

TOPIC	CONTENT
<p>Unit 1 : Plant Diversity</p>	<p>Living world - Introduction; Attributes of living organisms- metabolism-Homeostasis-growth-Reproduction-Shape and size- Cellular structure-Consciousness Classification of Plants-Three domains; Five kingdom; Seven kingdom(Chromista); Diversity in the Plant World; Classification of plants; (cryptogams, phanerogams) Plant kingdom Viruses Discovery, classification, shape, size, structure (TMV, Bacteriophage) Reproduction -virion, virioids, virusoids Prions. Plant viral diseases (only names);Bacteria-Discovery, Archaeobacterium, Eubacterium Gram + and Gram negative bacteria - with reference to cell wall composition, Glycocalyx flagellum ultra structure, Pili and fimbriae Plasmid and its types, mesosome, Bacterial life processes,-Nutrition, Respiration, reproduction, Mycoplasma , structure, Economic importance (Useful & harmful);Cyanobacteria;Fungi-Reproduction, classification, phycomycetes, zygomycetes, ascomycetes, Basidiomycetes, Deuteromycetes, symbionts-Lichen , Mycorrhizae, Structure, Economic Importance; Algae - Thallus organisation, classification, Reproduction, Characteristics of Chlorophyceae, Phaeophyceae, Rhodophyceae, Structure of Oedogonium and Chara, Economic importance; Bryophytes - Salient features, classification Reproduction, Alternation of generation, Structure of Marchantia and Funaria, Economic importance; Pteridophytes-Salient features, classification, Different types of Stele, structure of Selaginella and Adiantum Economic importance; Gymnosperms- Salient features, comparison with angiosperm classification, Structure of Cycas and Pinus. Economic importance; Angiosperms- salient features, Dicots and monocots - Difference-traditional concept - Modern -Only Monocots; Life cycle of Plants - Haplontic, Diplontic, Haplo- Diplontic with examples.</p>
<p>Unit 2 : Morphology and Taxonomy of Angiosperms</p>	<p>Vegetative morphology - Introduction; Habit-Types; Life span; Habitat; Root system; Characteristics features, Regions of root; Types of roots, Functions, Modification of roots- Tap root (Storage, Modulated, Pneumatophore, assimilatory, Root buttress); Adventitious (Storage, Mechanical - Proproots, stilt roots (Balancing roots)- types and functions) Shoot system - Characteristic features, Buds-Terminal,</p>

	<p>Axillary and Adventitious buds modifications; Stem modifications - aerial, sub-aerial, underground; Comparison of underground stem and root, branching of stem; Leaf -Parts - Venation, Types-simple and compound; Phyllotaxy- Symmetry of leaves; Modification of leaf (Tendrils, spines, Hooks, Scales, tentacles, leaf bladders, foliar roots, storage, pitcher, Phyllode)</p> <p>Reproductive Morphology -Inflorescence-Types Racemose, Cymose, Mixed and special types; Flower Monoecious, Dioecious, Polygamous, , floral symmetry; Calyx, corolla, Perianth; Aestivation; Androecium Structure and types (Adelphy, epipetalous, syngenesious, gynostegium, pollinia, Didynamous, Tetradynamous; Gynoecium-Parts syncarpous and apocarpous, Gynobasic style; Gynandrophore Placentation, Construction of floral diagram and floral formula- Hibiscus, Brassica juncea, Croton, Vinca, Phyllanthus, Musa; Fruit -Definition and types.