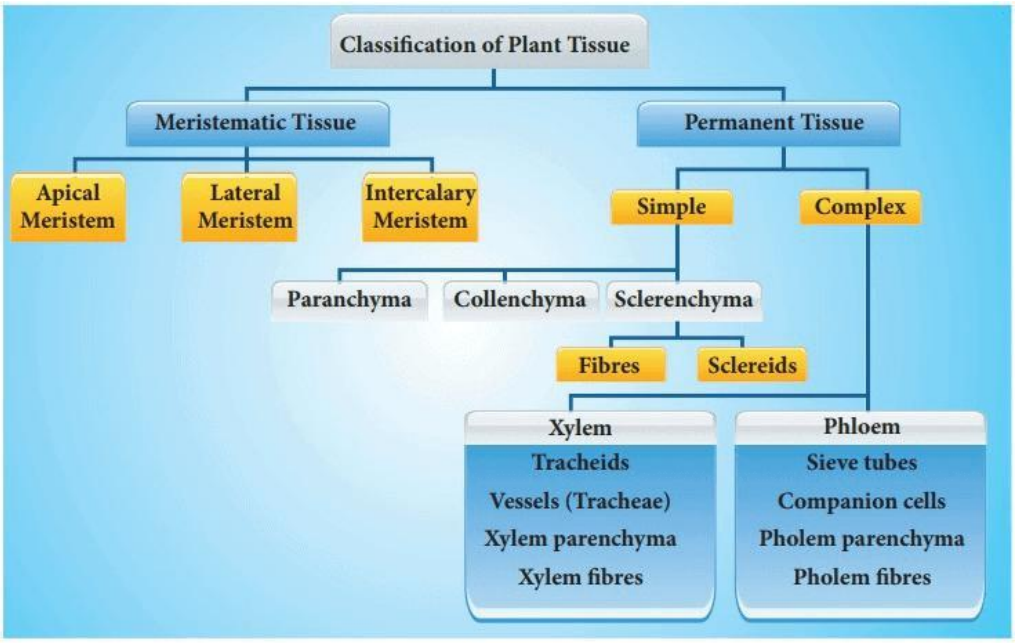
→ Most of the tissues they have are supportive, which provides them with structural strength.

→ Most of these tissues are dead, as they can provide better mechanical strength than the live ones, and need less maintenance.

→ Some of the plant tissues keep on dividing throughout the plant life. These tissues are localised in certain regions.

Types of Plant Tissues:

Based on the dividing capacity of the tissues, various plant tissues can be classified as growing or meristematic tissue and permanent tissue which have further sub-divisions as explained below:



A. Meristematic Tissue

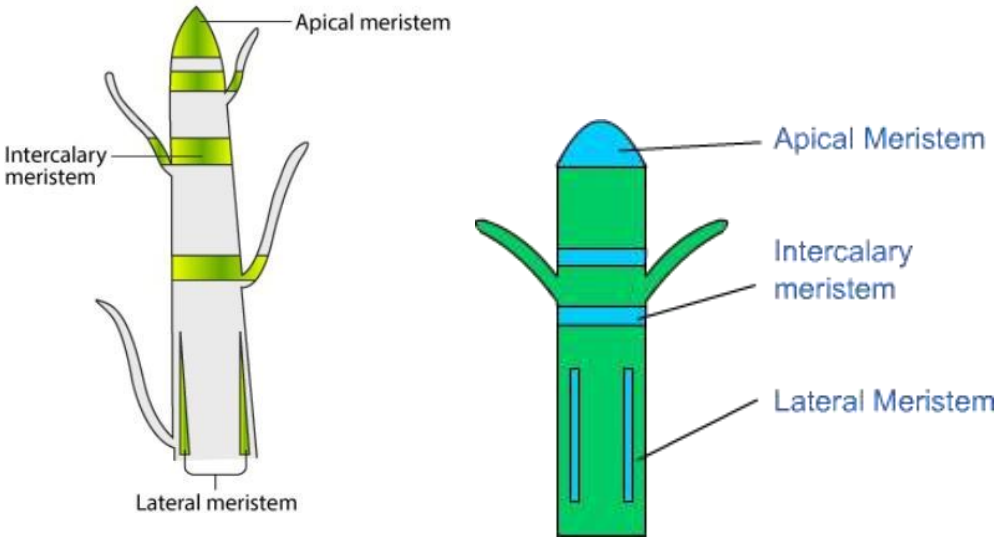
Meristematic tissues are responsible for growth in plants. Cells in these tissues can divide and form new cells.

Meristematic tissues are of three types:

(i) Apical Meristem: It is present at the growing tip of the stem and roots and increases the length. .

(ii) Lateral Meristem (cambium): It is present beneath the bark. It is responsible for growth in girth of trunk.

(iii) Intercalary Meristem: It is present at internodes or base of the leaves and increases the length between the nodes.



B. Permanent Tissue

→ Cells of meristematic tissues change their shape & size to get specialised in performing other functions in plants body. This process is called Differentiation.

→ Once the cells of meristematic tissue divide to a certain extent, they become specialized for a particular function.

