

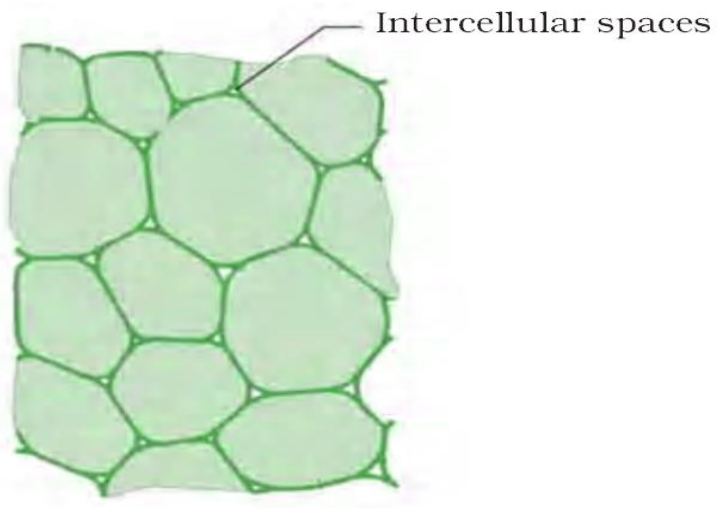
TISSUES

Prepared by Mr. B. John Ebenezer M.Sc, B.Ed.

CLASS: IX

BIOLOGY

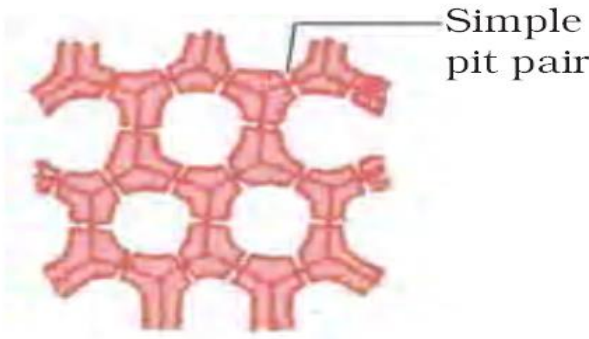
PLANT TISSUES

PARENCHYMA		
LOCATION		They are present in soft parts of the plant. i.e. roots, stems leaves flowers and fruits
STRUCTURE	1	The cells of this tissue are living .
	2	The cell walls are thin and made of cellulose .
	3	They are loosely packed .
	4	Intercellular spaces are larger .
FUNCTION		
		The parenchyma of stems and roots stores nutrients, waste and water .
T.S OF PARENCHYMA		
		

COLLENCHYMA

COLLENCHYMA		
LOCATION		They are located below the epidermis in stems and leaves.
STRUCTURE	1	The cells of this tissue are living .
	2	The cells are elongated .
	3	The cell wall is irregularly thickened at the corners . Cell wall is made of cellulose and pectin .
	4	Intercellular spaces are smaller.
FUNCTION		It provides elasticity and mechanical support to plants
DIAGRAM	T.S OF COLLENCHYMA	