</p> <p>Taxonomy and Systematic Botany - Difference between Taxonomy and Systematic Botany; Concept of species-morphological, Biological, Phylogenetic; Types of Specie; Taxonomic hierarchy; Organisms with their taxonomic categorie; ICBN Principles (now ICN) ,Nomenclature, Codes of Nomenclature - Vernacular and Scientific names - Polynomial, Binomial and Trinomial nomenclature, Author citation; Type concept- Holotype, Isotype, Lectotype, Syntype, Paratype, Neotype, Epitype; Taxonomic Aids-Keys, Flora, revisions Monographs, catalogues, Botanical gardens, International and National, BSI, Herbariumpreparation and uses, National(MH, PCM, CAL, TBGRI) and International herbaria (Kew); Classification - need and types; Artificial- Linnaeus, Natural - Bentham and Hooker, Phylogenetic- Engler& Prantl; Cronquist, APG system-APG III and IV- Cladistic methodology; Modern trends in taxonomy, Chemotaxonomy, Biosystematics, Karyotaxonomy, Serotaxonomy, Molecular methods (RFLP, AFLP and RAPD); Difference between classical and modern taxonomy; Diagnostic features and economic importance of following families, Fabaceae - Pisum sativum, Clitoria ternate, Solanaceae - Solanum nigram, Datura metal, Liliaceae -Allium cepa</p>
Unit 3 : Cell Biology and Bio Molecules	<p>Cell: The Unit of Life</p> <p>Discovery; Microscopy- Compound microscope, Electron microscope (TEM,SEM); Dark field, Phase contrast Microscope; Comparison of microscopes; Cell Theory ,Cell doctrine, Exceptions to cell theory, Protoplasmic theory,</p>

	<p>Granular theory, colloidal Theory, Sol-Gel Theory. Properties, Cell size & shape; Prokaryotes-Mesokaryotes-Eukaryotes; Plant cell and Animal cell differences; Protoplasm- Cell Wall- Cell Membrane-E.R, Golgi Apparatus- Mitochondria- Plastids- Ribosomes- lysosomes -Peroxisomes-Glyoxysomes-Centrioles-Vacuole-Cell inclusions-endocytosis- Phago cytosis -pinocytosis-exocytosis, microbodies- xenobiotics; Flagella- Prokaryotes & Eukaryotes Mechanism of Flagellar Movement, ultra structure of flagellum; Nucleus, Chromosome- Structure and Types, Cytological techniques</p> <p>Cell Cycle - History of Cell division, scientist contribution; Cell cycle - stages, duration; Cell Division- Amitosis, Mitosis & Meiosis; Mitosis stages and significance; Meiosis stages and Significance; Difference between Mitosis and Meiosis; Mitogens, mitotic poisons, endomitosis- Anastral, Amphiastral Biomolecules - Primary metabolites; Water; Carbohydrates - Classification & Structure; Proteins & Amino Acids- Classification & Structure; Lipids - Classification & Structure; Nucleic Acids general Structure & composition - Forms Of DNA & Types Of RNA; Enzymes - Classification, Nomenclature, Structure and Concepts, Mechanism of Enzyme Action, Activation energy, factors affecting enzyme action; Secondary Metabolites</p>
<p>UNIT 4 : Plant Anatomy (Structural Organisation of Plants)</p>	<p>Tissues - Introduction to anatomy & milestones; Brief outline of theories of meristem - (Apical Cell theory, Tunica Corpus theory, Quiescent Centre concept); Tissues - introduction & types; Meristematic tissue characteristics & types; Permanent tissue-Simple (Parenchyma, Collenchyma & Sclerenchyma) Complex (Xylem & phloem); Types - special types - aerenchyma, chlorenchyma. Tissue System - Dermal tissue - root, stem and leaf; Ground tissue - cortex & pith; Vascular tissue-types of bundles (collateral, bi-collateral, conjoint, oncentric, radial, amphivasal, amphicribal)-comparison of primary structure - monocot and dicot root, stem and leaf</p> <p>Secondary Growth - Secondary growth in dicots; Cork cambium, vascular cambium; Wood anatomy, Sap wood and heart wood; Autumn wood and spring wood; Anomalous secondary growth in dicots and monocots</p>
<p>Unit 5 : Plant Physiology (Functional Organisation of Plants)</p>	<p>Transport in Plants - Movement of water, gases and nutrients; Cell to cell transport-diffusion, facilitated diffusion - active transport - uniport, antiport and symport , role of membrane permeability in transport, comparison of different transport processes - aquaporins; Plant water relations-Water potential, Osmosis, Osmotic pressure, Plasmolysis, Deplasmolysis, DPD, Imbibition, movement of substances; Absorption of water, -apoplast, symplast; Conduction of water - root pressure, Exudation, Guttation,</p>