Permanent tissues are of two types:

Simple tissues and Complex tissues

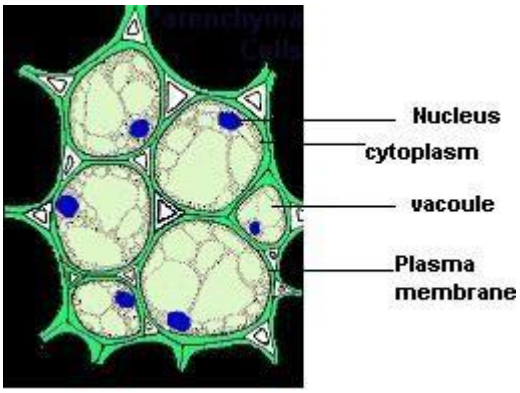
(i) Simple tissues: This type of tissue is composed of same type of cells. These are again of four types:

(a) Parenchyma simple tissues: Cells of parenchyma tissues are live. They are oval, elongated and loosely packed with large inter-cellular space, forming basic packing of tissue and are found throughout the plant body.

Functions of parenchyma:

→ They provide mechanical support to the plant body.

→ They store food and nutrients in vacuoles.



Parenchyma Tissue

Chlorenchyma: Parenchyma with chlorophyll which performs photosynthesis is called as chlorenchyma.

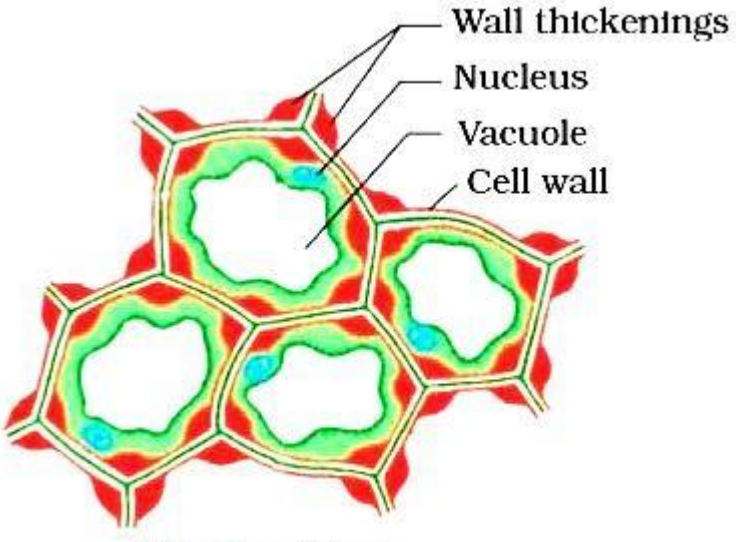
Aerenchyma: In aquatic plants, cells of parenchyma have large air cavities to give buoyancy to the plant and is called aerenchyma .

(b) Collenchyma simple Tissues: Cells of collenchyma are live. They are oval and elongated and tightily packed with no inter-cellular spaces. They are found below epidermis in leaves and stem.

Functions of collenchymas tissues:

→ They provides mechanical support to plant.

→ They also provide flexibility to plants so that they can bend without breaking.



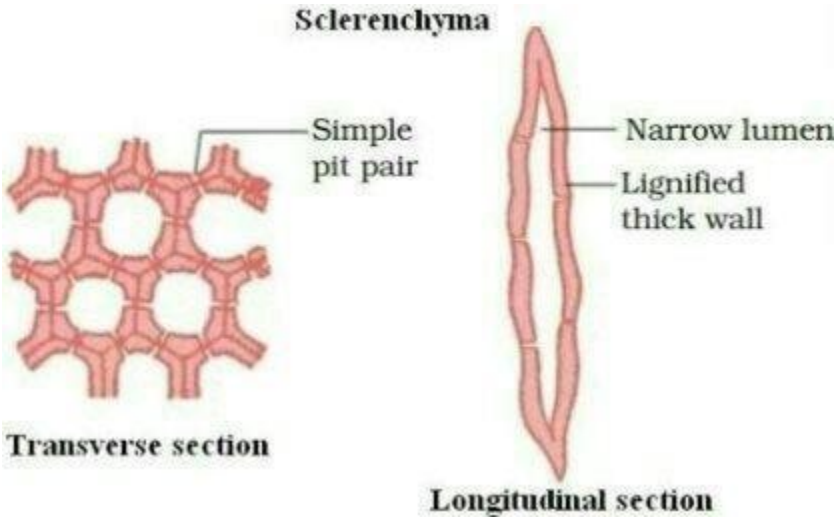
Collenchyma Tissue

(c) Sclerenchyma Simple Tissues: Cells of sclerenchym are dead. They are narrow and elongated. The cell wall in sclerenchyma is composed of lignin which makes it hard. Sclerenchyma are found around vascular bundles, veins of leaves in hard covering of seeds and nuts. For example: Scalerenchyma tissues are found in coconut husk.

Functions of sclerenchyma:

→ They help to makes parts of plant hard and stiff.

→ Also provides mechanical strength.



(d) Protective tissues: They protect the plant body by forming an outer layer.