SCLERENCHYMA

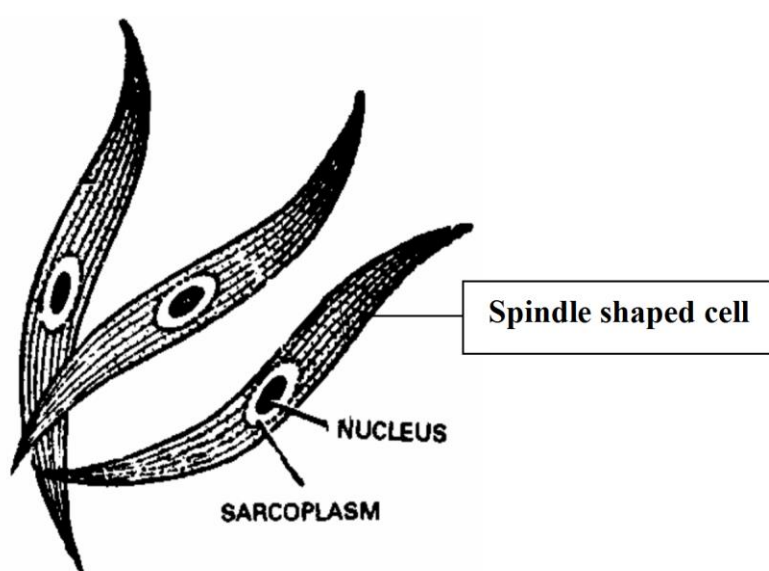
SCLERENCHYMA	
LOCATION	It is present in the xylem and phloem of root, stem, leaves and the hard coverings of seeds and nuts.
STRUCTURE	1 The cells of this tissue are dead .
	2 They are long and narrow .
	3 The cell wall is uniformly thickened . Cell wall is made of lignin .
	4 There is no intercellular space.
FUNCTION	It provides rigidity and mechanical support to the plant parts .
DIAGRAM	T.S OF SCLERENCHYMA
	

ANIMAL TISSUES

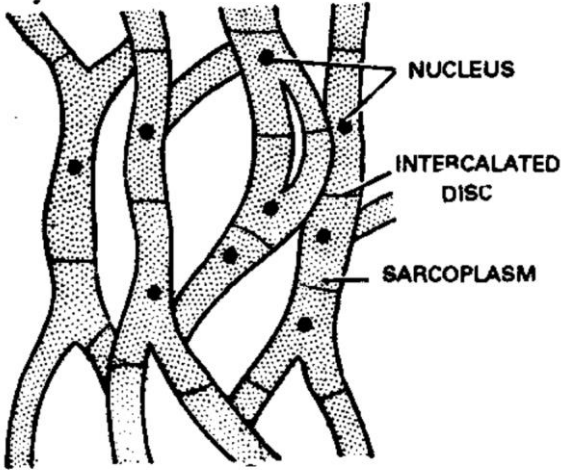
STRIATED MUSCLE OR SKELETAL MUSCLE

STRIATED MUSCLE (VOLUNTARY MUSCLE)	
LOCATION	Skeletal muscles
	Body parts such as hands, legs and tongue.
STRUCTURE	1 Cylindrical cells.
	2 Dark and light bands are present.
	3 Unbranched
	4 Multinucleated
	5 Nuclei are arranged at the periphery.
	6 The cytoplasm of muscle cell is called sarcoplasm.
	7 The cytoplasm of each cell is divided into large number of small fibrils called myofibrils.
FUNCTION	Helps in the body movement.
DIAGRAM	<p>The diagram illustrates the structure of striated muscle. On the left, a single cylindrical muscle cell is shown with multiple nuclei located at its periphery. On the right, a bundle of myofibrils is shown, characterized by alternating dark and light bands. Labels with arrows point to the following structures: SARCOLEMMA (the outer membrane of the muscle fiber), SARCOPLASM (the cytoplasm of the muscle fiber), NUCLEI (the nuclei of the muscle fiber), DARK BANDS (the dark regions of the myofibril), and MYOFIBRIL (the individual contractile units).</p>