	<p>Hydathodes; Transpiration, types of transpiration, factors affecting transpiration; Plant antitranspirants; Transpiration pull and guttation; Ascent of sap; Mechanism of stomatal movement – role of potassium, Calcium & ABA; Uptake and translocation of minerals; Transport of food-phloem transport-phloem loading and unloading; Mechanism of translocation</p> <p>Mineral Nutrition - Essential minerals, Criteria for essentiality; Classification on the basis of function; Mechanism of absorption of elements; Macro and micronutrients and their role; Deficiency symptoms & toxicity of mineral elements, Hydroponics, Aeroponics, Special modes of nutrition; Nitrogen metabolism- Nitrogen cycle, biological nitrogen fixation (Symbiotic and non symbiotic eg. Rhizobium, Frankia, Azospirillum)</p> <p>Photosynthesis in higher plants Introduction, Historical, Significance, site of photosynthesis; Pigments involved in photosynthesis; Chlorophyll structure; Photosynthetic units; Photochemical and biosynthetic phases; Photoluminescence; Cyclic and noncyclic photophosphorylation, Chemiosmotic hypothesis; C₃, C₄ and CAM cycle; Bacterial photosynthesis; Photorespiration, CO₂ compensation point; Respiration – Introduction; Mechanism of Respiration, anaerobic (fermentation); Factors affecting respiration; Aerobic, Glycolysis, Pyruvate oxidation, TCA cycle (amphibolic pathway); Electron transport chain, oxidative phosphorylation, energy relations – ATP molecules generated; Respiratory quotient (RQ); Growth and Development - Introduction-Characteristic- Phases of plant growth – growth types-kinetics of growth and growth rate- Growth curve types-Conditions of growth-measurement of growth; Conditions of growth, Sequence of developmental process in a plant cell; Differentiation, dedifferentiation, and redifferentiation; Plant growth regulators – classification; Auxin, Avena curvature test, Went's experiment. Types of auxins, Precursors, structure, Bioassay and physiological effects; Synergistic effects, antagonistic effects; Gibberellin discovery, chemical structure of GA₃, Precursors, Bioassay and Physiological effects; Cytokinin– discovery, Precursors, structure, Bioassay and physiological effects; Ethylene – discovery, Precursors, structure, Bioassay and physiological effects; ABA – discovery, Precursors, structure, Bioassay and physiological effects; Photoperiodism- Vernalization</p>
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TOPIC	CONTENT
UNIT – 1 : Animal Diversity	<p>LIVING WORLD - Diversity in the living world – Need for classification-Three domains of life; Taxonomy and Systematics- Concept of species and taxonomical hierarchy - Binomial and trinomial nomenclature – Tools for study of Taxonomy– Key, Museums, Zoo.</p> <p>KINGDOM ANIMALIA - Basis of classification - Levels of organisation, asymmetry - symmetry, Radial symmetry, and Bilateral symmetry - Diploblastic and triploblastic organisation (Brief account giving one example for each type from the representative phyla) - Acoelomates, Pseudocoelomates and Eucoelomates: Schizo and Entero coelomates - Segmentation and notochord - Salient features and classification of animals Non-Chordates (Invertebrates) up to phyla level and Chordates up to class level (five salient features and at least two examples of each category).</p>
UNIT – 2 : Structural Organisation in Animals	<p>ANIMAL TISSUES - Animal tissues - Epithelial tissues simple and compound epithelium - Connective tissue - Loose and dense connective tissue - Muscle tissues skeletal muscle, smooth muscle, cardiac muscle, Neural tissue</p> <p>ORGAN AND ORGAN SYSTEM IN ANIMALS - Morphology – Anatomy and functions of different systems (digestive, respiratory, circulatory, nervous and reproductive) of Earthworm, Cockroach and Frog.</p>
