Chapter 6 Tissues

Tissues are groups of cells that have a similar structure and act together to perform a specific function.

Are Plants and animals made of the same types of tissues?

Plants	Animals
• Stationary or fixed • Growth in a limited region • Needless energy to survive • Most of the tissues are dead	• They can move • Growth in every part • Need more energy to survive • Most of the tissues are alive

Tissues are two types

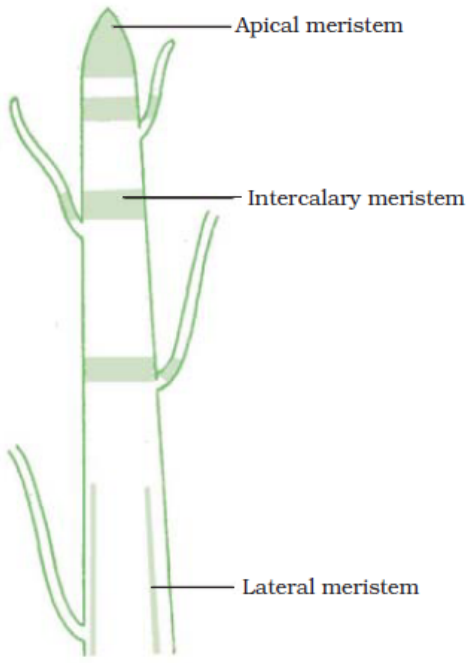
1. Plant tissues
2. Animal tissues

Plant tissues

Plants have two types of tissues Meristematic tissue and permanent Tissue

Meristematic tissue

These are simple living tissues capable of division and formation of new cells. Present in the growing region of plants. Ex. root growing branches etc.



Meristematic Tissues are three types

i. Apical meristem
ii. Intercalary meristem
iii. Lateral meristem

Apical meristem

- It is present at growing tips of stems and roots
- This tissue leads to the elongation of stems and roots
- This evolved in the primary growth of plants.

Intercalary meristem

- It is present at the internodes
- It is part of apical meristem which is left behind during growth.

- It helps in the longitudinal growth of the plant.

Lateral meristem

- It occurs along the side of the longitudinal axis of the plant
- It gives rise to vascular tissues.
- It causes growth in the girth of the stem and Roots.
- This is responsible for secondary growth.

Permanent tissues

It is composed of those cells which have lost their capability to divide, they have a definite shape, size, and thickness. It may be dead or living.

Permanent tissue are two types

i. Simple permanent tissue
ii. Complex permeant tissue

Simple permanent tissue

These are made up of the same types of cells which are similar in structure and also in function

Simple Permanent tissue includes two types of tissues (a) protective tissues (b) supporting tissues

- **Protective tissues** are consisted of the Epidermis, Cork or Phellem

Epidermis

It is the outermost single cell layer of plant organs Such as leaves, flowers, roots, etc. It is cover by cutile (waterproof layer).

Stomata-

The epidermis has small pores on its surface. These pores are called stomata. These are enclosed by two kidney-shaped cells called guard cells.

Function

- It protects the plant from desiccation and infection.
- Cutile cuts the rate of transpiration and the proportion of water.
- Stomata allow gaseous exchange during photosynthesis
- Stomata also help in transpiration

Cork or phellem

It is made up of dead cells with thick walls and does not have intercellular spaces. Cell wall in cork deposit waxy substance called Subcrin. The cell wall is impermeable. It does not have any protoplasm.

Function

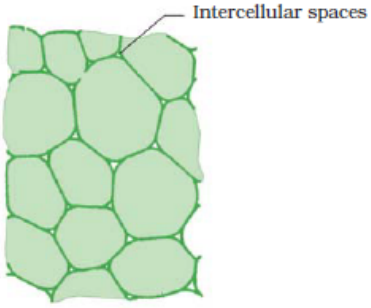
- It prevents plants from infection or mechanical injury
- It is a shock absorber, insulator for plants.
- Provide toughness to plants
- Cork used in making of sports goods like – Cricket ball, table tennis, wooden, paddles, etc.

Supporting Tissues

These tissues are supporting in function. These tissues are three types

Parenchyma

It thin-walled cell, composed of living cells, oval and spherical in structure. It has large central vacuoles, found in leaves, the pith of stems, and roots.