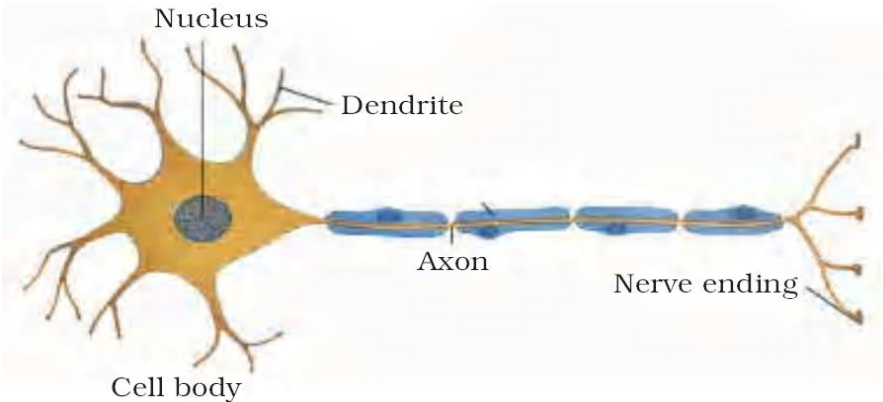
UNSTRIATED MUSCLE OR SMOOTH MUSCLE

UNSTRIATED MUSCLE (INVOLUNTARY MUSCLE)		
LOCATION	1	Alimentary canal
	2	Blood Vessel
	3	Iris of the eye
	4	Ureters
	5	Bronchi of the lungs
STRUCTURE	1	Spindle-shaped
	2	No Dark and light bands
	3	Unbranched
	4	Uninucleated
	5	Nucleus is located at the centre
FUNCTION	1	Movement of food in the alimentary canal.
	2	Contraction and relaxation of blood vessels.
		 <p style="text-align: right; margin-right: 50px;">Spindle shaped cell</p> <p style="margin-left: 100px;">NUCLEUS</p> <p style="margin-left: 100px;">SARCOPLASM</p>

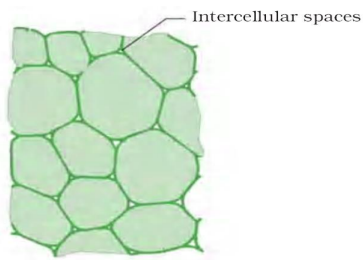
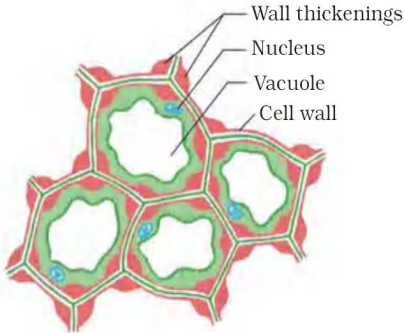
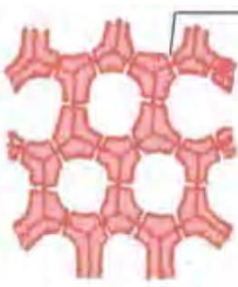
CARDIAC MUSCLE

CARDIAC MUSCLE (INVOLUNTARY CARDIAC MUSCLE)		
LOCATION		Heart
STRUCTURE	1	Cylindrical
	2	Slight bands are there
	3	Branched
	4	Uninucleated
	5	Nucleus is located at the centre
FUNCTION		Rhythmic contraction and relaxation of heart muscles throughout life.
DIAGRAM	 <p style="text-align: right; margin-right: 50px;"> NUCLEUS INTERCALATED DISC SARCOPLASM </p>	

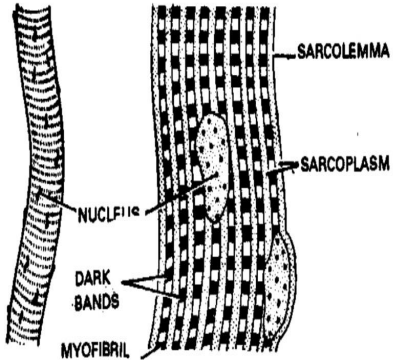
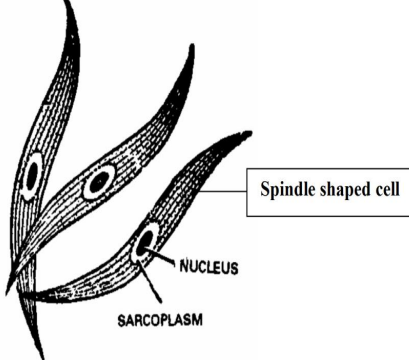
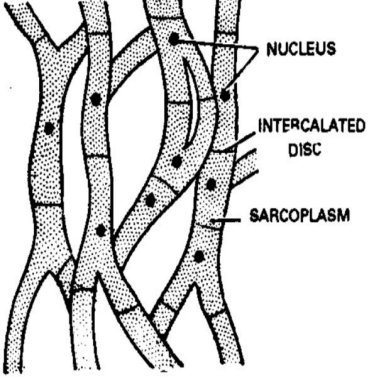
NUERON

