

BIOLOGY

CLASS- 12



**BOARD OF SECONDARY EDUCATION, RAJASTHAN
AJMER**

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BIOLOGY

Class - XII

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PREFACE

The present book is the English translation of the Text Book of Biology prescribed by the Board of Secondary Education Rajasthan, Ajmer. An effort has been made to translate the subject matter in such a way that its original meaning does not vary from its Hindi version. It is hoped that the book shall be welcomed by the English medium students of class XII (Biology).

I express my sincere thanks to the team of the teachers to have carried out the translation work from Hindi to English. I appreciate the help rendered by the subject experts to scrutinize the translated manuscript in a very short period of time.

There might have been some mistakes in the book, the worthy teachers are requested to bring it to the notice of the authors so that they may be corrected in the next edition. Suggestions to improve the book are also welcome from the teachers and the students as well.

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SYLLABUS

BIOLOGY

Class-XII

S.No.	Name of Unit	Periods	Marks
I. Botany			
1.	Unit I Reproduction and Development in Angiosperms	15	4
2.	Unit II Plant physiology I	30	9
3.	Unit III Plant physiology II	15	5
4.	Unit IV Bio Technology	15	5
5.	Unit V Economic Botany and Human welfare	15	5
II. Zoology			
6.	Unit VI Human physiology I	25	7
7.	Unit VII Human physiology II	25	7
8.	Unit VIII Human Embryology	15	5
9.	Unit IX Genetics and Genomics	15	5
10.	Unit X Human Welfare and Health	10	4
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Details of the Syllabus

Botany

Unit I Reproduction and Development in Angiosperms

1. Reproduction in Angiosperm plants : Vegetative, Asexual, Sexual
2. Male and Female Gametophytes : Structure and Development
3. Incompatibility in Pollination, Fertilization, Embryo Development and Development of fruits and seeds.
4. Special Methods of Reproduction : Apomixis, Polyembryony and Micro propagation.

Unit II Plant Physiology-I

1. **Plant water relations** : Diffusion, Permeability, Osmosis, Plasmolysis and deplasmolysis, Imbibition, Diffusion pressure deficit, Osmotic pressure, Turgor and wall pressure, Hypothesis of water potential, water absorption and water pathways in plants, Ascent of sap, Transpiration, Types and affecting factors, Guttation.

2. **Mineral Nutrition** : Essential elements of minerals, Role of micro and macro elements Mechanism of Mineral Absorption. Mechanism of Active and Passive Absorption. Enzymes Meaning, Structure, Features, Functioning, Nomenclature and Classification.

Unit III Plant Physiology-II

1. **Photosynthesis** : History, Site, Pigments, Light Reaction, Dark Reaction C_3 and C_4 Pathway, Photo respiration, Crassulacean Acid Metabolism, Factors affecting Photosynthesis, Importance, Chemosynthesis (in brief).
2. **Respiration** : Definition, Types, Mechanism, Respiratory Quotient, Fermentation, Factors Affecting Respiration.
3. **Nitrogen Cycle** : Nitrogen Cycle and Nitrogen fixation.
4. **Plant Growth** : Meaning, Measuring phases, Affecting Factors, Growth regulators, Growth Inhibitors, Senescence, Abscission, Photoperiodism, Vernalization.

Unit IV Biotechnology

1. **General Introduction** : Definition and discovery, Scope of biotechnology in India and significance in different fields.
2. **Genetic Engineering**: Definition and Discover, General Procedure/Method and Apparatus tools, Enzyme and Cloning Vector, Plasmid, Bacteriophage, Cosmid, Gene Library, Gene Bank, Genetic Engineering.
3. **Plant Tissue Culture** : Definition, History Essential Apparatus, Types of Culture, Steps of Culture, Achievements of Plant Tissue Culture, Methods of Gene Transfer in plants, Transgenic Plant, Genetically Modified Crops, Genetically Modified Food.

Unit V Economic Botany and Human Welfare

1. Oil, Fibers, Spices and Medicinal Plants :- Oil (Mustard, Peanuts, coconut and castor), Fibres (Moonj, Cotton, Sunnhemp) spices (Clove, Fennel, Red Chilli, Black Pepper, Cumin, Lovage, Turmeric) Medicine (*Rauvolfia serpentina*, *Papaver somniferum*, *Cinchona officinalis*, *Ferula asfoetida* *Curcuma longa* and brief description of Important Medicinal Plants found in Rajasthan).
2. Sustainable Agriculture : Biofertilizer, Biopesticides.
3. Bio Energy : Its main Sources, Biomass, Wood, Biogas, Biodiesel.

