



**Maharashtra State Board of  
Secondary & Higher Secondary School, Pune**

*Department of Biology*

**Subject: Biology (25)**

**Std: Eleven**

**Faculty: Science**

**Syllabus**

**XI Biology (Theory & Practical)**

# XI Syllabus

## Theory Index

Sr. No.	Unit/Topic	Weightage	
		Compulsory	With option
1.	Living world	2	3
2.	Systematics of living organisms	3	4
3.	Kingdom Plantae	5	7
4.	Kingdom Animalia	4	5
5.	Cell structure and organization	4	5
6.	Biomolecules	4	5
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9.	Morphology of flowering plants	7	10
10.	Animal tissue	4	6
11.	Study of animal type : Cockroach	4	6
12.	Photosynthesis	5	7
13.	Respiration and energy transfer	5	7
14.	Human nutrition	5	7
15.	Excretion and Osmoregulation	5	7
16.	Skeleton and movement	5	7
	<b>Total</b>	<b>70</b>	<b>98</b>

## Syllabus

Sr. No.	Name of the Topic	Scope of Syllabus
1.	<b>Living world</b>	<ul style="list-style-type: none"><li>• Basic principles of life</li><li>• Herbarium</li><li>• Botanical Gardens</li><li>• Museum</li><li>• Zoological Parks</li><li>• Biodiversity Parks</li><li>Key</li></ul>
2.	<b>Systematics of living organisms</b>	<ul style="list-style-type: none"><li>• Systematics</li><li>• Taxonomy</li><li>• Three domains of life</li><li>• Chemotaxonomy</li><li>• Numerical Taxonomy</li><li>• Cladogram</li><li>• Phylogeny</li><li>• DNA barcoding</li><li>• Taxonomic Categories</li><li>• Taxonomic Hierarchy</li><li>• Units of Classification</li><li>• Nomenclature</li><li>• Salient features of Five Kingdoms</li><li>• Acellular Organisms</li></ul>
3.	<b>Kingdom Plantae</b>	<ul style="list-style-type: none"><li>• Kingdom plantae</li><li>• Salient features of major plant groups under Cryptogams</li><li>• Salient features of major plant groups under Phanerogams</li><li>Plant life cycle and alternation of generation</li></ul>

4.	<b>Kingdom Animalia</b>	<ul style="list-style-type: none"> <li>• Criteria used for animal classification</li> <li>• Animal Body plan</li> <li>• Animal Classification:             <ol style="list-style-type: none"> <li>1. Phylum: Porifera</li> <li>2. Phylum: Cnidaria</li> <li>3. Phylum: Ctenophora</li> <li>4. Phylum: Platyhelminthes</li> <li>5. Phylum: Aschelminthes</li> <li>6. Phylum: Annelida</li> <li>7. Phylum: Arthropoda</li> <li>8. Phylum: Mollusca</li> <li>9. Phylum: Echinodermata</li> <li>10. Phylum: Hemichordata</li> </ol> </li> </ul>
5.	<b>Cell structure and organization</b>	<ul style="list-style-type: none"> <li>• Cell</li> <li>• Kinds of cells             <ol style="list-style-type: none"> <li>A. Prokaryotic cells</li> <li>B. Eukaryotic cells</li> </ol> </li> <li>• Components of Eukaryotic cell             <ol style="list-style-type: none"> <li>1. Cell wall</li> <li>2. Cell membrane'</li> <li>3. Cytoplasm</li> <li>4. Endoplasmic Reticulum(ER)</li> <li>5. Golgi complex</li> <li>6. Lysosomes</li> <li>7. Vacuoles</li> <li>8. Glyoxysomes</li> <li>9. Mitochondria</li> <li>10. Plastids</li> <li>11. Ribosomes</li> <li>12. Nucleus</li> </ol> </li> <li>• Cytoskeleton</li> </ul>
6	<b>Biomolecules</b>	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Biomolecules in the cell             <ol style="list-style-type: none"> <li>A. Carbohydrates</li> <li>B. Lipids</li> <li>C. Proteins</li> <li>D. Nucleic Acids</li> </ol> </li> <li>• Enzymes</li> </ul>

