

Learning horizon

Class 9

Tissue

Notes

What is a Tissue?

A **tissue** is a group of **similar cells** that perform a **specific function**.

- In **unicellular organisms**: one cell performs all functions.
- In **multicellular organisms**: there is a **division of labor**, so tissues are needed.

1. Plant Tissues

A. Meristematic Tissues (Growth Tissues)

- Made of actively dividing cells.
- Found in growing regions of the plant.
- **Types:**

Type	Location	Function
Apical	Tips of roots and shoots	Increases height
Lateral	Sides of stems/roots	Increases thickness (girth)
Intercalary	Base of leaves, nodes	Increases length between nodes

B. Permanent Tissues (Non-dividing cells)

1. Simple Permanent Tissues (Same type of cells)

Tissue	Characteristics	Function
Parenchyma	Living, loosely packed, thin walls	Storage, photosynthesis, support
Collenchyma	Living, thick corners, flexible	Provides flexibility and support
Sclerenchyma	Dead, thick walls (lignin), hard	Provides strength and rigidity

Special types:

- **Chlorenchyma** - Parenchyma with chlorophyll (for photosynthesis)
- **Aerenchyma** - Parenchyma with air spaces (in aquatic plants)

2. Complex Permanent Tissues (Different types of cells)

Tissue	Transports	Made of
Xylem	Water	Vessels, Tracheids, Xylem fibers, Xylem parenchyma
Phloem	Food	Sieve tubes, Companion cells, Phloem fibers, Phloem parenchyma

Animal Tissues – Detailed Notes

Animal tissues are specialized to carry out specific functions like protection, movement, support, coordination, and transport.

There are 4 main types of animal tissues:

♦ 1. Epithelial Tissue (Covering or Protective Tissue)

► Function:

- Covers body surfaces (external and internal)
- Forms lining of organs and cavities
- Protects from injury, germs, and dehydration

► Characteristics:

- Cells are tightly packed
- No intercellular space
- Rest on a basement membrane
- No blood supply (gets nutrients from underlying tissues)

► Types of Epithelial Tissue:

Type	Structure	Location	Function
Squamous	Flat, thin	Skin, lining of lungs, blood vessels	Diffusion, protection
Cuboidal	Cube-shaped	Kidney tubules, glands	Secretion, absorption
Columnar	Tall, column-like	Intestine lining	Absorption
Ciliated	Columnar with hair-like cilia	Respiratory tract, oviduct	Moves particles/substances
Glandular	Modified columnar/cuboidal	Sweat glands, salivary glands	Secretion of hormones/enzymes

◆ 2. Connective Tissue (Joining & Supporting Tissue)

► Function:

- Connects, binds, and supports other tissues/organs
- Transports substances and fights infections

► Characteristics:

- Most abundant tissue in animals
- Cells are scattered in matrix (can be fluid, jelly-like, or solid)

► Types of Connective Tissue:

Type	Components	Location	Function
Blood	RBCs, WBCs, platelets in plasma	Circulatory system	Transport, immunity, clotting
Bone	Hard matrix of calcium & phosphorus	Skeleton	Support, protection, movement
Ligament	Elastic tissue (bone to bone)	Joints	Provides flexibility & strength
Tendon	Tough, non-elastic (muscle to bone)	Muscles to bones	Connects muscles to bones
Cartilage	Smooth, elastic tissue	Nose, ear, joints, trachea	Smooth movement, support
Areolar	Loose, fibrous tissue	Between skin and muscles	Fills space, supports organs
Adipose	Fat-storing cells	Under skin, around organs	Insulation, energy storage

◆ 3. Muscular Tissue (Movement Tissue)

► Function:

- Responsible for all types of body movement (voluntary and involuntary)

► Characteristics:

- Made of elongated cells called muscle fibres
- Can contract and relax

► Types of Muscular Tissue:

Type	Features	Location	Control
Striated (Skeletal)	Long, cylindrical, multinucleated, voluntary, has stripes	Arms, legs, face	Voluntary
Untreated (Smooth)	Spindle-shaped, uninucleate, no stripes, involuntary	Walls of intestine, bladder, uterus	Involuntary
Cardiac	Branched, striped, uninucleate, involuntary	Heart only	Involuntary

◆ 4. Nervous Tissue (Control & Coordination)

➤ Function:

- Transmits messages between body parts and the brain
- Controls and coordinates body functions

➤ Structure:

- Composed of neurons (nerve cells)
- Neurons have:
 - Cell body (with nucleus)
 - Dendrites (receive signals)
 - Axon (transmits signals)

➤ Location:

- Brain, spinal cord, nerves

➤ Working:

- Neurons pass messages in the form of electrical impulses
- Helps in quick response and coordination

Quick Recap Table:

Tissue Type	Function	Examples
Epithelial	Protection, covering	Skin, lining of organs
Connective	Binding, transport	Blood, bone, ligament
Muscular	Movement	Skeletal muscles, heart, intestine wall
Nervous	Coordination, control	Brain, spinal cord, nerves