Zoology

Unit VI Human Physiology-I

1. **Integumentary System of Human** : Structure of Skin, Derivatives and Functions.
2. **Digestive System of Human** : Structure and function of alimentary canal and its different parts and related glands (Salivary Glands, Liver, Pancreas), Mechanism of Digestive System of Human, Ingestion, Digestion, Absorption, Assimilation and Egestion, Malnutrition and its related diseases.
3. **Respiration in Human** : Definition and Types of Respiration, Respiratory Organs of Human and Respiratory system, Mechanism of Respiration, Respiratory Volume and Capacities, Artificial Respiration, Respiratory disorders.

4. **Blood Circulatory System of Human** : Definition, Blood Composition and Functions, Blood Groups, Rh Factor, Blood Clotting, Blood Vessels, External and Internal Structure and working of Heart, Diseases related to heart.
5. **Human Excretory System** : Definition, Excretion of Nitrogenous Waste Materials, (Ammonotelic, Ureotelic and Uricotelic), Structure of Human Excretory System and its mechanism, Other Excretory Organs of Human (Skin, Heart, Liver), Disorders related to excretion, Haemodialysis, Kidney Transplantation.

Unit VII Human Physiology- II

1. **Nervous System of Human** : Types of Human Nervous System : Central, Peripheral and Autonomous, Central Nervous system of Human : Brain and Spinal-cord, Peripheral Nervous System-Cranial Nerves and Spinal Nerves, Autonomous Nervous System: Sympathetic and Para Sympathetic Nervous System, Reflex Actions.
2. **Sense Organs of Human** : Definition and Types, Structure and functioning of Human Eye, Different Disease of Eyes, Structure and Functions of Ear.
3. **Reproductive System of Human** : Male and Female Reproductive System.
4. **Chemical Co-ordination of Human** :
 1. Exocrine and Endocrine Glands.
 2. Structure and functions of Endocrine Glands of Human beings and main diseases related to hormone imbalance.
5. **Movement and Locomotion in Human**
 1. Human Skeleton : Axial and Appendicular Bones, Cranium and Thoracic Bone, Joints and its Types.
 2. Muscles : Types, Mechanism of Muscular Contraction.
 3. Diseases of Bones : Arthritis, Osteoporosis (in brief).

Unit VIII Human Embryology

1. Gametogenesis : Spermatogenesis and Oogenesis, Structure of human sperm and ovum (egg).
2. Fertilization and its Mechanism.
3. Embryonic Development in Human : Cleavage, Morula, Blastula, Gastrulation.
4. Menstrual Cycle, Parturition and Lactation.

Unit IX Genetics and Genomics

1. Mendel's Hereditary Experiment and Laws of heredity : Incomplete Dominance, Co-Dominance, Multiple Allels, Pleiotropy, Sex Determination in Human.
2. Chromosomal aberrations in Human : Linkage, Crossing Over, Sex Linked Inheritance, Sex Linked Diseases, Haemophilia, colourblindness, Phenylketonuria, Sickle Cell Anaemia.
3. Mutation, Genetic Code, Human Genome Project, D.N.A. Finger Printing, Cloning.

Unit X Human Welfare and Health

1. Human Population : Birth Rate, Mortality Rate, Population Explosion, Methods of Birth Control.
2. Immune System : Innate or Natural Immunity, Aquired Immunity, Vaccination and Immunisation.
3. Main diseases of Human : Sexually Transmitted Diseases (S.T.Ds.), AIDS, Hepatitis, Cancer : Types, Causes, Symptoms and Diagnosis.
4. Bacterial Diseases : Viral Diseases, Fungal Diseases, Protozoan Diseases, Worms borne diseases.
5. Domestication, Culture and Economic Importance of animals : Paultry Farming, Fisheries, Apiculture, Silk Moth Rearing (Sericulture), Lac insect culture (in brief).
6. Main Bio Medical Techniques : Haematalogical Examinations, E.C.G., E.E.G., C.T. Scane, M.R.I., Ultrasound and R.I.A.

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