Class 9 Science – Chapter 6: Tissues

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1. Introduction

In multicellular organisms, cells do not work alone. Similar cells group together and perform a specific function. This group of similar cells is called a **tissue**.

So, **tissue = group of similar cells performing a particular function**.

Example: Muscle tissue helps in movement.

The branch of science that studies tissues is called **Histology**.

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2. Why Do We Need Tissues?

In unicellular organisms, one cell does all functions. But in multicellular organisms:

- Different cells perform different jobs
- This division of work increases efficiency
- Makes body functioning smooth

PLANT TISSUES

Plant tissues are of two main types:

1. **Meristematic Tissue**
2. **Permanent Tissue**

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3. Meristematic Tissue

These tissues have cells that **continuously divide**.

Features:

- Cells are small
- Dense cytoplasm
- Large nucleus
- No vacuoles

Types:

Type	Location	Function
Apical meristem	Tips of roots & shoots	Increase length

Type	Location	Function
Intercalary meristem	Base of leaves/internodes	Growth in length
Lateral meristem	Sides of stem/root	Increase thickness

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4. Permanent Tissue

Cells that have lost the ability to divide.

Types:

1. **Simple permanent tissue**
2. **Complex permanent tissue**
3. **Protective tissue**

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5. Simple Permanent Tissues

Made of only one type of cell.

(a) Parenchyma

- Living cells
- Thin walls
- Store food

Special types:

- **Chlorenchyma** → photosynthesis
- **Aerenchyma** → air spaces (aquatic plants)

(b) Collenchyma

- Living cells
- Uneven thickening at corners
- Gives flexibility

(c) Sclerenchyma

- Dead cells
- Thick walls
- Provide strength

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6. Complex Permanent Tissues

Made of more than one type of cell.

(a) Xylem

Transports water.

Components:

- Tracheids
- Vessels
- Xylem fibres
- Xylem parenchyma

(b) Phloem

Transports food.

Components:

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

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7. Protective Tissues

Epidermis

- Outermost layer
- Protects plant
- Has stomata for gas exchange

Cork

- Dead cells
- Waterproof
- Protects stem

ANIMAL TISSUES

Four main types:

1. **Epithelial tissue**
2. **Connective tissue**
3. **Muscular tissue**

4. **Nervous tissue**

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8. Epithelial Tissue

Covers body surfaces.

Types:

Type	Function
Squamous	Protection
Cuboidal	Secretion
Columnar	Absorption
Ciliated	Movement of substances
Glandular	Secretion

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9. Connective Tissue

Connects body parts.

Types:

Tissue	Function
Areolar	Fills spaces
Adipose	Stores fat
Bone	Support
Cartilage	Flexible support
Blood	Transport
Tendons	Muscle to bone
Ligaments	Bone to bone

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10. Muscular Tissue

Responsible for movement.

Type	Control	Location
Striated	Voluntary	Limbs

Type	Control	Location
Smooth	Involuntary	Organs
Cardiac	Involuntary	Heart

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11. Nervous Tissue

Made of **neurons**.

Function:

- Carry messages
- Control body

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12. Plant vs Animal Tissues

Feature	Plant Tissue	Animal Tissue
Growth	Continuous	Limited
Support	Dead tissues	Living tissues

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13. Key Points

✓ Tissue = group of similar cells
✓ Meristematic tissue helps growth
✓ Xylem carries water
✓ Phloem carries food
✓ Muscles help movement
✓ Nervous tissue controls body