7.	<b>Cell division</b>	<b>Cell division</b> <ul style="list-style-type: none"> <li>• Cell cycle</li> <li>• Types of cell division <ul style="list-style-type: none"> <li>A. Amitosis</li> <li>B. Mitosis</li> </ul> </li> <li>• Meiosis</li> </ul>
8.	<b>Plant tissue and Anatomy</b>	<ul style="list-style-type: none"> <li>• Tissue</li> <li>• Meristematic tissue</li> <li>• Permanent tissue <ul style="list-style-type: none"> <li>A. Simple permanent tissues</li> <li>B. Complex permanent tissue</li> </ul> </li> <li>• Tissue systems</li> <li>• Secondary growth in plants</li> <li>• Wood</li> <li>• Cork cambium and secondary growth</li> <li>• Anatomy of root, Stem and leaf <ul style="list-style-type: none"> <li>A. Anatomy of Dicot root</li> <li>B. Anatomy of Monocot root</li> <li>C. Anatomy of Dicot stem</li> <li>D. Anatomy of Monocot stem</li> <li>E. Anatomy of leaf (V.S of Typical dicot leaf)</li> <li>F. Isobilateral leaf</li> </ul> </li> </ul>
9.	<b>Morphology of flowering plants</b>	<ul style="list-style-type: none"> <li>• Angiosperms</li> <li>• Morphology</li> <li>• Root <ul style="list-style-type: none"> <li>a. Types of Root</li> <li>b. Modifications of tap root <ul style="list-style-type: none"> <li>1. Food storage</li> <li>2. For respiration</li> </ul> </li> <li>c. Modifications of adventitious roots <ul style="list-style-type: none"> <li>1. Food storage</li> <li>2. For mechanical support</li> <li>3. For special function</li> </ul> </li> </ul> </li> <li>• Stem</li> </ul>

		<p>a. Modifications of stem</p> <ol style="list-style-type: none"> <li>1. Underground stem</li> <li>2. Sub aerial stem</li> <li>3. Aerial modification</li> </ol> <ul style="list-style-type: none"> <li>• Leaf <ol style="list-style-type: none"> <li>1. Typical leaf structure</li> <li>2. Leaf venation</li> <li>3. Types of leaf</li> <li>4. Modification of leaves</li> <li>5. Inflorescence</li> <li>6. Flower</li> <li>7. Fruit</li> </ol> </li> </ul>
10.	<b>Animal tissue</b>	<ul style="list-style-type: none"> <li>• Histology</li> <li>• Epithelial tissue <ol style="list-style-type: none"> <li>A. Simple epithelial tissue</li> <li>B. Compound epithelial tissue</li> </ol> </li> <li>• Cell Junction</li> <li>• Connective tissue <ol style="list-style-type: none"> <li>A. Connective Tissue Proper</li> <li>B. Supporting Connective tissue</li> <li>C. Fluid Connective tissue</li> </ol> </li> <li>• Muscular tissue</li> <li>• Nervous tissue</li> </ul>
11.	<b>Study of animal type : Cockroach</b>	<ul style="list-style-type: none"> <li>• Habit and habitat</li> <li>• Systematic Position</li> <li>• External morphology</li> <li>• Body cavity</li> <li>• Digestive system of cockroach</li> <li>• Circulatory system or blood vascular system</li> <li>• Respiratory system or tracheal system</li> <li>• Excretory system</li> <li>• Nervous system</li> <li>• Reproductive system</li> <li>• Interactions with mankind</li> </ul>