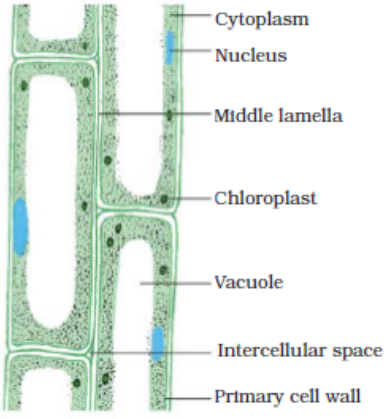
a (i)

Function

- Storage foods in large vacuoles
- Provide turgidity to cells
- Photosynthesis
- Wound repair and new growth
- Buoyancy control in aquatic plants

Collenchyma

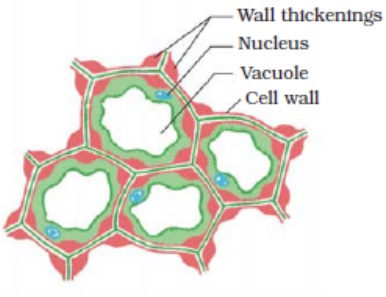
It forms filler tissues in soft parts of plants present in the cortex, pith primary stems, and roots. It is found epidermis. The cell of this tissue is living, the wall thickened at the corners.



a (ii)

Function

- Provide flexibility to plant pants.
- All provide mechanic's support



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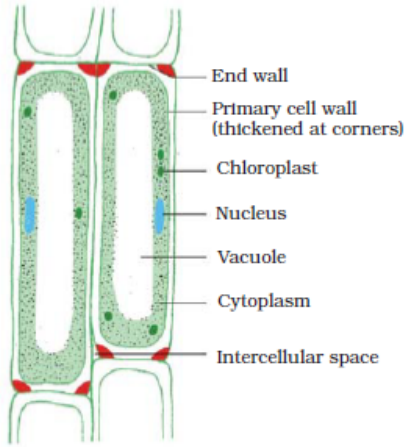


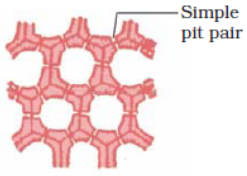
b (ii)

- Filling the vacant place

Sclerenchyma

It is strengthening tissues composed of extremely thick-walled cells made up of lignin. Its cells are dead.

Present in stems, around vascular bundles, in the veins of leaves, and hard covering seeds and nuts.



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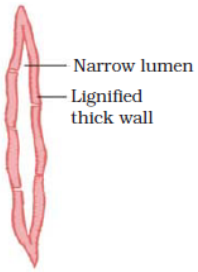

c (ii)

Function

- Provide strength to plant parts.

Complex Permanent tissues

- It consists of more than one type of cell which works together as a unit.
- It is also known as conducting or vascular tissue.
- It helps in transporting organic material, water, and minerals up and down in the plant.

Complex Permanent tissue are of two types

i. Xylem
ii. Phloem

Xylem

Xylem is the vascular tissue in a plant that transports water and dissolved nutrients upward-from the roots.

Xylem consist of four types of cells

- Tracheid
- Vessels
- Xylem parenchyma
- Xylem sclerenchyma

Tracheid

Elongated angular dead cells are involved in the conduction of water.

Vessels

This one cylindrical tube-like structure is placed one above the other end which forms a channel for the conduction of water.

Xylem parenchyma

Thick cells used for storage of food (Starch)

Xylem sclerenchyma

Non-living fibres with thick walls and narrow cavities provide mechanical support.

Phloem

Phloem is the vascular tissue in the plant which conducts sugars and other metabolic Products upward and downwards from the leaves.

It consists of four types of cells

- Sieve tubes
- Companion cells
- Phloem fibres
- Phloem parenchyma

Sieve tubes

Transport Organic compounds (sugar) made during photosynthesis.

Companion cells

Regulate the activity of Sugar in sieve tubes.

Phloem fibers

Provide mechanical support to sieve tubes.

Phloem parenchyma

It stores food.

Animal Tissues

Animals have four types of tissues

- Epithelial
- Connective
- Muscular