NERVE CELL (NEURON)		
LOCATION		Nerves, spinal cord, Brain.
STRUCTURE	1	Nerve cell consists of a large body called cell body with a prominent nucleus.
	2	It has many branched cytoplasmic projections called dendrites .
	3	A long, unbranched cytoplasmic projection arises from the cell body is called axon .
	4	A myelin sheath is present over the axon of some nerve cells.
FUNCTION		Neurons receive messages through dendrites and send them through axon.
DIAGRAM		

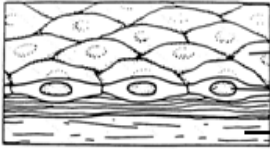
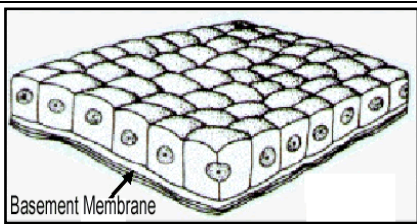
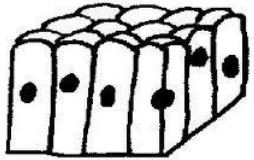
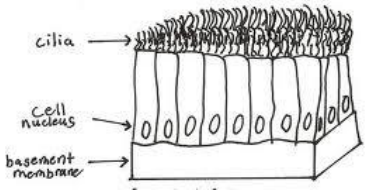
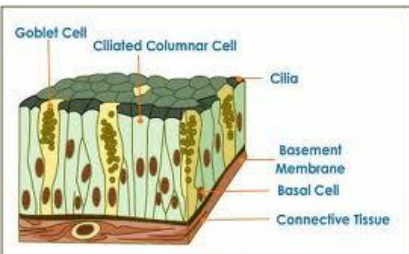
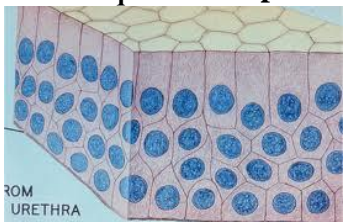
Simple Permanent Tissues

	PARENCHYMA	COLLENCHYMA	SCLERENCHYMA
Location	They are present in soft parts of the plant. i.e. roots, stems leaves flowers and fruits	They are located below the epidermis in stems and leaves.	It is present in the xylem and phloem of root, stem, leaves and the hard coverings of seeds and nuts.
Structure	The cells of this tissue are living .	The cells of this tissue are living .	The cells of this tissue are dead .
	The cells are isodiametric	The cells are elongated .	They are long and narrow .
	The cell wall is thin.	The cell wall is irregularly thickened at the corners .	The cell walls are uniformly thickened throughout the cell .
	The cell wall is made of cellulose .	The cell wall is made of cellulose and pectin .	The cell wall is made of lignin .
	Intercellular spaces are larger .	Intercellular spaces are smaller .	There is no intercellular space.
	The parenchyma of stems and roots stores nutrients, waste and water .	It provides elasticity and mechanical support to plants	It provides rigidity and mechanical support to the plant parts .
Diagram	T.S OF PARENCHYMA	T.S OF COLLENCHYMA	T.S OF SCLERENCHYMA
	 <p style="text-align: right; margin-right: 50px;">Intercellular spaces</p>	 <p style="text-align: right; margin-right: 50px;">Wall thickenings Nucleus Vacuole Cell wall</p>	 <p style="text-align: right; margin-right: 50px;">Simple pit pair</p>