12.	<b>Photosynthesis</b>	<ul style="list-style-type: none"> <li>• Chloroplasts</li> <li>• Nature of Light</li> <li>• Mechanism of Photosynthesis</li> <li>• Light reaction</li> <li>• Photophosphorylation</li> <li>• Dark reaction</li> <li>• Photorespiration</li> <li>• C<sub>4</sub> pathway or Hatch-Slack pathway</li> <li>• CAM-Crassulacean Acid Metabolism</li> <li>• Factors affecting Photosynthesis</li> </ul>
13.	<b>Respiration and energy transfer</b>	<ul style="list-style-type: none"> <li>• Formation of ATP</li> <li>• Anaerobic respiration</li> <li>• Aerobic respiration (Krebs Cycle/TCA cycle/Citric Acid Cycle, Electron Transport Chain )</li> <li>• Utility of stepwise oxidation</li> <li>• Respiratory Quotient</li> </ul>
14.	<b>Human nutrition</b>	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Human Digestive System</li> <li>• Histological structure of alimentary canal</li> <li>• Digestive glands (Salivary gland, Liver, Pancreas)</li> <li>• Physiology of digestion (Digestion in buccal cavity, stomach, small intestine)</li> <li>• Absorption, assimilation and egestion</li> <li>• Nutritional disorders and disorders of digestive system</li> </ul>

<p><b>15.</b></p>	<p><b>Excretion and Osmoregulation</b></p>	<ul style="list-style-type: none"> <li>• Excretion and excretory products</li> <li>• Mode of excretion <ul style="list-style-type: none"> <li>A. Ammonotelism</li> <li>B. Ureotelism</li> <li>C. Uricotelism</li> </ul> </li> <li>• Excretory system in human being</li> <li>• Nephron</li> <li>• Urine formation</li> <li>• Concentration of urine</li> <li>• Composition of Urine</li> <li>• Role of other organs in excretion</li> <li>• Disorders and diseases</li> </ul>
<p><b>16.</b></p>	<p><b>Skeleton and movement</b></p>	<ul style="list-style-type: none"> <li>• Movements and locomotion</li> <li>• Location and structure of skeletal muscles</li> <li>• Working of Skeletal Muscles</li> <li>• Mechanism of muscle contraction</li> <li>• Physiology of muscle relaxation</li> <li>• Relaxation of muscle fibres</li> <li>• Properties of Muscles on Electrical Stimulation</li> <li>• Skeletal system</li> <li>• Groups of skeleton (Axial &amp; Appendicular skeleton)</li> <li>• Disorders related to muscles</li> <li>• Disorders related to bones</li> </ul>



## Practical Index

Sr. No.	Practical's Name
<b>A. List of experiments to be performed</b>	
1.	Study of parts of compound microscope
2.	To observe mitochondria in onion peel cells
3.	Biochemical tests
4.	Preparation of stained slides of Dicot and Monocot specimens
5.	To prepare temporary stained slides of Dicot and Monocot specimens
6.	Study of plant Families (Vegetative and Floral characteristics)
7.	To Prepare temporary stained slide of squamous epithelium
8.	To study the effect of enzymes on starch, egg albumin and fats
9.	To test urine sample for normal and abnormal constituents
<b>B. Demonstrative experiments (Spotting)</b>	
1.	Study of specimens and identification with reasons
2.	Study of specimens and their identification
3.	Study of permanent slides of T.S of sunflower and maize roots
4.	Study of modifications of root, stem and leaf
5.	Study and identification of inflorescence
6.	Study of animal tissues like blood smear, cartilage, mammalian bone and muscles (straited, non-straited and cardiac)
7.	Demonstration of Aerobic respiration using Ganong's respirometer
8.	Demonstration of the Anaerobic respiration
9.	Study of the External features and Digestive system of Cockroach with the help of ICT/Charts/Model/Photographs
10.	Study of the Mouth parts, Gizzard and Trachea of Cockroach with the help of ICT/Charts/Model/Photographs
11.	Study of histology of digestive organs of mammals viz, T.S of Pancreas, small intestine and Liver
12.	Study of Human skeleton (Axial and Appendicular skeleton)
<b>C. List of Projects</b>	