There are two types of protective tissues:

1.Epidermis Simple Tissues: Epidermis tissue covers the entire body of plant. They protect plant from injury, germs and water loss.

Cells of epidermal tissue form a continuous layer without intercellular spaces.
Stomata are small openings on epidermal layer of leaf and soft part of stem to facilitate the gaseous exchange and transperation in plants. Each stomata is composed of two guard cells which regulate the opening and closing of stomata.
In desert plants, epidermis and cutin (a water proof waxy substance secreted by epidermis) are thicker to reduce loss of water due to transpiration.

2. Cork Simple Tissues: These types of tissue consist dead cells with no intercellular spaces. They form the outer layer of old tree trunks.

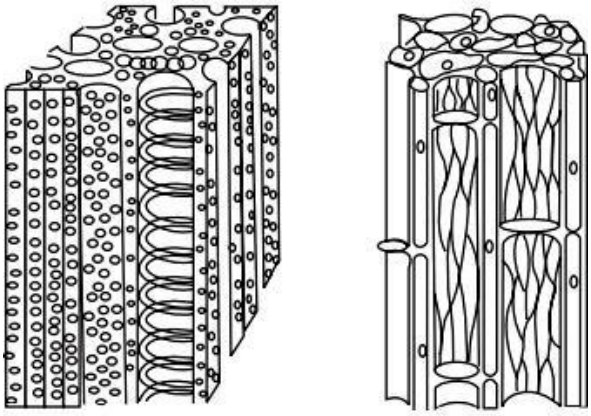
Cork cells have a chemical called suberin in their walls that makes them impervious to gases and water.

Cork tissue protects plants from injuries, germs and water loss.

Cork being light in weight is used for making several products like bottle stoppers and shuttle cork.

(ii) Complex tissues: Group of different type of cells performing common task together are named as complex tissues.

Complex tissues are of two types:
(a) Xylem (b) Phloem



(a) Xylem: This is the tissue that transports water and nutrients from root to upper parts of plant. It is composed of four types of cells i.e., tracheid, vessel, xylem parenchyma and xylem sclerenchyma (fibre).

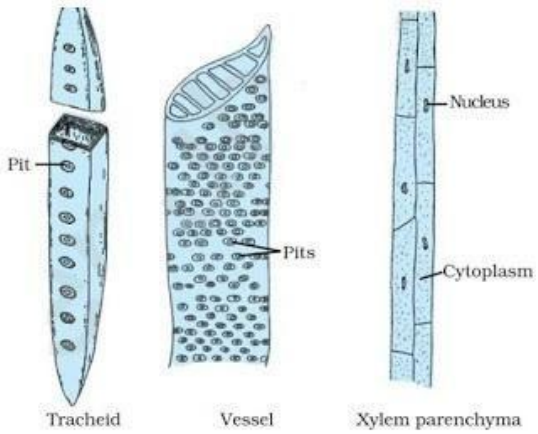


Diagram of xylem tissues

1. Trachieds are long elongated cells with tapered ending. Trachied cells are dead. Trachied transports water through pits.

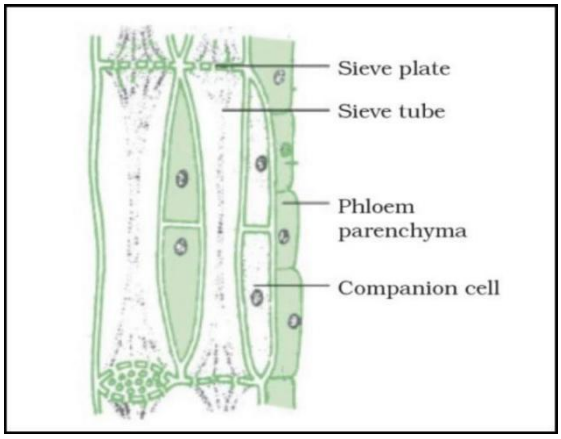
2. Vessel is a pipe like structure. Vessels are dead and have lignified thick cell wall. Upper and lower portion of cell wall is absent.

3. Parenchymas are living cells. They store food and nutrients.

4. Sclerenchymas (fibres) are dead cells. They provide mechanical support to plant.

(b) Phloem: Phloem is the tissue that transports food from site of photosynthesis to different parts of plants.

It is composed of four types of cell i.e. sieve cells, companion cells, phloem parenchyma, phloem fibre or blast fibre. Al types of cells are live except phoem fibres.



1. Sieve cells are elongated and have thin cell wall. They have cytoplasm but no nucleus and other organelles. These cells are responsible for transportation of food and nutrients
2. Companion cells have cytoplasm, nucleus and other organelles. They perform the tasks required for sieve cells for living.
3. Phloem parenchyma store food.
4. Phloem fibres have thick cell wall and they provide mechanical support to plant.

Try the following questions:

Q1. Name the tissue which allows easy bending in various parts of a plant.

Q2. What is the function of xylem?

Q3. Name the tissues which make up the husk of coconut.

Q4. Where is apical meristem found ?

Q5. Name the simple permanent tissue which contains chlorophyll in it .