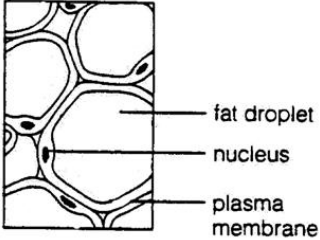
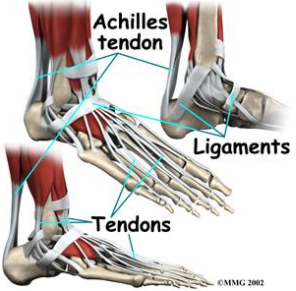
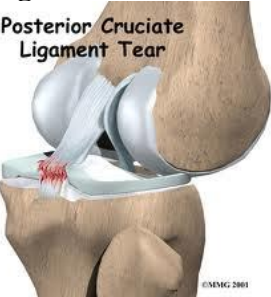
Muscular Tissues

	Striated Muscle (Voluntary)	Unstriated Muscle (Involuntary)	Cardiac Muscle (Involuntary)
Location	Skeletal muscles	Blood vessels	Only seen in the Heart.
	Hands	Alimentary canal	
	Legs	Iris of the eye	
	Tongue	Ureters	
		Bronchi of the lungs	
Structure	Cylindrical	Spindle-shaped	Cylindrical
	Dark and light bands	No Dark and light bands	Slight bands are there
	Unbranched	Unbranched	Branched
	Multinucleated.	Uninucleated	Uninucleated
	Nuclei are arranged at the periphery	Nucleus is located at the centre	Nucleus is located at the centre
Function	Helps in the body movement	Movement of food in the alimentary canal	Rhythmic contraction and relaxation of heart muscles throughout life
		Contraction and relaxation of blood vessels	
	Voluntary muscles	Involuntary muscles	Involuntary cardiac muscles
Diagram	 <p>The diagram shows a longitudinal section of striated muscle. It features multiple myofibrils with alternating dark and light bands. Nuclei are located at the periphery of the cells. Labels include: SARCOLEMMA, SARCOPLASM, NUCLEI, DARK BANDS, and MYOFIBRIL.</p>	 <p>The diagram shows several spindle-shaped cells of unstriated muscle. Each cell has a single nucleus located in the center. Labels include: Spindle shaped cell, NUCLEUS, and SARCOPLASM.</p>	 <p>The diagram shows branched cells of cardiac muscle. Each cell has a single nucleus. The cells are connected by intercalated discs. Labels include: NUCLEUS, INTERCALATED DISC, and SARCOPLASM.</p>

Epithelial Tissues

	Name of the Tissue	Type of Cells	Location in human body	Function
1	Simple Squamous Epithelium 	Single layer of flat cells	Lining of the mouth, Oesophagus, Lung Alveoli,	Protection
2	 Cuboidal Epithelium	Consists of cube-like cells	Lining of the kidney tubules, Gonads Ducts of the salivary glands	Mechanical support Absorption Excretion and Secretion
3	Columnar Epithelium 	Consists of elongated or column-like cells	Inner lining of the alimentary canal	Absorption Secretion
4	Ciliated Columnar Epithelium 	Consists of elongated or column-like cells with cilia	Respiratory tract Fallopian tube	Pushes the mucus forward and clear it
5	Glandular Epithelium 	Consists of multicellular glands	Glands	Secretion
6	Stratified Squamous Epithelium 	Multi-layered, Squamous cells	Lining of body cavities like the mouth and outer layer of skin	Protection

Connective Tissues

	Name of the Tissue	Location in human body	Function
1	Areolar Tissue	Skin and muscles	Fills the space inside the organs.
		Around the blood vessels	Supports internal organs.
		Nerves	Helps in repair of tissues.
2	Adipose tissue 	Found between the internal organs	Acts as the storage site of fats Acts as insulator of organs.
		Below the Skin	
3	Tendons 	Between muscles & bones	Connect muscles to bones
4	Ligaments 	Between two bones	Connect two bones together
5	Cartilage	Earlobe, Trachea, Between the joints	Protection
6	Bones	All over the body	Form the Framework or Skeleton
7	Blood	Throughout the body	
	Plasma		Carries Nutrients, Wastes, Hormones.
	RBC		Haemoglobin carries oxygen.
	WBC		Fight against disease causing germs.
	Platelets		Help in blood clotting during injury.