UNIT – 3 : Human Anatomy and Physiology (I)	<p>DIGESTION AND ABSORPTION - Digestive system: Alimentary canal –histology of human gut and digestive glands; salivary glands, gastric glands, liver and pancreas - Digestion of food - Role of digestive enzymes and gastrointestinal hormones - absorption and assimilation of proteins, carbohydrates and fats – Egestion - Caloric value of carbohydrates, proteins and fats- Nutritional and digestive disorders – Protein Energy Malnutrition, indigestion, constipation, vomiting, jaundice, diarrhoea, peptic ulcer, Appendicitis, Gallstone, Hiatus, Hernia</p> <p>RESPIRATION - Respiratory organs in animals- Human respiratory system - Mechanism of breathing – Respiratory volumes and capacities - Exchange of gases,- respiratory pigments- haemoglobin. methaemoglobin, transport of gases - O₂ and CO₂- Regulation of respiration - Disorders related to respiration-Asthma, Emphysema, TB, pneumonia, bronchitis; Occupational respiratory disorders - Problems with O₂ transport</p> <p>BODY FLUIDS AND CIRCULATION - Composition of blood, coagulation of blood - Composition of lymph and its function - Structure of human heart and blood vessels- arteries and veins; coronary blood vessels; Cardiac cycle, cardiac output, Double circulation - Regulation of cardiac activity - Disorders of circulatory system- Hypertension, Coronary artery disease,</p>

	<p>Angina pectoris, Heart failure, Rheumatoid heart disease - Diagnosis and treatment – Electrocardiograph (ECG), Angiogram, bypass surgery, heart transplantation, CPR</p> <p>EXCRETION - Modes of excretion- Ammonotelism, ureotelism, uricotelism - Human excretory system, structure and functions of Kidney; Urine formation - Osmoregulation : Regulation of kidney function-Reninangiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus- Urinary tract infection - causes - Role of other organs in excretion; Disorders related to excretory system; Uraemia, Renal failure, Renal calculi, Nephritis - Dialysis – types, Artificial kidney. Kidney transplantation.</p>
<p>UNIT – 4 : Human Anatomy and Physiology (II)</p>	<p>LOCOMOTION AND MOVEMENT - Types of movement amoeboid, ciliary, flagellar, muscular - Muscle – types, structure, distribution - Skeletal muscle- ultrastructure ; structure of contractile proteins and mechanism of muscle contraction; types of muscle contractions – isotonic , isometric - Skeletal system and its functions - Axial skeleton, appendicular skeleton - Joints- types - Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis – types , Osteoporosis, Gout, fatigue, pull, tetany, atrophy, rigor mortis - Bone fracture-mechanism and healing - dislocation of joints and treatment - Knee Replacement, physiotherapy</p> <p>NEURAL CONTROL AND COORDINATION – Neural System, Human neural system-Neuron as structural and functional unit of neural system - Generation and conduction of nerve impulse; synaptic transmission of impulse - Central neural system- human brain – Reflex action and reflex arc - Sensory reception and processing – Eye, Ear, Olfactory and gustatory receptors</p> <p>CHEMICAL COORDINATION AND INTEGRATION - Introduction – Endocrine glands and hormones - Human endocrine system- Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads - Hypo- and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison’s disease etc.,) - Mechanism of hormone action; Role of hormones as messengers and regulators - Hormones of heart, kidney and Gastro intestinal tract</p>
<p>UNIT – 5 : Animal Resources</p>	<p>TRENDS IN ECONOMIC ZOOLOGY - Scope of Zoology Vermiculture - Sericulture- apiculture – Lac culture – Aquaponics - Aquaculture - Fishes- Prawn- Pearl Culture- Animal Husbandry and management – Dairy farm - Poultry (chicken, duck) - Animal Breeding.</p>